FINAL

Environmental Impact Statement

for the Basing of MV-22 and H-1 Aircraft in Support of III MEF Elements in Hawaii

Volume 2 of 2—Appendices

Prepared by:
Department of the Navy

June 2012

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Appendices

APPENDIX A

Public Disclosure/ Outreach Documents

information is necessary for the proper performance of the functions of DoD, including whether the information will have practical utility; (b) the accuracy of the estimate of the burden of the proposed information collection; (c) ways to enhance the quality, utility, and clarity of the information to be collected; and (d) ways to minimize the burden of the information collection on respondents, including the use of automated collection techniques or other forms of information technology. The Office of Management and Budget (OMB) has approved this information collection requirement for use through December 31, 2010. DoD proposes that OMB extend its approval for use for three additional years.

DATES: DoD will consider all comments received by October 5, 2010

ADDRESSES: You may submit comments, identified by OMB Control Number 0704–0359, using any of the following methods:

- *Federal eRulemaking Portal: http://www.regulations.gov.* Follow the instructions for submitting comments.
- *E-mail: dfars@osd.mil.* Include OMB Control Number 0704–0359 in the subject line of the message.
- *Fax:* (703) 602–0350.
- *Mail:* Defense Acquisition Regulations System, Attn.: Mr. Mark Gomersall, OUSD (AT&L) DPAP (DARS), Room 3B855, 3060 Defense Pentagon, Washington, DC 20301–3060.
- Comments received generally will be posted without change to *http://www.regulations.gov,* including any personal information provided.

FOR FURTHER INFORMATION CONTACT: Mr. Mark Gomersall, 703–602–0302. The information collection requirements addressed in this notice are available on the World Wide Web at: *http://www.acq.osd.mil/dpap/dars/dfars/index.htm.* Paper copies are available from Mr. Mark Gomersall, OUSD (AT&L) DPAP (DARS), Room 3B855, 3060 Defense Pentagon, Washington, DC 20301–3060.

SUPPLEMENTARY INFORMATION: *Title and OMB Number:* Defense Federal Acquisition Regulation Supplement (DFARS) part 232, Contract Financing, and related clause at DFARS 252.232–7007, Limitation of Government's Obligation; OMB Control Number 0704–0359.

Needs and Uses: This information collection requires contractors that are awarded incrementally funded, fixed-price DoD contracts to notify the Government when the work under the contract will, within 90 days, reach the point at which the amount payable by the Government (including any termination costs) approximates 85 percent of the funds currently allotted to the contract. This information will be used to determine what course of action the Government will take (*e.g.,* allot additional funds for continued performance, terminate the contract, or terminate certain contract line items).

Affected Public: Businesses or other for-profit and non-profit institutions.

Annual Burden Hours: 800.

Number of Respondents: 800.

Responses per Respondent: 1.

Annual Responses: 800.

Average Burden per Response: 1 hour.

Frequency: On occasion.

Summary of Information Collection

This information collection includes requirements related to contract financing and payment in DFARS part 232, Contract Financing, and the related clause at DFARS 252.232–7007, Limitation of Government's Obligation. DFARS subpart 232.7, Contract Funding, limits the use of incrementally funded fixed-price contracts to situations where (1) the contract is for severable services, does not exceed one year in length, and is incrementally funded using funds available as of the date the funds are obligated; or (2) the contract uses funds available from two or more fiscal years and is funded with research and development appropriations, or Congress has otherwise authorized incremental funding. The clause at DFARS 252.232–7007 identifies procedures for incrementally funding the contract and requires the contractor to provide the Government with written notice when the work will reach the point at which the amount payable by the Government, including any termination costs, approximates 85 percent of the funds currently allotted to the contract.

Ynette R. Shelkin,

Editor, Defense Acquisition Regulations System.

[FR Doc. 2010–19411 Filed 8–5–10; 8:45 am]

BILLING CODE 5001–08–P

DEPARTMENT OF DEFENSE

Department of the Navy

Notice of Intent To Prepare an Environmental Impact Statement for the Basing of MV–22 and H–1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

AGENCY: Department of the Navy, DoD.

ACTION: Notice.

SUMMARY: Pursuant to Section 102(2)(C) of the National Environmental Policy Act, (NEPA), of 1969 (42 United States Code 4332(2)(C)), as implemented by the Council on Environmental Quality Regulations (40 Code of Federal Regulations [CFR] Parts 1500–1508), Department of the Navy (DoN) NEPA regulations (32 CFR Part 775), and United States Marine Corps (USMC) NEPA directives (Marine Corps Order P5090.2A, changes 1 and 2), the DoN intends to prepare an Environmental Impact Statement (EIS) and conduct public scoping meetings for the proposed basing and operation of MV–22 tiltrotor (MV–22) Osprey aircraft and H–1 Cobra and Huey attack helicopters in support of III Marine Expeditionary Force (MEF) training and readiness operations in Hawaii. The EIS will evaluate a proposal to introduce up to two Marine Medium Tiltrotor (VMM) squadrons with a total of 24 MV–22 aircraft and one Marine Light Attack Helicopter (HMLA) squadron composed of 18 AH–1Z and 9 UH–1Y helicopters. Because the proposed squadrons will train on land currently owned or controlled by the Department of the Army (Army), the DoN has requested that the Army be a cooperating agency for the preparation of this EIS.

DATES: See **SUPPLEMENTARY INFORMATION** section for public scoping meeting dates.

ADDRESSES: Written comments on the proposed action and alternatives may be submitted during the 30-day public scoping comment period and should be submitted and postmarked no later than September 7, 2010. There are three ways to submit written comments: (1) Attending one of the public scoping open-houses, (2) Submitting through the project Web site at *http://www.mcbh.usmc.mil/mv22h1eis,* or (3) Via mail. Comments submitted by mail should be sent to Department of the Navy, Naval Facilities Engineering Command, Pacific Division, *Attn:* EV21, MV–22/H–1 EIS Project Manager, 258 Makalapa Drive, Suite 100, Pearl Harbor, HI 96860–3134.

FOR FURTHER INFORMATION CONTACT: Please visit the project Web site or contact the MV–22/H–1 EIS Project Manager by telephone at 808–472–1196 or by e-mail via the project Web site. Please submit requests for special assistance, sign language interpretation for the hearing impaired, or other auxiliary aids needed at the public scoping open house to the Project Manager by August 13, 2010.

SUPPLEMENTARY INFORMATION: The DoN is initiating a public scoping process to identify community concerns and specific issues to be addressed in the EIS. Federal, state, county agencies and

interested parties are invited to attend any of these meetings and are encouraged to provide comments. The DoN will consider these comments in determining the scope of the EIS. Five public scoping meetings, using an informal open-house format, will be held on the following dates and locations in Hawaii:

1. Tuesday, August 24, 2010, 5 p.m. to 8 p.m., Hilo High School Cafeteria, 556 Waianuenue Avenue, Hilo, HI 96720.
2. Wednesday, August 25, 2010, 4 p.m. to 7 p.m., Waikoloa Elementary & Middle School Cafeteria, 68–1730 Hooko Street, Waikoloa, HI 96738.
3. Thursday, August 26, 2010, 5 p.m. to 8 p.m., King Intermediate School Cafeteria, 46–155 Kamehameha Highway, Kaneohe, HI 96744.
4. Saturday, August 28, 2010, 1 p.m. to 4 p.m., Kaunakakai Elementary School Library, Ailoa Street, Kaunakakai, HI 96748.
5. Monday, August 30, 2010, 5 p.m. to 8 p.m., Waimanalo Elementary & Intermediate School Cafeteria, 41–1330 Kalanianaole Highway, Waimanalo, HI 96795.

The scoping sessions will have informational displays available for review. Representatives from the DoN and Army will be present to answer questions, and the public will have an opportunity to submit written comments.

Over the next decade, the Marine Corps plans to restructure and rebase its forces in the Pacific. These initiatives will shape the future of Marine Corps aviation as adjustments are made to meet the diverse missions of today's and tomorrow's battlefields.

The Marine Corps organizes for operations by forming Marine Air-Ground Task Forces (MAGTFs). A MAGTF is a balanced, air-ground combined organization of Marine Corps forces under a single commander and is the Marine Corps' principal organization for all missions across the range of military operations. All MAGTFs are expeditionary, comprising four core elements: A command element (CE), a ground combat element (GCE), an aviation combat element (ACE), and a logistics combat element (LCE).

Marine Expeditionary Forces (MEFs) are the Marine Corps' largest MAGTFs, task-organized around permanent command elements and normally containing one or more Marine divisions, Marine aircraft wings, and Marine logistics groups. There are three standing MEFs across the Marine Corps. I MEF (Camp Pendleton, California) and III MEF (Okinawa, Japan) are assigned under Marine Forces Pacific. II MEF (Camp Lejeune, North Carolina) is assigned under Marine Forces Command.

Although III MEF is headquartered in Okinawa, Japan, a smaller MAGTF that is part of the larger MEF is based at Marine Corps Base (MCB) Hawaii Kaneohe Bay. The Kaneohe Bay elements include a command element (CE), the 3d Regiment (a GCE), Marine Air Group (MAG) 24 (a partial ACE), 1/12 Artillery Battalion, 3rd Radio Battalion, Combat Logistics Battalion 3 (LCE), and 21st Dental Company, among others. The VMM and HMLA squadrons would complete the MAG 24 ACE by providing missing attack and medium lift capability that are currently supplied from other commands, hence the need to base these squadrons in Hawaii.

Proposed Action

The proposed action would include the following:

- Basing and operation of up to two VMM squadrons and one HMLA squadron to service Marine Corps operations in Hawaii.
- Construction of facilities necessary to accommodate and maintain the VMM and HMLA squadrons, including new construction and replacement and/or renovation of taxiways, aprons, hangars, support facilities, and infrastructure such as roadways and utilities.
- Conducting VMM and HMLA training and readiness operations and special exercise operations to attain and maintain proficiency in the employment of the aircraft. These operations may occur at training facilities statewide and may include construction of new landing zones and improvements to existing landing zones at selected training facilities.

Purpose and Need

The purpose of the proposed action is to ensure that the Hawaii MAGTF is capable of supporting the needs of the III MEF operational commander to carry out his Title X responsibilities. To accomplish this, a MAGTF must train as it fights, that is as a single unit combining all of the four elements of a MAGTF. Readiness can only be assured through frequent, integrated training between the command, logistics, ground, and air elements of the MAGTF. Of particular importance is the ability to coordinate air and ground elements. This training, is required to maximize operational effectiveness and teaches aircrews how to combine operations with other Marine or joint air and ground assets. The need for the proposed action is to eliminate the existing disaggregation of the Hawaii MAGTF—and the work-around through gap deployments—to ensure a single deployable fighting unit to support III MEF operations in the western Pacific by correcting the currently incomplete ACE capability within the Hawaii MAGTF.

The purpose and need for the proposed action is to correct existing deficiencies in the Hawaii MAGTF force posture, which by necessity results in only three possibilities: Locate the needed assets in Hawaii (proposed action), move the entire MAGTF to another location, or the no action alternative of continuing to fill the missing capabilities from other sources. As explained above, the MAGTF is comprised of four elements. Three of these four elements are already located in Hawaii with all their attendant personnel and infrastructure. The fourth, the ACE, is partially located in Hawaii. Thus, fully 80% of the MAGTF's capacity is already located in Hawaii. Consequently, due to cost, timing and environmental and socioeconomic impacts, the option of relocating the entire MAGTF out of Hawaii was not considered a reasonable alternative.

A screening process using operational requirements was applied to narrow various Hawaii basing alternatives for the VMM and HMLA squadrons to a range of reasonable, feasible alternatives to be evaluated in the EIS. After applying the selection criteria, it was determined that Marine Corps Base (MCB) Hawaii Kaneohe Bay is the only reasonable site to be brought forward for further study.

Full implementation of the proposed action is planned for the year 2018. Approximately 1,000 active duty personnel, 22 civilian personnel (contractors and government employees), and 1,106 dependents would be associated with the new squadrons. Personnel increases would occur from 2012 through 2018, in phase with delivery of the aircraft.

Preliminary Alternatives

A range of reasonable aviation facility alternatives was developed to meet specific requirements. They vary by development footprints, layouts, and locations for aviation facilities at MCB Hawaii Kaneohe Bay. Under the No Action Alternative, current/baseline operations and support of existing capabilities would continue and new aircraft would not be introduced in order to support mission readiness. All of the alternatives except No Action involve construction of aviation facilities at MCB Hawaii Kaneohe Bay, landing zone improvements at selected sites such as Marine Corps Training Area Bellows (Bellows) in Waimanalo, and training and readiness operations by the VMM and HMLA squadrons at various training facilities statewide currently used by the Marine Corps. In addition to MCB Hawaii Kaneohe Bay and Bellows, VMM and HMLA squadrons may train at Wheeler Army Airfield, Dillingham Airfield, and various U.S. Army training areas on Oahu; Pohakuloa Training Area on the island of Hawaii; Molokai Training Support Facility and Kalaupapa Airfield on Molokai; and the Pacific Missile Range Facility on Kauai.

Environmental Issues and Resources To Be Examined

After scoping is completed, the EIS analysis will evaluate potential environmental effects associated with each alternative selected for full analysis. Issues to be addressed include, but are not limited to, aircraft noise, cultural resources, traffic, socioeconomics, biological resources, geology and soils, water quality, air quality, safety, hazardous materials and waste, visual resources, and environmental justice.

Agency Consultations

The DoN will undertake appropriate consultations with regulatory entities pursuant to the Endangered Species Act, National Historic Preservation Act, Coastal Zone Management Act, and other applicable laws or regulations. Consultation will include but is not limited to the following federal, state, and local agencies: U.S. Fish and Wildlife Service, National Marine Fisheries Service, State Historic Preservation Office, Advisory Council on Historic Preservation, National Park Service, Native Hawaiian Organizations, Historic Hawaii Foundation, and State of Hawaii Office of Planning.

Schedule

This Notice of Intent initiates a 30-day scoping comment period to identify issues to be addressed in the EIS and reasonable and feasible alternatives to implement the proposed action. The next opportunity for public input to the EIS process occurs with publication of a Notice of Availability (NOA) in the **Federal Register** and local media, announcing release of the Draft EIS and commencement of a 45-day public comment period. A notice will be published in local papers to advertise public meetings for the project during the 45-day comment period. The DoN will consider and respond to all comments received on the Draft EIS when preparing the Final EIS. The DoN intends to issue the Final EIS in late 2011, at which time an NOA will be published in the **Federal Register** and local media. The NOA will initiate a 30-day waiting period, after which the Assistant Secretary of the Navy or Principal Deputy Assistant Secretary of the Navy will issue a Record of Decision.

Dated: July 29, 2010.

D.J. Werner,

Lieutenant Commander, Judge Advocate Generals Corps, U.S. Navy, Federal Register Liaison Officer.

[FR Doc. 2010–19422 Filed 8–5–10; 8:45 am]

BILLING CODE 3810–FF–P

DEPARTMENT OF DEFENSE

Department of the Navy

Notice of Intent To Prepare an Environmental Impact Statement for the Proposed Modernization and Expansion of Townsend Bombing Range in McIntosh County, GA

AGENCY: Department of the Navy, DoD.

ACTION: Notice.

SUMMARY: Pursuant to Section (102)(2)(c) of the National Environmental Policy Act (NEPA) of 1969, and regulations implemented by the Council on Environmental Quality (40 Code of Federal Regulations [CFR] Parts 1500–1508), Department of the Navy (DoN) NEPA regulations (32 CFR Part 775), and United States Marine Corps (USMC) NEPA directives (Marine Corps Order P5090.2A, changes 1 and 2), the DoN intends to prepare an Environmental Impact Statement (EIS) and conduct public scoping meetings for the modernization and expansion of the Townsend Bombing Range (TBR) located in McIntosh County, Georgia to accommodate the use of inert (with spotting charges) Precision Guided Munitions (PGMs) with their associated larger land requirements. To accomplish this, the USMC proposes to acquire lands in the vicinity of TBR on which to create new target areas to allow for a greater variety of training activities. The TBR is owned by the DoN, and is operated by the Georgia Air National Guard (GA ANG). The DoN will prepare the EIS.

DATES AND ADDRESSES: The DoN is initiating a 30-day public scoping process to identify community interests and local issues to be addressed in the EIS, which starts with the publication of this Notice of Intent. Two public scoping meetings, using an informal open house format, will be held from 4 p.m. to 7 p.m. on the following dates and at the following locations in Georgia:

(1) Tuesday, August 24, 2010, City of Ludowici Meeting Room, City Hall, 469 North Macon Street, Ludowici, GA 31316.

(2) Thursday, August 26, 2010, Haynes Auditorium—Ida Hilton Public Library, 1105 Northway, Darien, GA 31305.

The public is invited to attend these meetings to view project-related displays, speak with USMC representatives, and submit public comment forms. All comments regarding the scope of issues that the USMC should consider during EIS preparation must be received prior to September 7, 2010. Additional information concerning the meetings and the proposed alternatives are available on the EIS website at *http://www.townsendbombingrangeeis.com* and will be announced in local and regional newspapers. Please submit requests for special assistance, sign language interpretation for the hearing impaired, oral comments, or other auxiliary aids needed at the scoping meeting to the EIS Project Manager by August 16, 2010.

Submitting Comments: Federal, state, local agencies and interested parties are encouraged to provide oral and/or written comments regarding the scope of the EIS, reasonable alternatives and/or specific issues or topics of interest to the public. There are four ways by which comments can be submitted: (1) Attending one of the public scoping open-houses; (2) submitting through the project's public website at *http://www.townsendbombingrangeeis.com;* (3) E-mail to *townsendbombingrangeeis@ene.com;* (4) submitting written mailed comments on the scope of the EIS. All written comments should be submitted and/or postmarked no later than September 7, 2010. Comments submitted by mail should be sent to: Townsend EIS, Project Manager, Post Office Box 180458, Tallahassee, FL 32318.

The USMC will consider all comments received during the scoping period. A mailing list has been assembled to facilitate preparation of the EIS. Those on this list will receive notices and documents related to EIS preparation. This list includes local, state, and federal agencies with jurisdiction or other interests in the alternatives. In addition, the mailing list includes adjacent property owners, affected municipalities, and other interested parties such as conservation organizations. Anyone wishing to be added to the mailing list may request to

Notice of Intent Distribution List

Salutation	First	Middle	Last Title	Company1	Company2
				FEDERAL AGENCIES	
Brig. Gen.	Mark	W.	Yenter, P.E., Commander and Division Engineer	U.S. Army Corps of Engineers, Pacific Ocean Division	
Ms.	Loyal		Mehrhoff, Field Supervisor	US Fish and Wildlife Service, Pacific Islands Ecological Field Service Office	
Dr.	Samuel		Pooley, Ph. D., Director	US National Marine Fisheries Service	
Mr.	Frank		Hays, Pacific Area Director	US National Park Service, Pacific West Region - Honolulu	
Mr.	Ronnie		Simpson, Manager, Airports District Office/ FAA Local Coordinator for the Pacific	US Federal Aviation Administration	
Ms.	Wendy		Wiltse	US Environmental Protection Agency - Pacific Islands Office	
Ms.	Paula		Bisson, Manager	US Environmental Protection Agency - Region IX	
				US Environmental Protection Agency - Washington DC	
				STATE AGENCIES	
Mr.	Kelvin		Sunada, Head	Dept. of Health, Environmental Planning Office	State of Hawaii
Dr.	Pua		Aiu, Administrator	Dept. of Land and Natural Resources, State Historic Preservation Div.	State of Hawaii
Ms.	Laura	H.	Thielen, Director	Dept. of Land and Natural Resources	State of Hawaii
Mr.	Brennon		Morioka, Director	Dept. of Transportation	State of Hawaii
Mr.	Clyde	W.	Namu'o, Administrator	Office of Hawaiian Affairs	State of Hawaii
Ms.	Katherine		Kealoha, Director	Department of Health, Office of Environmental Quality Control	State of Hawaii
Mr.	Ted	E.	Liu, Director	Dept of Business, Economic Development & Tourism	State of Hawaii
Ms.	Abbey	S.	Meyer, Director	DBEDT Office of Planning, Coastal Zone Management Branch	State of Hawaii
Mr.	Kaulana	H.R.	Park, Chairman	Dept of Hawaiian Home Lands	State of Hawaii
Ms.	Kathryn		Matayoshi, Interim Superintendent of Education	Dept of Education	State of Hawaii
				CITY & COUNTY OF HONOLULU *	
Mr.	Wayne	M.	Hashiro, Manager & Chief Engineer	Board of Water Supply	City & County of Honolulu
Mr.	Tim		Steinberger, Director	Department of Environmental Services	City & County of Honolulu
Mr.	Jeoffrey		Cudiamat, P.E., Director & Chief Engineer	Department of Facility Maintenance	City & County of Honolulu
Mr.	David		Tanoue, Director	Dept of Planning & Permitting	City & County of Honolulu
Mr.	Lester	K.C.	Chang, Director	Department of Parks & Recreation	City & County of Honolulu
Mr.	Wayne		Yoshioka, Director	Department of Transportation Services	City & County of Honolulu
				COUNTY OF HAWAII *	
Mr.	Lono		Tyson, Director	Dept of Environmental Management	County of Hawaii

Notice of Intent Distribution List

Salutation	First	Middle	Last Title	Company1	Company2
Mr.	Warren		Lee, Director	Dept of Public Works	County of Hawaii
Mr.	Milton		Pavao, Manager	Dept of Water Supply	County of Hawaii
Ms.	Bobby Jean		Leithead-Todd, Director	Planning Dept	County of Hawaii
Mr.	Bob		Fitzgerald, Director	Dept of Parks and Recreation	County of Hawaii
				COUNTY OF KAUAI *	
Mr.	Ian		Costa, Director	Dept of Planning	County of Kauai
Mr.	Donald		Fujimoto, County Engineer	Dept of Public Works	County of Kauai
Mr.	Wynne		Ushigome	Dept of Water Supply	County of Kauai
Mr.	Leonard		Rapozo, Jr., Director	Dept of Parks and Recreation	County of Kauai
				COUNTY OF MAUI *	
Ms.	Tamara		Horcajo, Director	Dept. of Parks and Recreation	County of Maui
Mr.	Jeff		Hunt, Director	Dept. of Planning	County of Maui
Mr.	Tracy		Takamine	Dept. of Environmental Mgmt., Solid Waste Management	County of Maui
Mr.	Don		Medeiros, Director	Dept. of Transportation	County of Maui
Mr.	Jeffrey		Eng, Director	Dept. of Water Supply	County of Maui
				CITIZEN GROUPS, INDIVIDUALS AND CONSULTED PARTIES	
Ms.	Beatson		Bonnie, President	Kaneohe Business Group	Windward Community College (WCC)
Mr.	Larry	E.	Smith, President	Kaneohe Rotary Club	
Mr.	Tom		van der Hout, President	Windward Rotary Club	
Ms.	Lea	E.	Albert, Superintendant	DOE - Castle/Kahuku Complex	
Ms.	Joyce		Bellino, Superintendant	DOE - Kailua/Kalaheo Complex	
Mr.	Dave	A.	Krupp, Ph.D., Professor, Marine + Biological Services	Kaneohe Bay Regional Council / Division of Aquatic Resources	Dept. of Natural Sciences at WCC
Mr.	Doug		Dykstra, Chancellor	Windward Community College	
Ms.	Cynthia		Okazaki, Site Coordinator	Kaneohe Community Family Center	
Mr.	John	L.	Reppun, Executive Director	Key Project (Kahaluu)	
Ms.	Mahealani		Cypher, President	Koolaupoko Hawaiian Civic Club / Mahuahua Ai o Hoi	
				Kaneohe District Park	
Mr.	Chuck		Eakes, President	Waikalua Loko Fishpond Preservation Society	
Ms.	Cheryl		Ka'uhane Lupenui, President & CEO	YWCA of Oahu	
Dr.	Matthew		Claybaugh, CEO President	Marimed Foundation	
Ms.	Jo-Ann		Leong, Director	Hawaii Institute of Marine Biology at Coconut Island	
Mr.	Ray		Sanborn	He'eia State Park / Kama'aina Kids / Kaneohe Yacht Club	
Ms.	Donna		Wong, Executive Director	Hawaii's Thousand Friends	
Ms.	Kimberly		Kalama	T.S. Dye + Colleagues, Archaeologists, Inc.	
Ms.	May		Akamine, Director	Waimanalo Health Center	

Notice of Intent Distribution List

Salutation	First	Middle	Last Title	Company1	Company2
Ms. & Mr.	Donnie & Wally		Camvel	21 lineal descendants to iwi on MCBH	
Ms.	Marilyn		Leimomi Khan, President	Association of Hawaiian Civic Clubs	
Mr.	Puna		Nam, President	Kailua Chamber of Commerce	
Mr.	Ned		Bush, Director	Kailua Chamber of Commerce / Kahaluʻu Neighborhood Board Member, no. 29	
Mr.	Dennis		Taniguchi, Executive Officer	Hawaii Island Chamber of Commerce	
Mr.	Randall		Francisco, President	Kauai Chamber of Commerce	
Mr.	Henry		Curtis, Executive Director	Life of the Land Hawaii	
Mr.	Ed		Misaki, Chair	Molokai Invasive Species Committee	
Mr.	Robert	D.	Harris, Director	Sierra Club	
				Waikii Ranch Homeowners Association	
	Nahua		Guilloz, Corp. Secretary/Administrative Executive	Parker Ranch	
Ms.	Roberta		Chu, Chair	Hawaii Island Economic Development Board	
	Ruby		McDonald, President	Hawaii Island Hawaiian Civic Club	
Ms.	Vivian		Landrum, Predisent/CEO	Kona-Kohala Chamber of Commerce	
				Nature Conservancy	
Mr.	David	S	De Luz, Counsel President	Navy League of Hilo	
Ms.	Donald		Straney, Chancellor	University of Hawaii at Hilo	
Ms.	Patricia	C	Bergin, First Vice Chair	Mauna Kea Management Group	
Mr.	Jim		Whillock, Manager	Waikoloa Village Association	
Ms.	Collette	Y	Machado, Trustee	OHA Representative, Molokai	
Mr.	Steve		Prokop, Superintendant	Kalaupapa National Historic Park	
Ms.	Karen		Holt, Executive Director	Molokai Community Service Council	
Mr.	Steve		Chaikin, Chair	Molokaʻi Planning Commission	
Mr.	John		Sprinzel, Vice Chair	Molokaʻi Planning Commission	
Mr.	Joseph		Kalipi, Member	Molokaʻi Planning Commission	
Ms.	Mikiala		Pescaia, Member	Molokaʻi Planning Commission	
Ms.	Lori		Buchanan, Member	Molokaʻi Planning Commission	
Mr.	Don		Williams, Member	Molokaʻi Planning Commission	
Ms.	Napua		Leong, Member	Molokaʻi Planning Commission	
Mr.	Nathaniel		Bacon, Member	Molokaʻi Planning Commission	
Ms.	Debra		Kelly, Member	Molokaʻi Planning Commission	
Mr.	Robert		Stephenson, President	Molokaʻi Chamber of Commerce	
Mr.	Walter		Ritte		
Mr.	Marvin		Moniz, District Manager	Maui Airport including Molokaʻi	
Mr.	George		Maioho, District Supervisor	DHHL Molokaʻi District Office	

Notice of Intent Distribution List

Salutation	First	Middle	Last Title	Company1	Company2
				UTILITIES	
				Hawaiian Electric Company	
				Hawaiian Telcom	
				The Gas Company	
				Oceanic Time Warner Cable	
				ELECTED OFFICIALS	
The Honorable	Clayton		Hee, Senator	District 23 - Kaneohe to Kahuku	
The Honorable	Fred		Hemmings, Senator	District 25 - Kailua to Hawaii Kai	
The Honorable	Jill		Tokuda, Senator	District 24 - Kaneohe, MCAB, Kailua, E. Lake	
The Honorable	J.	Kalani	English, Senator	District 6 - Hana, East and Upcountry Maui, Molokaʻi, Lanaʻi, Kahoʻolawe	
The Honorable	Gary	L.	Hooser, Senator	District 7 - Kauaʻi, Niʻihau	
The Honorable	Dwight	Y.	Takamine, Senator	District 1 - Hilo, Honokaʻa, Laupahoehoe, Hamakua, Waikea Uka, Keaukaha, Waimea	
The Honorable	Pono		Chong, Representative	District 49 - Kailua, Kaneohe	
The Honorable	Ken		Ito, Representative	District 48 - Kaneohe to Heeia	
The Honorable	Chris		Lee, Representative	District 51 - Lanikai, Waimanalo	
The Honorable	Mele		Carroll, Representative	District 13 - East Maui, Lanaʻi, Molokaʻi, Kahoʻolawe, Molokini	
The Honorable	Michael	Y.	Magaoay, Representative	District 46 - Kaena Point, Schofield, Mokuleia, Waialua, Haleiwa, Waimea, Pupukea, Sunset, Kahuku, Kunia Camp, Poamoho, Wheeler, Laie	
The Honorable	Cynthia		Thielen, Representative	District 50 - Kailua, Kaneohe Bay	
The Honorable	Jessica		Wooley, Representative	District 47 - Laie, Hauula, Punaluu, Kahana, Kaaawa, Waikane, Kahaluu, Ahuimanu, Kaneohe	
The Honorable	Maile	S.L.	Shimabukuro, Representative	District 45 - Waianae, Makaha, Makua	
The Honorable	Roland	D	Sagum III, Representative	District 16 - Niihau, Lehua, Koloa, Waimea	
The Honorable	Mark	M.	Nakashima, Representative	District 1 - North Kohala, South Kohala, Hamakua, North Hilo, South Hilo	
Mr.	Ben		Achohido, Chair	Wahiawa Neighborhood Board, no. 26	
	Junior		Primacio, Chair	Koolauloa Neighborhood Board, no. 28	
Mr.	Michael		Lyons, Chair	North Shore Neighborhood Board, no. 27	
	Jo		Jordan, Chair	Waianae Neighborhood Board, no. 24	
Mr.	David		Henkin, Chair	Kahaluu Neighborhood Board, no. 29	c/o Earthjustice
Mr.	Roy		Yanagihara, Chair	Kaneohe Neighborhood Board, no. 30	
Mr.	Charles	A	Prentiss, Chair	Kailua Neighborhood Board, no. 31	
Mr.	Wilson	Kekoa	Ho, Chair	Waimanalo Neighborhood Board, no. 32	

Notice of Intent Distribution List

Salutation	First	Middle	Last Title	Company1	Company2
Mr.	Andrew		Jamila, Jr., Member	Waimanalo Neighborhood Board, no. 32	
Mr.	Jim		Corcoran, Council/ Member	MCBH Civ-Mil / Kailua Neighborhood Board, no. 31	
The Honorable	Kirk		Caldwell, Acting Mayor	City and County of Honolulu	
The Honorable	William	P.	Kenoi, Mayor	County of Hawaii	
The Honorable	Bernard	P.	Carvalho, Jr., Mayor	County of Kauai	
The Honorable	Charmaine		Tavares, Mayor	County of Maui	
The Honorable	Todd	K.	Apo, Councilmember Chair for City and County of Honolulu	District 1 - Ewa, Kapolei, Waianae Coast	
The Honorable	Nestor	R.	Garcia, Councilmember Vice - Chair for City and County of Honolulu	District 9 - Makakilo, Mililani, Waikele, Kunia	
The Honorable	Donovan	M.	Dela Cruz, Councilmember for City and County of Honolulu	District 2 - Wahiawa, Mililani, Kahalu'u, Ko'olauloa, Laie, kahuku, North Shore	
The Honorable	Ikaika		Anderson, Councilmember for City and County of Honolulu	District 3 - Waimanalo to Kaneohe	
The Honorable	Danny	A.	Mateo, Council Chair	Maui County Council	
The Honorable	Bill	Kaipo	Asing, Council Chair	Kauai	
The Honorable	Daniel	K.	Akaka, U.S. Senator	U.S. Congress Senate	
The Honorable	Daniel	K.	Akaka, U.S. Senator	U.S. Congress Senate	
The Honorable	Daniel	K.	Inouye, U.S. Senator	U.S. Congress Senate	
The Honorable	Daniel	K.	Inouye, U.S. Senator	U.S. Congress Senate	
The Honorable	Mazie		Hirono, U.S. Representative	U.S. Congress House of Representatives	
The Honorable	Mazie		Hirono, U.S. Representative	U.S. Congress House of Representatives	
The Honorable	Dominic		Yagong, Councilmember for Hawaii County, District 1		
The Honorable	Kelly		Greenwell, Councilmember for Hawaii County, District 8		
The Honorable	Pete		Hoffmann, Councilmember for Hawaii County, District 9		
Ms.	Janice		Kalanihuia, Chair	Governor's Moloka'i Community Advisory Council	
Ms.	Laurie	L. K.	Yohshida, Liaison	Kaua'i Liaison to Governor	
Mr.	Andy		Smith, Liaison	West Hawai'i Liaison to Governor	
Mr.	Marc		Miranda, Liaison	East Hawai'i Liaison to Governor	
Mr.	Bobby		Command,	Office of the Mayor County of Hawaii	
The Honorable	Charles		Djou, U.S. Representative	U.S. Congress House of Representatives	

Notice of Intent Distribution List

Salutation	First	Middle	Last Title	Company1	Company2
The Honorable	Charles		Djou, U.S. Representative	U.S. Congress House of Representatives	
			LIBRARIES		
			Librarian	Hilo Public Library	
			Librarian	Kailua-Kona Public Library	
			Librarian	Thelma Parker Memorial Public & School Library	
			Librarian	Kauai - Waimea Public Library	
			Librarian	Molokai Public Library	
			Librarian	Waimanalo Public & School Library	
			Librarian	Kaneohe Public Library	
			Librarian	Kahuku Public & School Library	
			Librarian	Wahiawa Public Library	
			Librarian	Mililani Public Library	
			Librarian	Waianae Public Library	
			NEWS MEDIA		
Mr.	Frank		Bridgewater, Director	Honolulu Star Advertiser	7 Waterfront Plaza, Suite 210
Mr.	David		Bock, Editor	Hawaii Tribune Herald	
Mr.	Adam		Harju	Garden Island Newspaper	
Mr.	Brian		Perry, Editor	Maui News	
Mr.	Todd		Yamashita, Editor	Molokai Dispatch	
Mr.	Reed		Flickinger	West Hawaii Today	

Interviewees

Business
- Ray Sanborn – He‘eia State Park, Kaneohe Yacht Club, Kama`āina Kids

Community Members/Organizations
- Mahealani Cypher – President, Ko‘olaupoko Hawaiian Civic Club
- May Akamine – Executive Director, Waimanalo Health Center
- Donna Wong – Kailua Neighborhood Board
- Wilson Kekoa Ho - Waimanalo Neighborhood Board

Education
- Jo-ann Leong – Director, Hawaii Institute of Marine Biology (HIMB)
- Jim Lackey – Marine Lab Supervisor, HIMB
- Lea Albert – Superintendent, DOE - Castle/Kahuku Complex

Government
- Representative Mele Carroll – Molokai/Maui
- Senator Jill Tokuda – Kailua/Enchanted Lake/Kaneohe
- Steve Prokop – Superintendent, National Park Service, Kalaupapa

How long have you lived or worked in Kaneohe/Kailua/Waimanalo/Molokai?
- A along time (Kaneohe)
- HIMB Director 9 years
- HIMB Marine Lab Supervisor, since 1965
- 11 years as DOE superintendent
- I have lived in Kaneohe all my life
- 45 years in Kailua/Kaneohe
- Life-long resident of Kaneohe
- Lived in Waimanalo for 60-plus years
- Worked in Waimanalo for 4 yrs and lived in Kaneohe for 25 years
- Moloka‘i legislator - many years at various government and community levels

Please describe any interactions you have had with Marine Corps Base Hawaii. Were these interactions positive/favorable?

The number in parentheses indicates the number of times a similar comment was made.

Kailua/Kaneohe
- (3) Tours to view base operations
- Tour of the base with the school administrators was a great PR move.
- (2) Participate on the civilian/military council.
- Youth director for dependent recreation for 5 years.
- Providing preschools for military families.
- Host Kama`āina Kids after school programs at Mokapu Elementary School and around MCBH.
- Positive and favorable interactions with the military
- MCBH supports community service projects. Very positive interaction.
- Yacht club leaders recently met with commander. MCBH assisted with activities in the Bay to include monitoring and rescue of boaters.
- As a retired air guard family, consider it a benefit to access and use MCBH.
- Good rapport with the Mokapu Elementary (on MCBH).
- Marine Base volunteers helped clean up the Hawaii Institute of Marine Biology (HIMB).
- Interactions were favorable; have attended various events on Base.
- The community in general is supportive of the military. Some good interactions. Some could have been better.
- When attended cultural events on MCBH, found the MCBH to be less accommodating to Native Hawaiians than to mud bog and other community event participants. Native Hawaiian groups have to wait in line for safety and security checks. However, when MCBH opens the Base for community events, the participants do not have to go through security checks. Security procedures seem to discriminate against Native Hawaiians. Unbalanced security requirements.
- Interactions with Native Hawaiian groups by MCBH have been through archaeologists who work on Base. This is not the most effective way to communicate between Native Hawaiians and military personnel.
- Over the years, the continued expansion on MCBH has disrupted native burial sites. Not sure whether MCBH personnel are proceeding with expansion efforts with adequate care and respect for the burial sites. Not even sure whether MCBH personnel care because they have military resources to do what they want. It

seems that locals and Native Hawaiians are a nuisance to MCBH personnel. Do not feel welcome on base.

- Native Hawaiian genealogy stems from Mokapu. MCBH personnel need to recognize that native people existed before them. Cannot operate in a vacuum. Need more managed access to places on MCBH.
- At past neighborhood board meeting, MCBH personnel would not provide details on the decibel level of jets. No straight answer was given. People were frustrated over lack of details.
- Has tried to address issues concerning MCBH through the Kailua Neighborhood Board, but got the run around. MCBH representative asked questions that the community could not answer, such as "Are you sure that aircraft is ours?" How would the average person know if the aircraft belonged to MCBH?
- When the MCBH representative is asked for information about things the public sees and hears on the base at neighborhood board meetings, the representative does not usually know the answer.
- The MCBH representative has not been able to answer questions related to wind generation project, in which a cable is supposed to supply service to Oahu via MCBH. This is a disservice to community.
- If the MCBH representative does not know the answers to the community's questions, then they need to provide the answers at the next meeting.
- The MCBH representative that comes to the neighborhood board meetings is nice, but only provides general information. Community wants specific responses to questions.

Waimanalo

- As a member of the Waimanalo Neighborhood Board, my interactions with the MCBH have been positive. The interaction has been on a professional level via partnering with the elementary schools and community clean ups.
- Get along very well.
- Recognize that the training is necessary – take the good with the bad.
- Military presence is not new. The Air Force came to Waimanalo and cleaned the streams. The community shared lunch with them. It built camaraderie. This helps make the military presence known.
- Initially there were problems related with the installation of a security fence between Bellows AFS and the Waimanalo Health Center. The military put up No Trespassing signs, but portions of the health center were on federal property so they always

trespassed. The interaction started off negative, but eventually both parties worked out a solution that ended on a positive note.

Molokai

- Have had no interaction with MCBH personnel

What impact has Marine Corps Base Hawaii trainings/activities had on your community?

Noise

- Noise issues - The jets are loud!
- Over the last 2 years, helicopters created a lot of noise and caused house to shake.
- Noise and safety are issues.
- The C17s flying directly over the HIMB.
- Noise and vibrations from the aircraft disturbs the marine life. As such, HIMB staff cannot conduct research when aircraft are flying over HIMB.
- Fighter jets flying over King Intermediate School during school hours.
- Noise from the jets makes it difficult for teachers teaching in the classroom.
- Helicopters flying at night.
- Obviously the noise.
- Noise from aircraft (Waimanalo)
- Noise from gun shots fired at night time. Gives kids the impression they are in a war zone (Waimanalo)
- Not that much impact. Residents have complained about noises from shooting of rifles on weekends (Waimanalo).

Traffic

- Speeding by base personnel on roads leading on and off MCBH. Neighborhood board was given the contact number to report speeding by base personnel.
- Traffic

Sewage Infrastructure

- Due to limited sewage plant capacity, it is difficult for HIMB to obtain attain permits to modernize its facilities.
- Sewage plant capacity

Housing

- Housing (on Base or in the community). Rents will increase with additional military personnel moving into the community.

Other

- Safety (worst fear is a jet will crash into the school)
- Intimidating feeling many get when aircraft fly over Kaneohe and when planes approach the runway for landings. Sends the message that the military is the master (although interviewee recognized that that was not the intent of the military to make people feel that way).
- Culture clash. Need sincere effort on the part of the military to understand our people – the host culture. The military has been in the islands for so long, they forget that there is a host culture.
- Use of the land. Would prefer the training be done elsewhere.
- Not familiar with training on Molokai

After reading the fact sheet, what impacts on your community would you expect from the new VMM and HMLA squadrons at MCBH?

The number in parentheses indicates the number of times a similar comment was made.

Noise

- #1 issue – NOISE
- (3) Noise
- Noise (Waimanalo)
- Small businessess will fare very well with increase of military personnel.
- In Kaneohe, the sounds from MCBH echo in the community. There is a day-to-day wearing away of people's energy from dealing with noise.
- He'eia Park sits right below jet flight pattern. Causes buildings to shake.
- Number one concern is noise. Noises from the helicopters will interfere with doctors examining patients (Waimanalo).

Traffic/People

- (2) Increased number of personnel
- Increased traffic
- More cars, more people; what and who will this project benefit?

- Traffic problems. Kailua Road cannot handle the traffic for the present residential population. By adding another 2000+ personnel to the base population, this will certainly increase the amount of people going to Kailua and adding to traffic issues.
- More people means more traffic (Waimanalo)
- Training will increase traffic (Waimanalo)
- H-3 and MCBH back gate helps to alleviate traffic problems.
- Convoy of support equipment to training areas decreases rate of traffic flow and causes backups of traffic.
- When state, county or private entities do traffic studies, it seems they do not take into account Base personnel impacts.
- Do not have any issues related to the number of personnel coming to MCBH. There is already lots of coming and going of military personnel.
- Increase in personnel will have positive impact for preschools and Kama`āina Kids programs.
- Brings more people to support work at He'eia State Park.
- Small businesses will fare very well with increase of military personnel

Sewage Infrastructure

- Impacts to sewage treatment plant. Understand that base has its own treatment plant for sewage, which is then processed through the Aikahi plant outfall. What is the infrastructure capability of the Aikahi plant?

Housing/Carrying Capacity

- Increasing number of military retirees living in the community.
- With the increase of the military, the cost of living goes up forcing local family homes to expand their residences to accommodate family members.
- Increased cost of living resulting from potential increase of rents.
- Locals cannot compete for housing with military personnel who have housing allowances (locals do not have housing allowances). Landlords raise rents, knowing military personnel can pay the rents. This causes increased homelessness and people having to move in with family members because they cannot afford to rent a place to live. Single parents cannot live in Kaneohe because they cannot afford the rent. Increasing the number of military personnel will worsen this already existing problem.
- Address the question, What is the carrying capacity of MCBH? How much can it operationally house without impairing quality of services?

Pollutants

- Hydrocarbons being released into the area

- Pollutants and noise will impact the environment
- Biological resources, such as wildlife, plants, soil and water quality, will be affected by pollutants.

Schools

- Increased population within the local schools means more money for the school system. Windward schools have seen a decrease in student population over the years as the population has aged.
- Windward public schools can accommodate new Marine dependants.
- Schools have great programs to help military students transition into public schools.

Cultural

- Interviewee is not anti-military, but feels that the military has a prolonged disrespect for the Hawaiian people. There are many unresolved issues. Unhealed sores that have not been healed. The military does not really want a relationship with native peoples.
- Cultural resources are the second biggest concern. Impacts to the cultural resources will have a negative impact to the spiritual health of the local population.

Other

- If 80% of the operations (of the MAGTF's capacity) are already on MCBH, why were the other 20% not previously addressed? Why conduct an expensive EIS for 20% of the work that could have been previously done?
- It appears the project is a done deal.
- Some commanders have made great efforts in working with the Native Hawaiians and local community. Then get shipped out or retire. All the work is gone and the community is back to ground zero. Not consistent.
- Use of the land (Waimanalo)
- Marines here are well behaved. Have no problems. Very pleasant now (Waimanalo).
- Community access to the Bellows AFS beach.

Moloka‘i

- Noise
- How will it affect the quality of life for people living on Moloka`i?
- Impacts to the environment and water resources
- Pollutant impacts from the helicopters
- Molokai residents are very sensitive to impacts on their culture and natural resources.
- Military jobs for Moloka`i residents would be a positive.

What are your ideas for mitigating those impacts?

- Good communication - getting information out to the public in timely manner
- Share the benefits of the project right up front with the community
- Height limitations for how low helicopters can fly.
- Redirect flight plans from the north
- House military personnel at Kalaeloa
- Mokapu grounds are sacred to the Hawaiian community
- Attend neighborhood board meetings
- Attend the Castle Educational Summit meeting on Sept 18, 2010
- Attend the board meeting at Castle High School on Oct 7, 2010 at 3:30 and 7 pm
- Conducting a socio–economic impact study IS A MUST! Identify and mitigate impacts prior to implementation of the plan. The H-3 study predicted impacts and those impacts have occurred. But nothing was done to mitigate those impacts. Address how to mitigate those impacts today. Do not just study and do nothing.
- Move the project to Hickam AFB. It is more of an industrial area than Kaneohe. There would be less of socio-economic and cultural impacts. The community there is already used to the noise. The winds blow the noise offshore.
- Assume cannot change flight patterns.
- Convoy support equipment during non-rush hours and non-school traffic hours.
- "Just don't do it!" If the project does go through, maybe extended the buffer zone further away from the Waimanalo Health Center and community
- Molokai
- Community consultations with residents and cultural practitioners

In your opinion, what methods can be used to meaningfully involve your community (to include minority or low income populations) in the environmental impact statement community outreach process (open houses, public meetings, fact sheets, news articles, etc.)?

- Online information is much easier to access
- Provide continuous information about the project
- Yacht Club in Kaneohe (over 800 members) and He‘eia State Park staff willing to e-blast members about upcoming public meetings. Groups are very interested in issues and want to be involved.
- Get the word out through neighborhood board meetings.

- Mailing to people living in Kaneohe zip code to attend informational meeting.
- Show the community that their suggestions have been heard and the military has taken action on them – and that those actions will not be changed by the next commander.
- Have information that is real and relevant to the community to aid in their understanding. For example, when talking about the noise level of a helicopter, compare it to the sound of a vacuum cleaner – something everyone can relate to. People cannot relate to decibel levels.
- Provide specifics on noise/decibel levels.
- Suggest comparing noise levels between jets and helicopters.
- Unfortunately, the Neighborhood Board Commission cut the budget for filming. neighborhood board meetings on Olelo. This would have been a great venue.
- Meet with the Kaneohe Bay Regional Council, which only meets once a year
- Address the issues upfront!
- The military needs to show they can work in good faith with the community. For example, in the development of Ford Island, Native Hawaiians discussed with the Navy the Hawaiian historical value of the island – it used to be a burial site. The Navy was to give adequate recognition of that history in its materials. The Navy did not follow through. The community felt the Navy did not keep their word.
- Doing good. Continue going to neighborhood board meetings (Waimanalo)
- Word of mouth is the best way to let people know what is going on (Waimanalo)
- Getting the word out about the project through flyers and putting information on the Waimanalo Health Center website.

<u>Molokai</u>

- Community consultations with residents and cultural practitioners.
- BE TRANSPARENT! Build trust with the community by effectively delivering information.
- Talk-story sessions with community members.

In your opinion, how can MCBH improve/enhance its interaction with the community?

- Provide more tours on Base.
- Continue hosting events such as Blue Angels and Bay Fest.
- Continued support of community groups and community service projects.
- Being more visible in the community by participating in community events and community service programs, such as the upcoming Waimanalo Carnival.

- One primary protocol – respect the community and the community will respect the military.
- Continue to partner with the community. For example, when the Marines did a demonstration at the Waimanalo elementary school.
- Right now, the military says we are doing this and we are doing that. Instead, the military should ask, "Can we come into your community and do this?" Come and kukakuka (discuss) what it is you want to do. Do not say we are coming no matter what.
- Have those writing the EIS collaborate with the Hawaiian historical and cultural experts in the community.
- MCBH and military in general do a disservice by staying so isolated from the community. So now they come and try to win over the community now that they know there will be additional impacts on the community. Will always have people angry at the Base for one reason or another. Having events on the Base and opening to the public is nice, but they are still isolated.

Do you have any specific questions or issues addressed at the public scoping meetings?

The number in parentheses indicates the number of times a similar comment was made.

- At what times can the community expect training activities (i.e., flying of aircraft) to take place in their community?
- (2) Educate the community on how to identify the various helicopters.
- A scoping meeting should be held in Kailua. Residents more than likely will not travel to Kaneohe or Waimanalo to attend the already scheduled meetings.
- Recognize that the windward community is an aging community, made up of retirees. They are at home during the day and are impacted by aircraft flying over their homes.
- Why do they have to fly C17 out from the base?
- Adjust flight patterns so aircraft do not fly over schools and inform the community about the flight patterns.
- Maybe reroute aircraft landing from the mountain side to the ocean side.
- Pollutants and their impact on the environment and community
- Sufficient housing, both on Base and off Base.
- Capacity of Mokapu Elementary School to handle increase in military dependents.
- That a socio-economic impact study will be adequately completed.
- Have all the alternatives been evaluated, to include locating the project at Hickam AFB?
- How quick is the timeline for impact study? In other words, how many resources have been committed or invested without really getting community input?

- Specifically address noise levels.
- What are the effects of the helicopters on the people?
- Talk about the need for the helicopters and what they do. This will help the community understand the bigger purpose of why the new helicopters are here.
- Will the community continue to have access to the Bellows beach, waters and camping areas?

Molokai

- Will military personnel be located on Moloka`i and island of Hawaii?
- How will this project benefit the community of Molokai?

Who else should we be talking to?

- Amy Madsion - school liaison for MCBH
- Kaneohe Bay Regional Council
- Ko'olau Civic Club
- Office of Hawaiian Affairs/Collette Machado
- Bill Sager - Friends of Kaneohe Bay/environmentalist on the Kaneohe neighborhood board
- Jeanine Tully – staff member to Pono Chong, 247-1796
- Jerry and Rocky Kaluhiwa – Native Hawaiians who lived in the area for over 200 years, 286-7955
- Bob Nakata – minister, concerned about social impacts, 295-1316
- Kahalu'u and Kaneohe neighborhood boards
- Roy – prodevelopment guy on the Kaneohe neighborhood board
- Amy Luerson – former chairman Kahalu'u neighborhood board. Worked many years on the Kaneohe Bay regional plan. Now works for Hawaii Community Foundation, 537-6333
- DOE – King Intermediate School principal
- Kaneohe business group
- Chancellor at Windward Community College
- Hawaiian Civic Club
- Kekoa Ho
- Mabel Spencer
- Kim Kalama

- Paul Richards of the Hawaiian Homestead Association
- Queen Liluokalani Community Center in Waimanalo
- Chris Lee
- Billy Akutagawa of Na Puu Wai on Molokai

Molokai

- Collette Machado OHA
- Scottie Schaffer - EMS paramedic - 479-6470
- Nature Conservancy (Mark Fox)
- Ms. Vanda Hanakahi, Aha Kiole Advisory Committee
- 808-560-6203
- 808-658-0098
- hanakahi@sandwichisles.net

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III MEF Elements in Hawaii
List of Scoping Comments

Received	Source	Salutation/Rank	First Name	Last Name	Job Title	Company/Group	OrgType
8/6/2010	Mail		Anika	Glass			Private Organization
8/6/2010	EMail		Anika	Glass		Nightingales	Private Organization
8/6/2010	EMail		Susan	Quick			Individual
8/9/2010	EMail		Robert	Gowan		Gathering of Eagles	Private Organization
8/12/2010	EMail		Mark	Valencia			Individual
8/13/2010	EMail	Mr.	Craig	Gorsuch	Environmental Program Manager	USAF Bellows AFS	Federal
8/13/2010	EMail	Capt	Rick	Pelzl		USAF Bellows AFS	Federal
8/13/2010	EMail	Mr. and Mrs.	David and Sue Pekarsky	Gary			Individual
8/16/2010	EMail		Eugene	Dashiell			Individual
8/16/2010	Mail		Jonella	Varner			Individual
8/16/2010	Mail		Alec	Wong	Chief	Clean Waters Branch, Department of Health	State of Hawaii
8/17/2010	Mail		Tamara	Horcajo	Director	Department of Parks and Recreation	County Maui
8/20/2010	EMail		Tammy	Sumida			Individual
8/22/2010	EMail		Cory	Harden			Individual
8/22/2010	EMail		Janice	Palma Glennie			Individual
8/24/2010	Mail		Clayton	Yoshida	Planning Program Administrator	Department of Planning	County Maui
8/24/2010	Hilo (scoping)		Cory	Harden			Individual
8/24/2010	Hilo (scoping)		Danny	Li			Individual
8/24/2010	Hilo (scoping)		Jim	Albertini			Individual
8/24/2010	Hilo (scoping)		L.	Kelly			Individual
8/24/2010	EMail		Lee	Ballard			Individual
8/24/2010	Hilo (scoping)		Leland	Pa			Individual
8/24/2010	Hilo (scoping)		Nelson	Ho			Individual
8/24/2010	Hilo (scoping)		Patrick	Kahawaiolaa			Individual
8/24/2010	Hilo (scoping)		Public	Public		Belt Collins	UNKNOWN
8/24/2010	Hilo (scoping)		Star	Newland			Individual
8/25/2010	Waikoloa (scoping)		Anika	Glass		Nightingales	Private Organization
8/25/2010	Waikoloa (scoping)		Bette	Green			Individual
8/25/2010	Waikoloa (scoping)		Bill	Simonsma			Individual
8/25/2010	Waikoloa (scoping)		Edward	Ahuna			Individual
8/25/2010	Waikoloa (scoping)		Gail	Jackson			Individual
8/25/2010	Waikoloa (scoping)		Michael and Arline	O'Brien			Individual
8/25/2010	Waikoloa (scoping)		Minoru	Hanato			Individual

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III MEF Elements in Hawaii
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Received	Source	Salutation/Rank	First Name	Last Name	Job Title	Company/Group	OrgType
8/25/2010	Waikoloa (scoping)		Unknown				Individual
8/25/2010	EMail		Ryan	Terayama			Individual
8/25/2010	Waikoloa (scoping)		Steve	Troute			Individual
8/26/2010	Kaneohe (scoping)		Claire	Durham			Individual
8/26/2010	Kaneohe (scoping)		David	Clymer			Individual
8/26/2010	Kaneohe (scoping)		Elayne	Pool			Individual
8/26/2010	Kaneohe (scoping)		Gretchen	Gould			Individual
8/26/2010	Kaneohe (scoping)		Guy	Ballou			Individual
8/26/2010	Kaneohe (scoping)		Janet	Ness			Individual
8/26/2010	Kaneohe (scoping)		Jean	Reiziss			Individual
8/26/2010	Kaneohe (scoping)		Kimbal	Thompson			Individual
8/26/2010	Kaneohe (scoping)		Public	Public		Belt Collins	UNKNOWN
8/26/2010	Kaneohe (scoping)		Stann	Reiziss			Individual
8/27/2010	Mail		Paul	Kikuchi		Board of Water Supply	City County Honolulu
8/27/2010	EMail	Mr.	Erich	Wida			Individual
8/28/2010	Molokai (scoping)		Jade	Bruhjell			Individual
8/28/2010	Molokai (scoping)		Kirk	Greenman			Individual
8/29/2010	Mail		Ellen	Akaka			Individual
8/30/2010	Waimanalo (scoping)		Andrew	Jamila Jr.			Individual
8/30/2010	Waimanalo (scoping)		Bob	Vericker			Individual
8/30/2010	Mail		Jeoffery	Cudiamat	Director and Chief Engineer	Department of Facility Maintenance	City County Honolulu
8/30/2010	Mail		Ivan	Torigoe	Deputy Director	County of Hawaii Environmental Management	County Hawaii
8/30/2010	Waimanalo (scoping)		Kimberly	Kalama			Individual
8/30/2010	Waimanalo (scoping)		Makaha'a	Wolfgramm			Individual
8/30/2010	Waimanalo (scoping)		Noel	Richardson	Principal	Waimanalo Elementary and Intermediate	State of Hawaii
8/30/2010	Waimanalo (scoping)		Public	Public		Belt Collins	UNKNOWN
	Mail			Mihara ?			Individual
9/1/2010	EMail		Tom	Kelly		EPA Region 9	Federal
9/1/2010	Mail		Tom	Kelly		US EPA Region IX	Federal

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III MEF Elements in Hawaii
List of Scoping Comments

Received	Source	Salutation/Rank	First Name	Last Name	Job Title	Company/Group	OrgType
9/2/2010	Mail		Carol	Hinton			Individual
9/2/2010	Mail		Wayne	Yoshioka	Director	Department of Transportation	City County Honolulu
9/2/2010	Mail		BJ	Leithead Todd	Planning Director	County of Hawaii Planning Department	County Hawaii
9/3/2010	Mail					DLNR	State of Hawaii
9/3/2010	Mail		Jana	Sasada			Individual
9/3/2010	Mail		Patricia	Collins			Individual
9/3/2010	Mail		Brennon	Morioka	Director of Transportation	State Department of Transportation	State of Hawaii
9/4/2010	EMail		Dave	Kisor			Individual
9/6/2010	EMail		Cory	Harden			Individual
9/7/2010	EMail		Craig	Gorsuch			
9/7/2010	Mail		Donald	Munro			Individual
9/7/2010	Mail		Edward	Hirata			Individual
9/7/2010	Mail		John	Carse			Individual
9/7/2010	EMail		John	Cusick			
9/7/2010	Mail		Lucy	Akau			Individual
9/7/2010	Mail		Marilyn	Morita			Individual
9/7/2010	Mail		Polly	Pool			Individual
9/7/2010	Mail		Randy	Kennedy			Individual
9/7/2010	Mail		Cindy	Orlando	Park Superintendent	US Department of Interior	
9/8/2010	EMail		Peter	Rappa			
9/13/2010	Mail		Glenn	Teves			Individual
9/16/2010	Mail		David	Tanoue		Department of Planning and Permitting	City County Honolulu
9/21/2010	EMail		Sue	Gary			Individual
9/27/2010	Mail		Frank	Hays	Pacific Area Director	Department of Interior, National Parks Service	Federal
9/30/2010	Mail		Charlene	Unoki	Assistant Administrator	Department of Land and Natural Resources	State of Hawaii
10/5/2010	Mail		Mahealani	Cypher	President	Koolaupoko Hawaiian Civic Club	
10/12/2010	Mail		Kirk	Tomita	Senior Environmental Scientist	Hawaiian Electric Company	

Anika Glass
Malama Waikoloa Nightingales

68-1863 Ua-Noe ST
Waikoloa, HI 96738
808-937-2309

August 6, 2010

Naval Facilities Engineering Command
Pacific Division
Attn: EV21, MV/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

Aloha,

When considering issues to be addressed in the EIS for basing and operating MV22 trirotor Osprey Aircraft and H-1 Cobra and Huey attack helicopters in the Pohakaloa Training Area, or other areas of the Island of Hawaii, please address:

1. Making a requirement aircraft do not fly in the airspace directly over Waikoloa Village, HI. This is the current rule, but is not always enforced.
2. Making a requirement aircraft do not fly in the airspace directly over the parcels between Waikoloa Village and Mamalahoa Highway where approximately 500 feral donkeys roam. Scattering and terrifying donkeys would result in serious health concerns for donkeys. It could likely cause them to panic and break down fences that enclose them. Donkeys outside of fencing are a danger to motorists and destroy landscape property of homeowners. Once out of fencing, you have scattered herds of donkeys that you will need to capture, provide veterinary care, and find property owners willing to accept them.

As founder of Malama Waikoloa Nightingales (taking care of our local donkeys), I can put you in touch with individuals who can answer questions I cannot. You will need to determine appropriate mitigations.

Sincerely,

Anika Glass

Anika Glass
Founder, Malama Waikoloa Nightingales
http://malama-waikoloa-nightingales.blogspot.com

copies
Brady Bergin, DVM, Kamuela, HI
Inga Gibson, Hawaii State Director, Western Regional Office, U.S. Humane Society
Jim Whillock, General Manager Waikoloa Village Association
Mike Price, Chair South Kohala Traffic Safety Committee

From:	Anika Glass
To:	Inga Gibson; brady bergin; Jim Whillock;
cc:	mv22h1eis;
Subject:	Testimony: EIS for the basing and operation of MV-22 tiltrotor Osprey aircraft and H-1 Cobra and Huey attack helicopters in support of III Marine Expeditionary Force
Date:	Friday, August 06, 2010 10:13:51 AM
Attachments:	Testimony EIS Helicopter Pohakuloa.doc

The notice of meetings for "Public Scoping" was published in West Hawaii Today. Here is the website link. http://mcbh.usmc.mil/mv22h1eis/ The "Documents" Section contains a few additional details, including their intended use in Pohakuloa. I cannot attend the Waikoloa Meeting.

Anika
http://malama-waikoloa-nightingales.blogspot.com/
808 937 2309

Anika Glass

Malama Waikoloa Nightingales

68-1863 Ua-Noe ST
Waikoloa, HI 96738
808-937-2309

August 9, 2010

Naval Facilities Engineering Command
Pacific Division
Attn: EV21, MV/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

Aloha,

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1. Making a requirement aircraft do not fly in the airspace directly over Waikoloa Village, HI. This is the current rule, but is not always enforced.

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Sincerely,

Anika Glass
Founder, Malama Waikoloa Nightingales
http://malama-waikoloa-nightingales.blogspot.com

copies
Brady Bergin, DVM, Kamuela, HI
Inga Gibson, Hawaii State Director, Western Regional Office, U.S. Humane Society
Jim Whillock, General Manager Waikoloa Village Association
Mike Price, Chair South Kohala Traffic Safety Committee

From:	Quick, Joy
To:	mv22h1eis;
Subject:	Comments - EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii
Date:	Friday, August 06, 2010 12:52:40 PM

Please complete the following information:

Name: Susan Quick
Company/Organization:
Mailing Address: 44-117 Puuohalai Pl.
City: Kaneohe
State: HI
Zip Code: 96744

Add to Mailing List? (Yes or No): No

Comments: Although I support our military and their need to maintain the strongest defense possible, I have concerns about these new helicopters and aircraft in this initiative. Specifically, we already have very loud planes and helicopters flying above our homes at all times of the day and night. We hear the planes revving their motors on the runways for hours at a time, even in the middle of the night, and the helicopters make the windows shake when they fly by. Sometimes our conversations inside the house are affected. If we have more military aircraft at MCBH I worry about increased noise pollution and the quality of life we will have.

I'm also concerned about pollution from jet fuel in the air, which comes across Kaneohe Bay. I've lived in my home for over 20 years and have seen much more black dust inside the house since Barbers Point closed and MCBH expanded. I wonder about exposure to this dust as I already suffer from allergies.

I would like to have these issues addressed and reassured that we can continue to live peacefully in our homes without worry, toxic exposure, and excessive noise. Thank you.

From: Robert G
To: mv22h1eis;
Subject: Comments - EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii
Date: Monday, August 09, 2010 10:32:48 AM

Aloha !

I am Robert Gowan , Hawaii State coordinator for the Gathering of Eagles
a 501c(4) registered non-profit , nationwide , troops support organization .

I live on the Big Island of Hawaii in the Kona district and am very well familiar
with Pohakuloa Training Area (PTA) and the training needs of USMC units
that deploy here from exercises up there .

I would like to WELCOME and encourage the deployment of the 2 MV-22 and
HMLA squadrons that are proposed to be attached to MAG-24 here in Hawaii .

We would like to be on hand to offer whatever community support we can to these
good Aviation Marines , should they visit our island for training in the future .

We offer our beautiful ,open , Hawaiian skies to them ! Come!

Aloha!
e komo mai .....

S/F

Robert Gowan

808-987-7018

--
"The only life worth living is one in service to others."

Lt. Michael Murphy U.S.N. [SEAL]

From:	Mark J. Valencia
To:	mv22h1eis;
Subject:	Comments - EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii
Date:	Thursday, August 12, 2010 11:59:52 AM

Please complete the following information:

Name:MARK J. VALENCIA
Company/Organization: MYSELF
Mailing Address:47-511 HIO PLACECity:
KANEOHE

State:HI
Zip Code:96744

Add to Mailing List? (Yes or No):
NO
Comments:

FOR OVER TWO YEARS I HAVE BEEN ATTEMPTING THROUGH MAJOR CROUCH PA OFFICER KMCAB TO GET SIMPLE ANSWERS TO SIMPLE QUESTIONS REGARDING THE NOISE FROM CURRENT BASE RELATED AIRCRAFT

I HOPE THESE QUESTIONS WILL BE ADDRESSED IN THE DRAFT EIS FOR BOTH THE CURRENT AND NEW AIRCRAFT, IE TO THE DEGREE THE NEW AIRCRAFT WILL BE ADDING TO ALREADY EXISTING NOISE POLLUTION

1. WHAT IS THE **MAXIMUM** (NOT AVERAGE) DECIBEL LEVEL RESIDENTS CAN EXPECT TO EXPERIENCE IN THE CENTER OF AHUIMANU VALLEY (SAY IN THE VICINITY OF HIO PLACE)?
2. HOW OFTEN IS THAT LIKELY TO OCCUR? PLEASE PROVIDE A REAL (NOT THEORETICAL) DECIBEL VS FREQUENCY OF OCCURRENCE GRAPH.
ALSO PLEASE TAKE ACCOUNT OF ANY REVERBERATION EFFECT PRODUCED BY THE VALLEY WALLS AND FLOOR, AS WELL AS VIBRATIONS ON STRUCTURES.
3. HOW DOES THAT COMPARE WITH OTHER COMMON NOISE POLLUTION IN THE VALLEY EG LEAF BLOWERS, PASSING TRUCKS, LAWN TRIMMERS) AND AT WHAT DISTANCE?
4. REGARDING CURRENT AIRCRAFT NOISE POLLUTION , WHY CAN IT NOT BE MEASURED RATHER THAN THEORETICALLY GENERATED ?

THANK YOU
MARK J. VALENCIA

From: Gorsuch, Craig H CTR USAF PACAF 18 FSS/CEVQ
To: mv22h1eis;
cc: Pelzl, Rick T Capt USAF PACAF 18 FSS Det 2 Bellows/CC;
Subject: Comments - EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii
Date: Friday, August 13, 2010 1:24:34 PM

Please correct oversight and add the following names to your mailing/ distribution list:

Rick Pelzl
Detachment 2, 18th Force Support Squadron
Bellows Air Force Station
515 Tinker Road
Waimanalo, HI 96795-1903

Craig Gorsuch
Detachment 2, 18th Force Support Squadron
Bellows Air Force Station
515 Tinker Road
Waimanalo, HI 96795-1903

Mahalo,

Craig

CRAIG GORSUCH, LEED AP
Environmental Program Manager
Environmental Compliance Technical Support Booz Allen Hamilton

Bellows Air Force Station
Det 2, 18 FSS/CEE, Contractor
515 Tinker Road
Waimanalo, HI 96795-1903

DSN: 259-4213; COMM: 808-259-4213
FAX DSN: 259-4227; FAX COMM: 808-259-4227
MOBILE 808-927-1867
email: craig.gorsuch.ctr@hickam.af.mil

From: Gorsuch, Craig H CTR USAF PACAF 18 FSS/CEVQ
To: mv22h1eis;
cc: Pelzl, Rick T Capt USAF PACAF 18 FSS Det 2 Bellows/CC;
Subject: Comments - EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii
Date: Friday, August 13, 2010 1:24:34 PM

Please correct oversight and add the following names to your mailing/ distribution list:

Rick Pelzl
Detachment 2, 18th Force Support Squadron
Bellows Air Force Station
515 Tinker Road
Waimanalo, HI 96795-1903

Craig Gorsuch
Detachment 2, 18th Force Support Squadron
Bellows Air Force Station
515 Tinker Road
Waimanalo, HI 96795-1903

Mahalo,

Craig

CRAIG GORSUCH, LEED AP
Environmental Program Manager
Environmental Compliance Technical Support Booz Allen Hamilton

Bellows Air Force Station
Det 2, 18 FSS/CEE, Contractor
515 Tinker Road
Waimanalo, HI 96795-1903

DSN: 259-4213; COMM: 808-259-4213
FAX DSN: 259-4227; FAX COMM: 808-259-4227
MOBILE 808-927-1867
email: craig.gorsuch.ctr@hickam.af.mil

From: Gary Sue Pekarsky
To: mv22h1eis;
Subject: Comments - EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii
Date: Friday, August 13, 2010 10:07:48 AM

Please complete the following information:

Name: Sue Pekarsky Gary and David R. Gary
Company/Organization:
Mailing Address: PO Box 44362
City: Kamuela
State: HI
Zip Code: 96743-4362

Add to Mailing List? (Yes or No):

Comments:

Project Manager:

Because we will be on the mainland August 24 and 25 we are unable to attend your Public Scoping Open Houses. The following are our comments:

Our concerns relative to Marine Corps MV-22 tiltrotor Osprey aircraft and H-1 Cobra and Huey attack helicopters training in the PTA on Big Island are several: we are concerned with the deleterious effects of more munitions being exploded on the land, flora and fauna of this island, the deleterious effects on the residents of this island and the island's tourist based economy and the effects of the increases in noise and visible pollution from the transiting air vehicles.

It concerns us that on an earthquake prone island with an active volcano no consideration is given to the impact of the constant percussive nature of exploding armament on the ground.

It concerns us that the flora, fauna and land itself of the PTA continue to be destroyed. We are an island--a discrete compact unit--and everything that happens here affects the entire island.

It concerns us that attack helicopters transiting to and from the PTA would impact daily life and add to the sense of living in a war zone because of their high decibel level as well as the visual impact of military aircraft right in our backyards and faces.

It concerns us that, when tourism on Big Island is already severally impacted by the economic downturn, an increased visual, audible and vibrational military presence will deter potential tourists to this island. Because I/Sue work in a retail store at the Waikoloa Kings Shops I often hear negative comments from visitors to our island about their unwanted exposure to the sounds, sights and feel of the military training exercises at the PTA and the convoys between the PTA and Kawaihae Harbor. Adding more training to the mix will only exacerbate the situation.

It concerns us that to be subjected to even more visual, auditory and visceral impacts of being in a war zone, for all intents and purposes, can only lead to even more stress for the human mind, soul or body. Life is not good when the sounds of every day life are punctuated by the explosions at the PTA—at least 25 miles away. Life is not good when the house shakes repeatedly because of bombing or other armament explosions. Life is not good when we lie in bed at night and look out the window at explosive fireballs on the hills of the PTA. The recent training maneuvers in the waters of Hawaii, specifically off the Big Island's North Kohala coast and at Kawaihae Harbor, were yet another stressful immersion into the impact of war on innocent civilians, residents here on this island in the American state of Hawaii, not enemies in distant countries.

It concerns us that the military acts with impunity and puts the life of the island, its core, its flora, its fauna and those poor mortals residing here at emotional, physical and financial risk with its training activities.

Thanks for your consideration of Big Island but we think we are full up here with military training and bombing.

Sue Pekarsky Gary
David R. Gary
59-566 Lokelalni Place
Kawaihae, HI 96743
PO Box 44362
Kamuela, HI 96743
808 882 7367

From: Eugene Dashiell
To: mv22h1eis;
Subject: Comments - EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii
Date: Monday, August 16, 2010 10:48:29 AM

Please complete the following information:

Name: Gene Dashiell
Company/Organization: None
Mailing Address: 728 Nunu Street
City: Honolulu
State: Hawaii
Zip Code: 96734

Add to Mailing List? (Yes or No): No

Comments: I live in the Kaimolino area, near the back gate to MCBH. Helecopters from MCBH transit over our neighborhood back and forth to Bellows or other areas. I humbly request that the flight paths from MCBH to Bellows or other locations in that direction be re-routed oceanward. At times, the rotor-wash shakes the walls of our house and we cannot even hear the television or ourselves talk to each other. I can only imagine how this situation will worsen with the Ospreys.

In sum, please relocate the authorized flight path seaward to reduce the noise and vibration impacts.

Ocassionaly the P-3s fly right over our houses, and I don't think this is right..... they also show stay out to sea or at higher elevations. This situation will worsen if they overfly us with the replacement jet aircraft.

8-16-10

Dear Sirs:

I am one American that wants Osprey's built, the more the better. I wish this adminastration would build up all of our Armed forces, like President Ronald Reagan did. We were even safe with Bush. Not safe now, & everyone I talk to say's the same thing. They are scared for America & want her back. Before 2008

Please build, & I hope its here in Islands. America has to be most powerful.

Thank You,

A Concerned American

Jonella Varnes

LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
EMD / CWB

08032PMT.10

August 16, 2010

Department of the Navy
Naval Facilities Engineering Command
Pacific Division
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

Dear Sir/Madame:

SUBJECT: Notice of Intent to Prepare an Environmental Impact Statement (NOIEIS) For Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii Marine Corps Base Hawaii Kaneohe Bay and Bellows, and various U.S. Army training areas Islands of Oahu, Hawaii, Molokai, and Kauai, Hawaii

The Department of Health (DOH), Clean Water Branch (CWB), has reviewed the subject document transmitted by letter dated August 3, 2010, and offers these comments on your project. Please note that our review is based solely on the information provided in the subject document and its compliance with Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at http://www.hawaii.gov/health/environmental/env-planning/landuse/CWB-standardcomment.pdf.

1. Any project and its potential impacts to State waters must meet the following criteria:

   a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.

   b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.

   c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).

2. The operation and maintenance and construction related activities for the proposed facility/project shall comply with the exiting National Pollutant Discharge Elimination System (NPDES) permit issued to the U.S. Marine Corps for its Marine Corps Base Hawaii Kaneohe Bay (MCBHKB) Municipal Separate Storm Sewer System (MS4) on the Island of Oahu, Hawaii, Permit No. HI S000007. In addition, the storm water discharges associated with the proposed construction activities and the operation of the final drainage systems shall be required to receive an approval from the appropriate operation and maintenance organization of the MCBHKB MS4 system prior to conducting such construction activities and the operation of the drainage systems.

3. You are required to obtain a National Pollutant Discharge Elimination System (NPDES) permit for the discharge of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55). For the following types of discharges into Class A or Class 2 State waters, you may apply for NPDES general permit coverage by submitting a Notice of Intent (NOI) form:

   a. Storm water associated with construction activities, including clearing, grading, and excavation, that result in the disturbance of equal to or greater than one (1) acre of total land area. The total land area includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a larger common plan of development or sale. An NPDES permit is required before the start of the construction activities.

   b. Hydrotesting water.

   c. Construction Activity Dewatering.

   You must submit a separate NOI form for each type of discharge at least 30 calendar days prior to the start of the discharge activity, except when applying for coverage for discharges of storm water associated with construction activity. For this type of discharge, the NOI must be submitted 30 calendar days before to the start of construction activities. The NOI forms may be picked up at our office or downloaded from our website at http://www.hawaii.gov/health/environmental/water/cleanwater/forms/genl-index.html.

4. For types of wastewater not listed in Item 3 above or wastewater discharging into Class 1 or Class AA waters, you may need an NPDES individual permit. An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. The NPDES application forms may be picked up at our office or downloaded from our website at http://www.hawaii.gov/health/environmental/water/cleanwater/forms/indiv-index.html.

Department of the Navy
Naval Facilities Engineering Command
Pacific Division
Attn: EV21, MV-22/H-1 EIS Project Manager
August 16, 2010
Page 3

08032PMT.10

5. Please call the Army Corps of Engineers at (808) 438-9258 to determine if the subject project will require a Department of the Army (DA) permit(s). Permits may be required for work performed in, over, and under navigable waters of the United States. Projects requiring a DA permit also require a Section 401 Water Quality Certification (WQC) from our office.

6. Please note that all discharges related to the project construction or operation activities, whether or not a NPDES permit coverage and/or 401 WQC are required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of $25,000 per day per violation.

If you have any questions, please visit our website at http://www.hawaii.gov/health/environmental/water/cleanwater/index.html, or contact the Engineering Section, CWB, at 586-4309.

Sincerely,

Alec Wong

ALEC WONG, P.E., CHIEF
Clean Water Branch

MT:ml

c: DOH - EPO # I-3295 [via email only]

CHARMAINE TAVARES
Mayor

TAMARA HORCAJO
Director

ZACHARY Z. HELM
Deputy Director

(808) 270-7230
FAX (808) 270-7934

DEPARTMENT OF PARKS & RECREATION
700 Hali'a Nakoa Street, Unit 2, Wailuku, Hawaii 96793

August 17, 2010

Ms. Karen Sumida
Business Line Manager, Environmental
Department of the Navy
Naval Facilities Engineering Command, Pacific
258 Makalapa Drive, Suite 100
Pearl Harbor, Hawaii 96860-3134

SUBJECT: NOTICE OF INTENT
EIS FOR THE BASING OF MV-22 AND H-1 AIRCRAFT IN SUPPORT OF III MARINE EXPEDITIONARY FORCE ELEMENTS IN HAWAII

Dear Ms. Sumida:

Thank you for the opportunity to comment on your Notice of Intent. Our department has reviewed the referenced document and we have no comment or objection to this project.

Should you have any questions or concerns, please feel free to contact me or Steve Grogan, CIP Coordinator, at 270-6158.

Sincerely,

Tamara Horcajo

TAMARA HORCAJO
Director of Parks & Recreation

c: Patrick Matsui, Chief of Planning and Development Division

TH:PTM:sg

C:\Documents and Settings\County Employee\Desktop\SUBDIVISIONS\No Objections - III Marine Exped Force.doc

From: Tammy Sumida
To: mv22h1eis;
Subject: Comments - EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii
Date: Friday, August 20, 2010 5:54:43 PM

Please complete the following information:

Name: Tammy Yamanoha
Company/Organization: Resident
Mailing Address: 46-042 Heeia Street
City: Kaneohe
State: HI
Zip Code: 96744

Add to Mailing List? (Yes or No): No

Comments: While I support the military and all that our armed forces do for us, I ask that you do something about the noise from the jets. This past RimPac, the sound of the jets was so loud, that it scared my children and now the younger one freaks out any and every time she hears an aircraft. Our home is right in line across the bay from the KMCAS runway, so we're talking all the time. In addition, there should be a cut off time as I have been awakened by aircraft passing overhead at 1a, and also find myself cringing late at night (10p-after midnight) hoping the noise will not wake the kids.

From: Cory (Martha) Harden
To: mv22h1eis; celso.tadeo@us.army.mil;
Subject: public involvement
Date: Sunday, August 22, 2010 8:52:21 PM

Dear military officials,

I urge you to allow more public involvement in these upcoming meetings.

Allow public speaking at the scoping meetings for
MARINE AIRCRAFT SQUADRONS bringing about 2000 military-related people, 40 aircraft, and extensive construction to the Hawaiian Islands

Allow public speaking at the scoping meetings for
NAVY SONAR, EXPLOSIVES, GUNNERY, AND SHIP-SINKING that will kill marine animals near Hawai'i and California

Invite the public, not just hand-picked guests, to the
POHAKULOA DEPLETED URANIUM Human Health Risk Assessment announcement

Citizens should be able to publicly state what they think of the tremendous amount of land, ocean, and airspace put to military use in Hawai'i, the severity of impacts to our environment and to native Hawaiian culture, and the plans for continued expansion

When the Army forbade public speaking at a 2007 Stryker meeting, citizens risked arrest by bringing their own sound system and speaking out. David Henkin of Earthjustice said " 'Without sharing there's no real communication of the community's concerns, an opportunity for people to hear from others, hear the answers given to others.' " [*Stryker meetings inflexible, Hawai'i Tribune-Herald, 1-31-07]*

Thank you for your consideration.

Cory Harden
PO Box 10265
Hilo, Hawai'i 96721
mh@interpac.net
808-968-8965

From: Janice Palma-Glennie
To: celso.tadeo@us.army.mil; mv22h1eis;
Subject: Support democratic process
Date: Sunday, August 22, 2010 10:34:35 PM

Aloha,

I'm writing to ask that you please allow meaningful public involvement and testimony in the upcoming meetings related to the following military topics:

- Allow public speaking at the scoping meetings for **MARINE AIRCRAFT SQUADRONS** bringing about 2000 military-related people, 40 aircraft, and extensive construction to the Hawaiian Islands
-
- Allow public input at the scoping meetings for **NAVY SONAR, EXPLOSIVES, GUNNERY, AND SHIP-SINKING** that will kill marine animals near Hawai'i and California.
-
- Invite the general public to the **POHAKULOA DEPLETED URANIUM** Human Health Risk Assessment announcement.
-
- Allow citizens to publicly say what they think of the significant amount of land, ocean, and airspace put to military use in Hawai'i, the severity of proven and potential impacts to our environment and native Hawaiian culture, and the plans for continued expansion.

Mahalo for supporting the democratic process in our country and, in particular, these cherished and unique Hawai`i islands.

Sincerely,
Janice Palma-Glennie
PO Box 4849
Kailua-Kona, HI 96745

CHARMAINE TAVARES
Mayor
KATHLEEN ROSS AOKI
Director
ANN T. CUA
Deputy Director

COUNTY OF MAUI
DEPARTMENT OF PLANNING

August 24, 2010

Department of the Navy
Naval Facilities Engineering Command, Pacific Division
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, Hawaii 96860-3134

Dear EIS Project Manager:

SUBJECT: **EARLY CONSULTATION IN PREPARATION OF AN ENVIRONMENTAL IMPACT STATEMENT FOR THE BASING OF MV-22 AND H-1 AIRCRAFT IN SUPPORT OF III MARINE EXPEDITIONARY FORCE ELEMENT IN HAWAII, LOCATED AT KANEOHE BAY, ISLAND OF OAHU, HAWAII (RFC 2010/0117)**

The County of Maui, Department of Planning (Department) is in receipt of the above-referenced document for the proposed III Marine Expeditionary Force element in Hawaii. The Department understands the proposed action includes the following:

- The primary alternative would take place on the Island of Oahu at Marine Corps Base Hawaii Kaneohe Bay.
- Preliminary alternatives could include construction of aviation facilities at Kaneohe Bay, landing zone improvements at Waimanalo and Molokai Training Support Facility and training and readiness operations at various training facilities state wide on land currently used by the Navy.
- The only impact to the County of Maui would be the alternative utilizing the Molokai Training Support Facility at Kalaupapa Airfield. The islands of Maui, Lanai, and Kahoolawe would not be directly impacted.

Based on the foregoing, the Department provides the following comments in preparation of the Draft Environmental Impact Statement (EIS):

1. The Draft EIS should include a discussion of how the proposed project at the Kalaupapa Airfield relates to the Molokai Community Plan.
2. Discuss what odors, noises or other associated impacts may be created at the Kalaupapa Airfield during construction and during operation and how these may affect any general public that may be near the airfield.

250 SOUTH HIGH STREET, WAILUKU, MAUI, HAWAII 96793
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CURRENT DIVISION (808) 270-8205; LONG RANGE DIVISION (808) 270-7214; ZONING DIVISION (808) 270-7253

EIS Project Manager
August 24, 2010
Page 2

Thank you for the opportunity to comment. Should you require further clarification, please contact Staff Planner Joseph Prutch by email at joseph.prutch@mauicounty.gov or by phone at (808) 270-7512.

Sincerely,

CLAYTON I. YOSHIDA, AICP
Planning Program Administrator

xc: Joseph M. Prutch, Staff Planner
Mikal S. Torgerson, Molokai Planner
Project File
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Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawai'i
EIS scoping meeting, Tuesday, August 24, 5 – 8 pm, Hilo High School cafeteria
public statement

Cory Harden, PO Box 10265, Hilo, Occupied Hawai'i 96721
mh@interpac.net 808-968-8965

I commend members of the armed forces who believe they are defending our country and our ideal of freedom. I commend their courage in risking their lives, and enduring physical and mental pain.

But tonight our armed forces forbid citizens to speak in public. Is this defending freedom? And demonstrating courage?

Citizens will tell us what officials won't.

On the big picture, citizens will tell us our armed forces are often misused--

- to employ brute force instead of statesmanship, because we have more military force than we need, bloated by a corporate-military alliance that eats up over half our national budget
- to defend our addiction to oil, and to more than our share of earth's resources
- to bail out corporations chasing profits in risky places

On tonight's proposed action, this citizen will tell you the Ospreys that may fly overhead appear to be unsafe.

- in June 2009 an experienced analyst said the Osprey is unable to "glide" to the ground if it loses power, as many aircraft can, and is difficult to maneuver
- in March 2009 Marines were accepting new Ospreys with many "deviations and waivers", some "potentially serious"
- a December 2008 New York Times editorial said "Pull the plug" on the Osprey since it is not "reliable or safe"
- In November 2007 an Osprey caught fire because of a design flaw
- in September 2007, TIME magazine called the Osprey "A Flying Shame" and said "Marines…dangerously cut corners in their [Osprey] testing program"
- in March 2007 an Osprey had a engine-compartment fire before takeoff
- in December 2006 an Osprey had a nacelle fire
- in March 2006 a just-repaired Osprey took off on its own, then crashed, snapping off one wing and causing $1 million damage
- in December 2000 an Osprey crashed in North Carolina due to a hydraulic leak and problems with control software, killing four people
- the downwash from an Ospey is so strong that it
    - may blow over people guiding landings
    - once caused a nearby helicopter to start lifting off
    - blew tree branches down onto several civilians, injuring them, in May 2010

I hope the armed forces will thoughtfully weigh what citizens tell them.

Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawai'i
EIS scoping meeting, Tuesday, August 24, 5 – 8 pm, Hilo High School cafeteria
comments by Cory Harden, PO Box 10265, Hilo, Occupied Hawai'i 96721
mh@interpac.net 808-968-8965

Aircraft impacts
Evaluate noise (added to Stryker Brigade noise) and safety risks from all proposed aircraft.

What routes will the Osprey fly, how often, at what times, and in helicopter or aircraft mode?

How does the Osprey safety record compare to other military aircraft?

Evaluate the risks of Ospreys harming military personnel and civilians, in light of the following information and opinions. *(note: Wikipedia is not quoted as an authoritative source, but as a basis for further research)*

August 7, 2010
John Pike, director of GlobalSecurity.org, quoted in Marines to shift aircraft in isles, Honolulu Star-Advertiser
" 'The aircraft that they were flying in the '90s had problems. The aircraft they are flying today does not.' "

May 31, 2010
Spectators injured as military helicopter lands in park, Los Angeles Times
"CLOVE LAKES PARK, N.Y....At least nine people were injured...unconfirmed reports say, when a military aircraft landed in a Staten Island park... The low-flying Osprey was coming in for a landing when it passed over a patch of trees...The tiltrotor aircraft caused so much downward thrust that it blew down tree branches onto unsuspecting spectators...Conflicting reports say between five and nine people...are injured. Unconfirmed reports say most of the injuries are minor."

April 2010
Wikipedia
"On 8 April 2010, a USAF CV-22 crashed in southern Afghanistan.[2] Three US service members and one civilian were killed and 16 injured in the crash.[5] It is unclear if the accident was the result of enemy fire. Taliban spokesmen have claimed responsibility, however previous claims for downing aircraft have often been false.[6][7] The loaded CV-22B was at its hovering capability limit, landing at night near Qalat (altitude approx. 5,000 feet) in brownout conditions, in turbulence due to the location in a gully. Evidence suggests the crash was caused by a loss of situational awareness and aerodynamic control.[5][6]"

June 23, 2009
Closing Statement of Chairman Edolphus Towns, House of Representatives, Committee on Oversight and Government Reform
"...there is at least some evidence that the aircraft is inherently unsafe. To sum up, it has problems in hot weather, it has problems in cold weather, it has problems with sand, it has problems with high altitude, and it has restricted maneuverability."

June 23, 2009
Written testimony of Arthur Rex Rivolo before the House of Representatives, Committee on Oversight and Government Reform
"From June 1992 to March 2009 I was the principal analyst for the MV-22 and CV-22 at the Institute for Defense Analyses (IDA), a nonprofit organization supporting the Office of Secretary of Defense, Director of Operation Test and Evaluation. In that capacity I have independently analyzed and evaluated extensive flight test and engineering data of the V-22, participated in engineering discussions with US Navy and Bell-Boeing engineers, participated in test planning working group meetings, observed flight testing, and flown as an observer aboard V-22s during routine operational missions and during official flight evaluation periods. On 13 March 2009 I terminated my employment at IDA and have since severed all relations with the organization. I am here as a private citizen expressing my personal views...
Lack of Autorotation Capability Autorotation is a helicopter's version of gliding. All helicopters have the ability to glide safely to ground following a complete and abrupt interruption of power caused by either engine(s) failure or by the deliberate removal of power to the rotors by pilot action necessitated by failures within the drive system of rotors, or failures within the rotors themselves. The inability of V-22 to safely autorotate has now been acknowledged by the manufacturer and the US Marine Corps, but little significance has been given to the implication this raises, which is – *the V-22 would fail to meet basic airworthiness requirements by the FAA regulation if it were a civilian transport aircraft.* Despite this, the US Marine Corps leadership has shown no concerns over this issue and has no problem requiring young men and women to ride as passengers in the V-22 under combat conditions.
Although airworthiness requirements of the FAA do not apply to military aircraft, equivalent requirements have been imposed on all passenger-carrying military aircraft in the past. The V-22 represents the first departure from this policy within the Defense Department. In my opinion, this represents a cynical disregard for soldiers' lives in favor of supporting a blind allegiance to the cause of this aircraft. The adoption of this reprehensible stand by the Marine Corps leadership, as well as by the Defense Department acquisition executives and the Congress, via their passive consent, makes these parties complicit in any future V-22 combat loss where autorotation could have saved lives. I believe this conscious disregard of a substantial and unjustifiable risk qualifies as reckless behavior in the legal sense.
The V-22 proponents who argue that V-22 is capable of making a safe all engine out landing by converting to airplane mode are either fooling themselves or willfully distorting the facts. The V-22 requires 12 seconds to convert from helicopter mode to airplane mode. In this interval, when both engines are inoperable or one engine has failed along with the interconnecting drive shaft, a V-22 will lose about 1600 feet of altitude under ideal conditions (i.e., no pilot errors.) Thus, any complete power failure while in helicopter mode below 1600 feet above the ground will result in a catastrophic loss of the aircraft.
Additionally, the conversion process is so dangerous that the pilot's flight manual for the aircraft instructs (not recommends) pilots *not* to attempt conversion if the failure occurs while the nacelles are at or above 60 degrees regardless of altitude. Thus, in this case the flight manual, inexplicably, instructs pilots to enter autorotation, irrespective of altitude, knowing full well that the aircraft cannot safely autorotate. ..
Lack of Combat Maneuvering Capability The V-22 is flown by a flight control computer – not the pilot. The pilot merely asks the computer for a given change of flight path, and the computer obliges by applying the necessary aerodynamic inputs to generate the requested change. Under near-equilibrium flight conditions, i.e., straight and level flight, steady turns, climbs, and descents, etc., the pilot's request and the computer's response are nearly simultaneous and the delivered inputs are exactly those requested by the pilot. However, under non-steady state conditions such as during evasive maneuvering, entry into autorotation, or unusual flight conditions such as vortex ring state, the flight control computer will attempt to protect the aircraft from structural overloads and other dynamical limits such as the flapping of the rotors (rotor disk not perpendicular to spindle shaft) by not producing the commands requested by the pilot's controls positions. This tends to significantly reduce the severity of any hard maneuver commanded by the pilot - the goal of evasive maneuvering.
The fact that the pilot has enough control authority to damage the aircraft during hard maneuvering is the reason why the flight manual places restrictions on how much flight control inputs can be used during evasive maneuvering. That a pilot actually has enough control authority to "break" the aircraft is unique to V-22. Concerns over this issue in V-22 have resulted in a significant decrease in the amount of control authority given to the pilot, making the aircraft less and less maneuverable. Key tests of combat evasive maneuvering scheduled in 2002 remain, to my knowledge, to be completed. Sending V-22 into real combat situations without the completion of these critical tests is, in my opinion, irresponsible."

May 2009
Defense Acquisitions, Assessments Needed to Address V-22 Aircraft Operational and Cost Concerns to Define Future Investments, General Accounting Office
"...a crash in 1991 and a fatal crash in 1992 that resulted in seven deaths...Following two fatal crashes that occurred in 2000 and resulted in 23 deaths, the last one occurring just before the full-rate production decision, the V-22 was grounded and, rather than proceeding to full-rate production, the program was directed to continue research and development at a minimum sustaining production rate of 11 aircraft per

year. Before the V-22 resumed flight tests, modifications were made to requirements and design changes were made to the aircraft to correct safety concerns and problems. The aircraft nacelles11 were redesigned to preclude line chafing; a robust software qualification facility was built; and Vortex Ring State, a dangerous aerodynamic phenomenon that all rotor wing aircraft are subject to and was reported to have contributed to one of the fatal V-22 crashes in 2000, was further investigated. Requirements for landings in helicopter mode in which engine power had failed ("autorotation") and nuclear, chemical and biological weapons protection among others were eliminated, and some KPPs were modified, prior to conducting a second round of operational testing with modified aircraft in June 2005.13 Testers then recommended that the aircraft be declared operationally effective and suitable for military use. The Defense Acquisition Board approved it for military use as well as full-rate production in September 2005." *[p. 7-8]*

" The MV-22's downwash has been described as significantly greater than that of the CH-46. During prior operational tests, concerns were raised about the effect of downwash on operations below the aircraft, including troop embarkation and debarkation, hooking up external loads, and fastroping. Recent shipboard tests have identified safety issues related toMV-22 downwash, including dislodging equipment such as life raft securing bands, and potentially blowing down the sailor who stands on the flight deck of the ship guiding the aircraft to a safe landing. To resolve these problems, life raft containers have been replaced through ship alterations with containers intended to withstand the downwash, and, during one training exercise on an L-class ship, another person was assigned to physically hold in place the sailor acting as the landing guide when MV-22s were landing. Downwash of the MV-22 interacting with other aircraft was also noted onboard ship. In one documented incident, downwash from a landing MV-22 exerted such force on the helicopter next to it that the helicopter's pilot had to take action to prevent his aircraft from lifting off the ship. Downwash concerns, however, are not restricted to shipboard operations. Recently completed tests on the CV-22 found that the significant downwash also had various negative effects on the landbased missions." *[p. 23]*

"...according to recent MV-22 tests, the V-22's IPS is not reliable. Flying through known or forecasted icing conditions is currently prohibited. The status of the IPS is one of the main issues preventing the MV-22 from being fully mission capable. Additionally, the MV-22 currently does not have weather radar. Incorporation of weather radar into a later Block upgrade is planned to give the aircraft the ability to fly in other adverse weather conditions that may be encountered." *[p. 24]*

March 2009
GAO-09-326SP Defense Acquistions, Assessments of Major Weapon Programs, General Accounting Office, p. 142

"The program also plans to integrate an all-weather radar into the V-22...The program is... modifying the engine air particle separator to prevent engine fires and enhance system reliability; and improving the environmental control system...In March 2008, the V-22 program signed a $10.4 billion multiyear production contract with Bell Boeing for the production of 167 aircraft through 2012, even though aircraft continue to be conditionally accepted with deviations and waivers relating to components such as brakes, landing gear, hydraulic hoses, de-icing systems, and radar altimeters."

FY 2009
Wikipedia

"An Air Force CV-22 suffered a Class A mishap causing more than a million dollars in damage sometime during FY 2009. No details were released.[19]"

December 2008
Editorial: How to Pay for a 21st-Century Military, New York Times

"Pull the plug on the Marine Corps's V-22 Osprey. After 25 years of trying, this futuristic and unnecessary vertical takeoff and landing aircraft has yet to prove reliable or safe. The 80 already built are more than enough. Instead of adding 400 more, the Marine Corps should buy more of the proven H-92 and CH-53 helicopters."

November 2007
Wikipedia

"An MV-22 Osprey of VMMT-204 caught fire during a training mission and was forced to make an emergency landing at Camp Lejeune on 6 November 2007. The fire, which started in one of the engine nacelles, caused significant damage to the aircraft. However, no injuries resulted from the incident.[17] After an investigation, it was determined that a design flaw with the EAPS (engine air particle separator) caused it to jam in flight, causing a shock wave in the hydraulics system and subsequent leaks. This hydraulic fluid leaked into the IR suppressors and was the cause of the nacelle fires. As a result, all Block-A V-22 aircraft were placed under flight restrictions until modification kits could be installed. No fielded Marine MV-22s were affected, as those Block-B aircraft already incorporated the modification.[18]"

October 2007
Wikipedia

"Upon delivery of the Osprey to a combat zone for the first time, one of the ten aircraft experienced an unidentified malfunction which required it to land in Jordan on 4 October 2007. It was repaired and took off again for Iraq but the malfunction returned, forcing it to turn back and land in Jordan for new repairs.[16]"

September 26, 2007
V-22 Osprey: A Flying Shame, TIME magazine

"V-22 crashes have claimed the lives of 30 men... all before the plane has seen combat... if the plane's two engines are disabled by enemy fire or mechanical trouble while it's hovering, the V-22 lacks a helicopter's ability to coast roughly to the ground — something that often saved lives in Vietnam. In 2002 the Marines abandoned the requirement that the planes be capable of autorotating (as the maneuver is called), with unpowered but spinning helicopter blades slowly letting the aircraft land safely. That decision, a top Pentagon aviation consultant wrote in a confidential 2003 report obtained by TIME, is "unconscionable" for a wartime aircraft. "When everything goes wrong, as it often does in a combat environment," he said, "autorotation is all a helicopter pilot has to save his and his passengers' lives." ... Probes into the deadly 2000 crashes revealed that in a rush to deploy the aircraft, the Marines had dangerously cut corners in their testing program. The number of different flight configurations — varying speed, weight and other factors — flown by test pilots to ensure safe landings was reduced by half to meet deadlines. Then only two-thirds of those curtailed flight tests were conducted. That trend continues: while a 2004 plan called for 131 hours of nighttime flight tests, the Marines managed to run only 33 on the Osprey. Why the shortcuts? Problems with a gearbox kept many V-22s and pilots grounded. That meant many pilots lacked the hours required to qualify for night flying. Similarly, sea trials were curtailed because the ship designated to assist with Osprey tests could spare only 10 of the 21 days needed... After the 2000 grounding, Osprey pilots were told to fly less aggressively, which critics say is the only reason no V-22 has crashed since... The director of the Pentagon's testing office, in a 2005 report, put it...bluntly. If power is lost when a V-22 is flying like a helicopter below 1,600 ft. (490 m), he said, emergency landings "are not likely to be survivable."... the V-22 continues to suffer problems unusual in an aircraft that first flew in 1989. In March 2006, for example, a just-repaired V-22 with three people aboard unexpectedly took off on its own — apparently the result of a computer glitch. After a 3?sec. flight to an altitude of 6 ft. (about 2 m), according to the V-22's flight computer, or 25 ft. (about 8 m), according to eyewitnesses, it dropped to the ground with enough force to snap off its right wing and cause more than $1 million in damage.There's more. Critics have had long-standing concerns about the poor field of view for pilots, the cramped and hot quarters for passengers and the V-22's unusually high need for maintenance. A flawed computer chip that could have led to crashes forced a V-22 grounding in February; bad switches that could have doomed the aircraft surfaced in June. In March the Government Accountability Office warned that V-22s are rolling off the production line in Amarillo, Texas, and being accepted by the Marines "with numerous deviations and waivers," including "several potentially serious defects." An internal Marine memo warned in June that serious and persistent reliability issues could "significantly" reduce the aircraft's anticipated role in Iraq. V-22s built before 2005, the report said, are fully ready to fly only 35% of the time, while newer models, like those in Iraq, are 62% ready."

March 2007
Wikipedia
"A V-22 experienced a hydraulic leak that led to an engine-compartment fire before takeoff on 29 March 2007.[14] It was also reported at that time that a more serious nacelle fire occurred on a Marine MV-22 at New River in December 2006.[14][15]

February 2007
Wikipedia
"The Air Force and Marine Corps commands temporarily grounded their entire fleet on 10 February 2007 after discovering a glitch in a computer chip that could cause the aircraft to lose control.[13]

July 2006
Wikipedia
"A V-22 experienced compressor stalls in its right engine in the middle of its first transatlantic flight to the United Kingdom for the Royal International Air Tattoo and Farnborough Airshow on 11 July 2006.[11] It had to be diverted to Iceland for maintenance. A week later it was announced that other V-22s had been having compressor surges and stalls, and the Navy launched an investigation into it.[12]

Early 2006
Wikipedia
"A V-22 experienced an uncommanded engine acceleration while ground turning at Marine Corps Air Station New River. Since the aircraft regulates power turbine speed with blade pitch, the reaction caused the aircraft to go airborne with the Torque Control Lever (TCL, or throttle) at idle. The aircraft rose 6 feet (1.8 m) into the air, and then fell to the ground with enough force to damage one of its wings; the total amount of damage was around US$ 1,000,000. It was later found that a miswired cannon plug to one of the engine's two Full Authority Digital Engine Controls (FADEC) was the cause. The FADEC software was also modified to decrease the amount of time needed for the switch between the redundant FADECs to eliminate the possibility of a similar mishap occurring in the future."

November 2004
Wikipedia
"A USMC MV-22B, BuNo *165838*, loses a substantial piece of a prop-rotor blade during test flight in Nova Scotia, Canada, on 26 November 2004, but is able to make safe precautionary landing at CFB Shearwater despite severe airframe vibration.[9]

December 2000
Wikipedia
"On 11 December, vibration-induced chafing from an adjacent wiring bundle caused a leak from the hydraulic line which fed the primary side of the swashplate actuators to the right side rotor blade controls. This leak caused a Primary Flight Control System (PFCS) alert. A previously undiscovered error in the aircraft's control software caused it to decelerate in response to each of the pilot's eight attempts to reset the software as a result of the PFCS alert. The uncontrollable aircraft fell 1,600 feet (490 m) into a forest in Jacksonville, North Carolina, killing all four aboard. The wiring harnesses and hydraulic line routing in the nacelles were subsequently modified.[1]

April 2000
Wikipedia
"A V-22 loaded with Marines, to simulate a rescue, attempted to land at Marana Northwest Regional Airport in Arizona on 8 April 2000. It descended faster than normal (over 2,000 ft/min or 610 m/min) from an unusually high altitude with a forward speed of under 45 miles per hour (72 km/h) when it suddenly stalled its right rotor at 245 feet (75 m), rolled over, crashed, and exploded, killing all nineteen on board.[3] The cause was determined to be vortex ring state (VRS), a fundamental limitation on vertical descent which is common to helicopters. At the time of the mishap, however, the V-22's flight operations rules restricted the Osprey to an 800 feet per minute (4.1 m/s) descent at lower than 40 knots (74 km/h) airspeed (restrictions typical of helicopters); the crew of the aircraft in question exceeded this operating restriction by descending at 1,800 ft/min (9.1 m/s).[4]
Another factor that may have triggered VRS was their operating in close proximity, which is believed to be a risk factor for VRS in helicopters. Subsequent testing has shown that the V-22, and the tiltrotor in general, is less susceptible to VRS, the conditions are easily recognized by the pilots; recovery from VRS requires a more natural action by the pilot than recovery in helicopters, the altitude loss is significantly less than for helicopters, and, with sufficient altitude (2,000 ft/610 m or more), VRS recovery is relatively easy.[5]
As a result of testing, the V-22 will have a descent envelope as large as or larger than most helicopters, further enhancing its ability to enter and depart hostile landing zones quickly and safely. The project team also dealt with the problem by adding a simultaneous warning light and voice that says **"Sink Rate"** when the V-22 approaches just half of the VRS-vulnerable descent rate.[ ] "

July 1992
Wikipedia
"On 20 July 1992, a leaking gearbox led to a fire in the right nacelle, causing the aircraft to drop into the Potomac River in front of an audience of Congresspersons and other government officials at Quantico, killing all seven crewmen and grounding the aircraft for 11 months."

June 1991
Wikipedia
"A miswired flight control system led to two minor injuries when the left nacelle struck the ground while the aircraft was hovering 15 feet (4.6 m) in the air, causing it to bounce and catch fire on 11 June 1991."

Past and present violations of national and international laws
Explain how the Federal, State, regional, and local governments in Hawai'i have legal authority to pursue this action, since

- the 1893 overthrow of the Kingdom of Hawai'i was illegal, per P.L. 103-150
- there is no annexation treaty between the Kingdom of Hawai'i and the U.S—only a U.S. congressional joint resolution on annexation dated July 7, 1898

If there are any legal instruments which allow U.S. military presence in the Kingdom of Hawai'i, identify them. They may include--
1-international, Federal, and State laws
2-international, Federal, and State court decisions
3-international treaties

Explain the legality of past, present, and planned use of Kingdom of Hawai'i land to further the military objectives of the occupying country, the U.S.

Evaluate cumulative impacts of U.S. occupation of Hawai'i, military presence, and the proposed action on native Hawaiians and the nation of Hawai'i

- Include impacts on native Hawaiian spiritual life, culture, connection with the land, self-determination, civil rights, language, wealth, emotional and physical health, and safety (hazards on former and current bases, and risks from Hawai'i becoming a target for enemies of the U.S.

- Include data showing native Hawaiians, compared to other ethnic groups in Hawai'i, suffer from--
  low incomes (1)
  high unemployment rates (1)
  high rates of dependence on government assistance programs (1)

high risk of homelessness (1)
high rates of health problems (1)
highest incarceration rates (1)
decreasing population in Hawai'i (though increasing outside of Hawai'i) (1)
shortest life expectancy (2)

(1) OHA Datebook 2006
(2) Life and death in Hawaii: ethnic variations in life expectancy and mortality, 1980 and 1990, Braun KL, Yang H, Onaka AT, Horiuchi BY, Center on Aging, University of Hawaii, Honolulu

Old hazards
Analyze impacts from this action added to unexploded ordnance, toxins, and other hazards on the approximately 57 former military sites on Hawai'i Island, plus unofficial military dumping sites on land and in the ocean. Include a map showing all former official military sites on Hawai'i Island. Identify which sites are cleaned up, and when the rest will be cleaned up.

Classified information
Describe policies re. public disclosure of environmental impacts from actions involving classified information, for alli Department of Defense agencies involved in this action.

Purpose and need
Where are the commands that now supply attack and medium lift capability for the Kaneohe MAG (Marine Air-Ground) 24 ACE (aviation combat element)?

Evaluate the alternative of basing the MV-22 and H-1 aircraft in other locations, such as Okinawa with III MEF (Marine Expeditionary Force), which the Hawai'i MAGTF is part of.

Evaluate the alternative of basing the Hawai'i MAGTF (Marine Air Ground Task Force) in other locations, such as Okinawa.

Miscellaneous
How much training would occur at Pohakuloa?

What construction would be done at Pohakuloa?

How many new military personnel and dependents would be stationed on Hawai'i Island?
If new military personnel on O'ahu receive housing allowances, how will housing prices on Hawai'i Island be affected?

NEPA issues
Do "no-public-speaking" meetings fulfill NEPA requirements?

"David Henkin, a lawyer for Earthjustice...said the Army has an obligation to actively seek public comment as part of the environmental impact statement process...[Henkin said] 'Without sharing there's no real communication of the community's concerns, an opportunity for people to hear from others, hear the answers given to others.' " *[Stryker meetings inflexible, Hawai'i Tribune-Herald, 1-31-07]*

I was with 70-plus people, led by Sam Kalelike (spelling??) of the Reinstated Hawaiian Government and Jim Albertini of Malu 'Aina Center for Non-Violent Education and Action, who risked arrest to turn a Hilo Stryker meeting a few years ago into a public-speaking meeting. The Army planned to take comments only to a stenographer or I think by video. Jim brought a sound system. The police started to take it, but the Army stopped them. People spoke for several hours in opposition to Strykers. We raised issues the Army downplayed in their meeting information---environmental degradation, impacts on native Hawaiian culture, the tremendous military footprint on Hawai'i, the illegal occupation of Hawai'i by the U.S. At similar O'ahu meetings, William Aila stormed out in protest, and other people brought a bullhorn so they could speak. These "no-public-speaking" meetings seem to be part of a recent trend by all military branches to mute community opposition to their growing footprint in Hawai'i.

What is the rest of the plan to "restructure and shift...forces?" Should the entire plan be covered in this EIS to avoid segmentation?

"The aircraft stationing is part of a plan by the Marines to restructure and shift their forces in the Pacific." *[Marines to shift aircraft in isles, Honolulu Star-Advertiser, 8-7-10]*

"Over the next decade, the Marine Corps plans to restructure and rebase its forces in the Pacific." *[Notice of Intent, Federal Register, 8-6-10. P. 47563]*

Should the West Coast and Hawai'i actions all be evaluated in one EIS?

"On Nov. 19 [2009] the Navy announced its decision to base up to 10 MV-22 squadrons, for a total of 120 Ospreys, on the West Coast to replace nine helicopter squadrons." *[Marines to shift aircraft in isles, Honolulu Star-Advertiser, 8-7-10]*

Should this EIS include the Navy plan to replace aircraft at Kaneohe?

"The mix of aircraft at Kaneohe Bay is likely to change in other ways. The Navy finalized a plan in late 2009 to replace all but three of its 27 propeller-driven P-3C Orion surveillance and reconnaissance aircraft with 18 P-8A Poseidon multimission jet aircraft based on the Boeing 737-800, but with strengthened wings, weapons systems and added fuel tanks.
The move to Poseidon surveillance aircraft would result in fewer airplanes and personnel at the Marine Corps base, slightly more noise and an investment of $147.5 million for infrastructure upgrades, the Navy said.
The Navy said at the time that it wanted to begin replacing the Orions in its fleet no later than 2012 and have the process completed by 2019." ." *[Marines to shift aircraft in isles, Honolulu Star-Advertiser, 8-7-10]*

Cumulative impacts —include these actions
Marines October 2008 EA Development and Use of Military Training Facilities on Pohakuloa
Army Joint High Speed Vessel
Army Pohakuloa mock airfield
Army Stryker EIS
Navy 2009 EIS/ OIES
Navy current EIS to expand area
Army's application for Nuclear Regulatory Commission depleted urainum license
National Guard construction in Hilo
Civilian—Saddle Road construction
Proposed Thirty Meter Telescope

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An Brief Overview of Militarization and Resistance in Hawai'i

A DMZ-Hawai'i / Aloha 'Aina Paper By Kyle Kajihiro
March 1, 2007

The Roots of the U.S. Militarization of Hawai'i: Invasion and Occupation

The militarization of Hawai'i was driven by the desire of U.S. leaders to access markets and resources in Asia and was amplified by their ideology of white supremacy. In the 19th century, the independent Kingdom of Hawai'i had entered into treaties with dozens of other nations, including the United States, Great Britain and France. But due to its strategic location and role as a vital refueling and provisioning stop for nearly all transpacific commerce Hawai'i was a highly coveted prize to U.S. leaders with imperial ambitions.

In the photo above, troops from the U.S.S. Boston come ashore in Honolulu in 1893 at the request of U.S. Minister and annexationist John L. Stevens.

In 1873 U.S. military spies picked Waimomi, which is one of the original names of Pearl Harbor, as the "key to the central Pacific Ocean."[1] In 1887 *haole* (white foreigner) business leaders and descendents of missionaries staged a coup d'etat and forcibly enacted the "Bayonet Constitution", which dramatically shifted power to the haole minority and disenfranchised most of the non-white population.[2] This enabled the leaders of the coup to adopt a new Treaty of Reciprocity that ceded exclusive use of Pearl Harbor to the U.S. in exchange for dropping tariffs on Hawai'i grown sugar, a move that was strongly opposed by Hawaiian nationals.

When Kalakaua's successor, Queen Lili'uokalani tried to restore provisions of the former Hawaiian constitution, the haole coup leaders conspired with the rougue U.S. Minister John Stevens to land U.S. troops. On January 17, 1893, U.S. Marines from the U.S.S. Boston backed the conspiracy to oust the Queen. To avoid bloodshed and preserve Hawai'i's neutrality, the Queen temporarily yielded to the U.S. troops, expecting that leaders in Washington, D.C. would disavow the military action in accordance with its treaties, and restore Hawai'i's sovereignty. But despite President Cleveland's acknowledgement of the illegality of the U.S. military invasion of Hawai'i, the U.S. did not act to restore the Kingdom.

Despite successful protests by Hawaiian nationals to defeat two attempted treaties of annexation to the U.S., the outbreak of the Spanish-American War triggered the full-scale military occupation of Hawai'i.[3] On July 6, 1898, Congress passed a simple joint resolution that authorized the seizure of Hawai'i. Virtually overnight, Hawai'i became the hub of the United States' vast military enterprise in the Pacific and a launching pad for its imperial thrust into Asia.[4]

U.S. occupation brought unbridled military expansion in Hawai'i. Construction of a naval base at Pearl Harbor began in 1900, destroying 36 traditional Hawaiian fishponds and transforming what was once a rich food source for O'ahu into a vast naval station. This was soon to be followed by the construction of Fort Shafter, Fort Ruger, Fort Armstrong, Fort DeRussy, Fort Kamehameha, Fort Weaver and Schofield Barracks. General Macomb wrote "Oahu is to be encircled with a ring of steel."[5] From 1898 to 1941, Hawai'i was ruled by a haole oligarchy that controlled the government and business and a military occupation that provided the force to control the majority non-white population of Kanaka Maoli and Asian settlers in Hawai'i.

> **"[PEARL HARBOR] IS THE KEY TO THE PACIFIC, IT IS THE GEM OF THESE ISLANDS."**
> **-GENERAL JOHN M. SCHOFIELD, 1873**

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In the above cartoon from 1898 a woman (Hawai'i) and Uncle Sam are getting married, kneeling before the minister (McKinley) who is reading from a book entitled "Annexation Policy". The bride seems ready to bolt. Behind the couple stands Morgan (jingo) with a shotgun. Courtesy of the Bernice Pauahi Bishop Museum Archives.

World War II and the Expansion of U.S. Empire

The Japanese surprise attack on U.S. military targets in Hawai'i on December 7, 1941 provided the long-anticipated opportunity and the justification for the military to impose martial law in Hawai'i.[6] Many of Hawai'i's Japanese community leaders were arrested, put in detention centers and shipped off to concentration camps in America. Large tracts of land were seized through presidential executive orders, swelling military land holdings to its peak of 600,000 acres (242,806.8 hectares) in 1944.[7]

The transition from World War II to the Cold War transformed Hawai'i from a remote military outpost of the United States into the center from which the U.S. projected its power outward across the Pacific. Tragically it turned Hawai'i into both a casualty of and an accomplice in the building of empire.

The U.S. Pacific Command (PACOM), the oldest and largest of the United States' unified commands, was established in Hawai'i on January 1, 1947.[8] The PACOM area of responsibility stretches over more than 50 percent of the earth's surface and encompasses 43 countries, 20 territories and possessions and 10 U.S. territories, 60 percent of the world's population, the world's six largest armed forces, and five of the seven worldwide U.S. mutual defense treaties.[9] PACOM has 300,000 military personnel in the theater (one fifth of the total U.S. active-duty military force), including 100,000 forward-deployed troops in the western Pacific.[10] Kanaka Maoli activist Kaleikoa Kaeo described the US military in Hawai'i as a monstrous *he'e* (octopus), its head represented by the Pacific Command headquarters, its eyes and ears the mountaintop telescopes, radar facilities, and underwater sensors, and its brain and nervous system the supercomputers and fiber optic networks that crisscross the islands. The tentacles of the he'e stretch from the west coast of North America to the East Coast of Africa, from Alaska to Antarctica.

> **"OAHU IS TO BE ENCIRCLED WITH A RING OF STEEL."**
> **-GENERAL MACOMB, 1911**

The U.S. Military In Hawai'i Today

Today the enormity of the U.S. military presence in Hawai'i is staggering:

- ▲ According to the U.S. Department of Defense, the combined military branches in 2004 have 161 military installations in Hawai'i (4 large, 4 medium and 153 small installations).
- ▲ The military controls 236,303 acres (95,626.6 hectares) in Hawai'i[11], or 5.7 percent of the total land area.
- ▲ On O'ahu, the most densely populated island, the military controls 85,718 acres (34,688.2 hectares) out of 382,148 acres (154,646.9 hectares), or 22.4 percent of the island.
- ▲ The military also controls vast stretches of ocean, including Defensive Sea Areas in Kane'ohe Bay, from Pearl Harbor to Koko Head, and off the west shore of Kaua'i.[12] The entire Hawaiian archipelago is surrounded by 210,000 square miles (54,388,733.8 hectares) of ocean military operating areas and 58,599 square miles (15,176,787.7 hectares) of military special use airspace.[13]
- ▲ According the State of Hawai'i in 2003 there were 44,458 active duty military per-

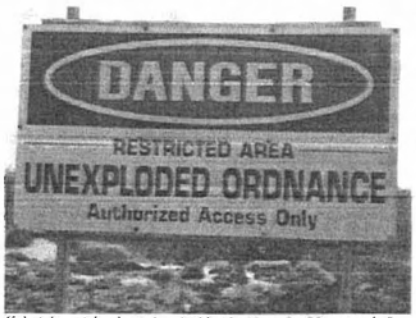
2

sonnel and 56,572 military dependents living in Hawai'i, the combined total of which amounted to 8 percent of Hawai'i's population of 1,257,608.[14] Combined with the 116,000 retired military personnel living in Hawai'i[15], the military-connected population totaled 217,030, or 17 percent of Hawai'i's total population. The 2000 U.S. Census found that Hawai'i has the largest percentage of its population in the military among the states.[16]

Key Issues

Taking Land

The military taking of land is a major source of conflict in Hawai'i. In 1898, the U.S. seized nearly 1.8 million acres (728,420.5 hectares) of government and crown lands of the Kingdom of Hawai'i. These so-called "ceded lands" are held in a quasi-trust status by the Federal government and the State. In 1959, when the U.S. incorporated Hawai'i as a state, the military retained control of approximately 180,000 acres (72,842 hectares) of the "ceded lands", while the rest reverted to the State as trustee.[17] Approximately 30,000 acres (12,140.3 hectares) of the land returned to the State were simultaneously leased back to the military for 65 years.[18] In most cases, the rent paid by the military was a token one dollar for the term of the lease. Today, more than 112,173 acres (45,394 hectares), or roughly 54 percent of military-controlled land in Hawai'i consist of the former government and crown lands of the Hawaiian nation.[19] During World War II other private parcels of land were seized by the U.S. to further its war aims.



Koho'olawe island was bombed by the Navy for fifty years before ptotests brought the destuction to a stop.

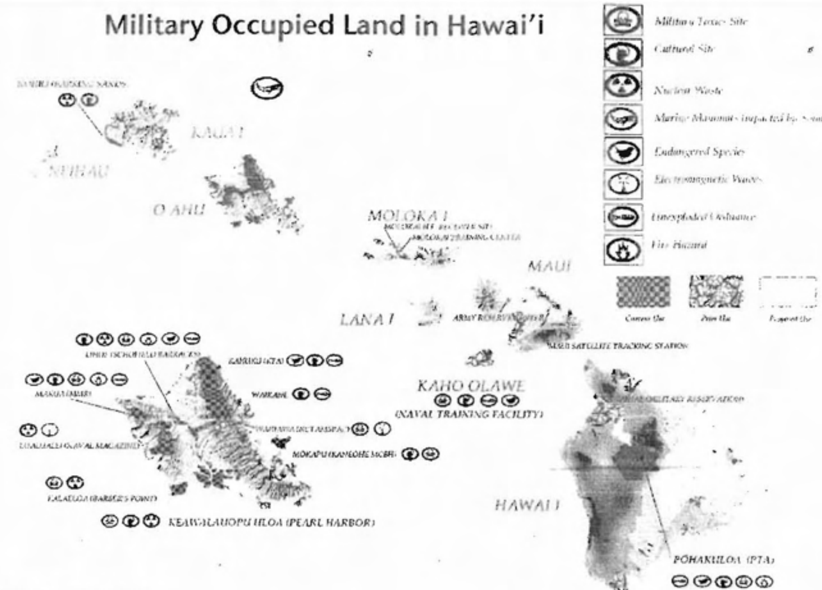
Threats to Native Hawaiian Cultural Survival

The displacement of Kanaka Maoli from their ancestral lands has resulted in the loss of subsistence and cultural resources. The cultural conflict over *'aina* (the Hawaiian word for land) goes much deeper than a simple matter of property rights or land use. There is a fundamental contradiction between Kanaka Maoli and western world views about the environment itself. In the Kanaka Maoli cosmology, the 'aina is the ancestor of the people, the physical manifestation of the union between the gods Papahanaumoku (Papa who gives birth to islands), the earth-mother, and Wakea, the sky-father. As a living ancestor, the 'aina could not be owned, sold or defiled. By severing the genealogical ties between Kanaka Maoli and their 'aina and by disrupting their ability to practice and transmit their culture to future generations, the military seizure of land continues to have profound impacts on the cultural survival of Kanaka Maoli. Military destruction of land is a form of violence against the people themselves.

Forced cultural assimilation of Kanaka Maoli has contributed to cultural disintegration. Statistics illustrate the legacy of this occupation: Kanaka Maoli have the highest rates of homelessness, poverty, disease and crime in Hawai'i.[20] They have the lowest educational achievement and life expectancy in Hawai'i.[21] Kanaka Maoli make up 36.5 percent of persons incarcerated for felony charges.[22]

In the century since the U.S. occupation began, the flood of settlers stripped Kanaka Maoli of their self-determination. The scenario resembles the population crises of other occupied nations like Tibet, East Timor, and Palestine. A combination of economic, cultural and political pressures has pushed nearly one third of Kanaka Maoli into diaspora.

By generating population transfer of U.S. nationals to Hawai'i, the military has also had a profound impact on Hawai'i's culture and political demographics. Between 1900 and 1950, migration to the Hawaiian Islands from the continental U.S. and its territories totaled 293,379.[23] The current military-connected population of 17 percent, including dependents and veterans, has



Map by Summer Nemeth

nearly eclipsed the Kanaka Maoli population of 239,655 or 19 percent of the total population.[24]

Environmental Contamination

The U.S. military is arguably the largest industrial polluter in Hawai'i. The 2004 Defense Environmental Restoration Program report to Congress listed 798 military contamination sites at 108 installations in Hawai'i, 96 of which were contaminated with unexploded ordnance. Seven of the military contamination sites were considered "Superfund" sites.[25] According to the Navy, the Pearl Harbor Naval Complex alone contains approximately 749 contaminated sites and is treated as a giant superfund site.[26] These numbers are low because they do not include contaminated sites that have not yet been listed for cleanup responses. Military installations made up five of the top ten polluters in Hawai'i responsible for releasing persistent, bioaccumulative and toxic (PBT) chemicals, which include lead, dioxins mercury, and polycyclic aromatic compounds.[27]

Military contamination hazards include unexploded ordnance, various types of fuels and petroleum products; organic solvents such as perchloroethylene and trichloroethylene; dioxins and PCB; explosives and propellants such as RDX, TNT, HMX and Perchlorate; heavy metals such as Lead and Mercury; napalm, chemical weapons, and radioactive waste from nuclear powered ships. Cobalt 60, a radioactive waste product from nuclear-powered ships, has been found in sediment at Pearl Harbor. Between 1964 and 1978, 4,843,000 gallons of low-level radioactive waste were discharged into Pearl Harbor. 2,189 steel drums containing radioactive waste were dumped in an ocean disposal area 55 miles from Hawai'i.[28] The military recently disclosed that from 1941 to 1972 it had dumped more than 8000 tons of chemical munitions, including blistering agents mustard gas and lewisite, in the shallow seas off O'ahu island. Fishermen have been burned when they accidentally raised this toxic catch.

For many years, the military denied ever using depleted uranium in Hawai'i. However in January 2006, activists forced the Army to admit the presence of depleted uranium contamination on O'ahu.

Military contamination sites are concentrated in and pose the greatest threat to Kanaka Maoli, immigrant Asian and Pacific Islanders and other low-income communities. This is called "environmental racism". Many Asians and Pacific Islanders subsist on fish and shellfish from Pearl Harbor's contaminated waters. The Wai'anae district, where a third of the land is occupied by military installations, has the largest concentration of Kanaka Maoli and some of the worst health, economic and social statistics in Hawai'i. In the late 1980s, powerful Navy radio transmitters in Lualualei valley were suspected to be the cause of a childhood leukemia cluster in the nearby Hawaiian Homestead.


Graphic from Hawaii Business, February 2005

Threats to Native Ecosystems and Endangered Species

Hawai'i is considered the endangered species capital of the world. Because of its geographic isolation, unique species and ecosystems evolved in Hawai'i over millions of years. More than 1,100 species, which represents around 82% of all native species in Hawai'i, are endemic to the islands.

Military training activities threaten native ecosystems with fires, erosion, the alteration of habitats and the introduction of alien species. Makua valley, for instance, where the military has conducted live fire training for more than 70 years, is home to over 40 endangered species. More than 270 military fires over the last 10 years have destroyed most of Makua's dryland forests except for the highest ridgelines.

Violence and Crime

Although reliable statistics on military related crime and violence in Hawai'i have not yet been compiled, there are numerous anecdotal accounts of tragic cases of violence involving military personnel including:

- ▲ This year an Army sergeant has been charged with the beating death of his 10-year old step daughter.
- ▲ In June 2002, a Pearl Harbor sailor violated a restraining order and brutally beat his wife to death with a skillet and stabbed her mother to death.
- ▲ In 1997, a Schofield Barracks soldier was sentenced to life for murdering a transgender prostitute.
- ▲ In October 2005, a Schofield Barracks soldier was charged with the murder of his pregnant ex-girlfriend, who is also a soldier.

Prostitution

As with other military base towns, prostitution in Hawai'i is fueled by the large military presence. During World War II, the military regulated prostitution in designated red-light districts. In recent years, prostitution has become more decentralized. A proliferation of strip clubs, massage parlors, escort services, hostess bars as well as street prostitution caters to military, tourist and local customers. One former prostitute estimated that in the down-

> **"THERE IS NO BETTER WAY OF SECURING THE LOYALTY OF SUCH PEOPLE THAN TO INCORPORATE THEM IN OUR MILITARY FORCES."**
> **-GENERAL SUMMERALL, 1920s**

town area at least 60% of those seeking prostitutes were from the military, and in Wahiawa, near Schofield Barracks, she estimated that the percentage jumped to 70 to 80%. She recounted how she was strangled by a military client until she hit him and escaped. According to an agency that helps prostitutes to get out of commercial sexual exploitation (CSE), Hawai'i is particularly susceptible to CSE and the trafficking of women and children due to the large tourism industry and military presence.[26]

Militarization of Youth

Hawai'i has historically had a high rate of military recruitment. In 2006, Hawai'i ranked 13th among states in the number of Army recruits per 1000 youth. Military recruiters have targeted low income communities of color who lack educational and career opportunities and are especially vulnerable to the economic enticements offered by recruiters.

Military recruiters now have unprecedented access to students through the military recruiter access provisions and student personal information disclosure requirements of the No Child Left Behind Act. Furthermore, the Pentagon has hired private data mining companies to compile a database on students.

In Hawai'i, the militarization of youth through reserve officer training corps (ROTC) programs, the proliferation of military imagery in popular culture and aggressive recruitment practices have also functioned to accelerate the assimilation and Americanization of local populations. In the 1920s, Commanding General Summerall of the Army Hawaiian Department created Hawai'i's second Reserve Officers Training Corp (ROTC) unit at McKinley High School, which was nicknamed "Little Tokyo" for its predominantly Japanese student body.[31] Summerall wrote "There is no better way of securing the loyalty of such people than to incorporate them in our military forces."[32]


Sacred offerings on a rain ko'a (shrine) on Kaho'olawe. Photo: Franco Salmoiraghi.

Economic Dependency

Hawai'i's extreme economic dependency on military spending has distorted the social, environmental and cultural priorities of policy makers, a condition some have likened to an addiction. Since September 11, 2001, U.S. military spending in Hawai'i has increased. As a result, in 2003, military expenditures, the second largest "industry" in Hawai'i behind tourism reached $4.5 billion, a 13 percent increase over 2002. "In 2003, Hawaii ranked second in the United States, with $2,566 in per-capita defense spending.... behind only one other state, Virginia, home of the Pentagon, headquarters of the U.S. Department of Defense."[33] The high rate of federal spending in Hawai'i has boosted industries like construction which have been detrimental to the preservation of cultural sites and natural resources. Housing subsidies for military personnel are indexed to market values, which tends to inflate the cost of housing, exacerbating homelessness in recent years. Military personnel in Hawai'i do not pay state income taxes. So the costs of public services are subsidized by local residents. This adds particular strains on the public school system which depends on state general funds. Federal Impact Aid that is supposed to offset the cost of providing services for military families, only makes up 1/10th of the actual cost of educating military children.

Past Resistance to Militarization in Hawai'i

Kaho'olawe

Kaho'olawe measures approximately 28,800 acres and is the smallest of the eight major islands in the Hawaiian archipelago. The island is sacred to Kanaka Maoli as an embodiment of the sea god Kanaloa. Kaho'olawe was also key to Polynesian navigation and settlement of Hawai'i. Kaho'olawe contains some of the richest cultural sites in Hawai'i. Originally part of the government lands of the Hawaiian Kingdom, the Navy seized the entire island for target practice on December 8, 1941.

In 1976, the Protect Kaho'olawe 'Ohana launched the first of several rescue landings on Kaho'olawe to protest the bombing. After years of direct action, demonstrations and lawsuits, President George H.W. Bush stopped the bombing in 1990. $400 million was appropriated for the clean up unexploded ordnance and restoration of the cultural sites and native ecosystems of the island, but the Navy failed to clean up the island to its stated goals. Instead only 1/10th of the island is now safe for human use. The movement to protect Kaho'olawe was seminal to the Hawaiian cultural renaissance, the emergence of the contemporary Hawaiian sovereignty movement, and other demilitarization struggles.

Makua Valley

The Kaho'olawe movement helped to inspire resistence to the Army in Makua valley on the west end of O'ahu. The name "Makua" means "parents." It is believed to be one of the places where Papa and Wakea came together to create life on Earth. Makua has been used as a military training area since 1929. In 1942, the remaining residents of Makua were forcibly evicted by the military. Their homes and a church were used as targets. All types of munitions have been fired and disposed of in Makua. As a result the valley is littered with unexploded ordnance and toxic chemicals. The rich cultural sites and native forest have been destroyed or seriously damaged. Since the 1970s Kanaka Maoli have fought for the clean up and return of Makua valley. The struggle continues today as the Army pushes for expanded training in Makua.

Halawa Valley / H-3 Freeway

The H-3 Freeway project was conceived in 1963 as a defense highway to connect the Marine Corps Base in Kane'ohe with Pearl Harbor. Although activists successfully asserted cultural and historic preservation laws to block the freeway from passing through Moanalua Valley, the project was realigned to Halawa Valley instead. Despite initial successes at challenging the new route, activists were trumped by Senator Daniel Inouye who passed legislation that exempted the H-3 project from applicable environmental laws. The Halawa Coalition, which was led by Kanaka Maoli women, occupied the Hale-o-Papa heiau – a women's temple in the path of the freeway - from April 1992 until their arrest in August of that year. Hale-o-Papa was saved but other sacred sites were destroyed. After a 37-year struggle, the H-3 was completed at a cost of $1.3 billion, or $80 million-a-mile, the most expensive roadway ever built.[34]

Nohili / Pacific Missile Range Facility

In the early 1990s, a coalition of Native Hawaiian and environmental organizations mobilized to block the Army Strategic Target System (STARS) missile launches at the Pacific Missile Range Facility (PMRF).[35] At issue were Kanaka Maoli burial sites in the sand dunes of Nohili, endangered species and contamination and accidents from the missiles. Thirty-five protesters were arrested for civil disobedience during the first two missile launches. Although the STARS program was de-funded by President Clinton in 1996, new threats emerged as PMRF's capabilities were expanded[36] and as work on missile defense programs later accelerated under George W. Bush.[37] Post-September 11 security measures have blocked cultural, subsistence and recreational access to beaches at Nohili and have sparked new

Kanaka Maoli youth protest against a Marine Corps amphibious landing at Bellows Air Force Base in Waimanalo.

activism. The Navy is expanding ocean training maneuvers and intensifying its use of sonar, which would be extremely dangerous to marine mammals.

Waikane Valley

Waikane in windward O'ahu contains many Kanaka Maoli sacred sites and traditional agricultural production. During World War II, the military leased 1,061 acres in Waikane and adjoining Wai'ahole for maneuver and live fire training until 1976. The Kamaka family, which owned 187 acres of the most heavily impacted areas, asked the Marines to clean up the unexploded ordnance as stipulated in the original lease. Instead, the Marine Corps condemned the parcel over the objections of the Kamaka family.

In 2003, the Marine Corps announced plans to conduct "jungle warfare" training in Waikane as part of its war on terrorism in the southern Philippines. This triggered strong protest from the community. In a public meeting held in March 2003, the community demanded that the Marine Corps cleanup and return the Kamaka family lands in Waikane. Another important development was the solidarity from Filipinos/as living in Hawai'i who challenged U.S. intervention in the Philippines as well as the training in Waikane. The Marines eventually canceled their plans for training in Waikane citing safety concerns, but they have not cleaned up the unexploded ordnance.[38]

Pohakuloa

Pohakuloa on the island of Hawai'i is a vast plain of lava fields and native dryland forest located on the "saddle" between three sacred mountains - Mauna Kea, Mauna Loa and Hualalai. Established in 1956, the Pohakuloa Training Area (PTA) encompasses 116,341 acres (47,080.6 hectare), of which 84,815 acres (34,322.8 hectares) are "ceded lands". PTA is the largest U.S. military training area in Hawai'i and the largest outside of the continental United States. Although the range is used for all types of live fire training, thousands of cultural sites have been identified within the PTA. It is the home to 21 endangered species of plants and animals. With Army proposals to expand the training area by 23,000 acres, Pohakuloa has again become a focus of resistance.


Strykers are intended for rapid deployment and for suppression of urban civil unrest.

Current Military Expansion Threats

The U.S. strategic rivalry with the China, its hostility towards North Korea, the "second front" war on terrorism in Southeast Asia and the realignment of US military forces and bases in East Asia has created added pressures to militarize Hawai'i.

Stryker Brigade

The Army is proceeding with plans to station a Stryker Brigade Combat Team (SBCT) in Hawai'i would bring 328 Stryker vehicles, 800 additional soldiers plus their dependents, and 28 construction projects to upgrade training, maintenance and housing facilities. One reporter called it "the biggest Army construction project in Hawai'i since World War II."[39]

Strykers are 20-ton light armored combat vehicles designed for rapid deployment and suppression of urban unrest. They will be stationed along with a new squadron of C-17 cargo aircraft and new high speed attack ships to provide transport for the brigade.

The Army plans to seize an additional 25,000 acres (10,117 hectares) of land - 1,400 acres (566.5 ha) in Central and Northern O'ahu and 23,000 acres (9307.6 ha) adjacent to the Pohakuloa Training Area on Hawai'i Island. The extent of the Strykers' impacts would stretch the entire length of the North Shore of O'ahu. On Hawai'i Island, the Stryker trail would go from the port at Kawaihae on the western flank of Mauna Kea to the Pohakuloa Training Area. Despite the discovery of numerous hazardous chemicals from live fire training, proposed munitions use in Hawai'i would increase by 25%. The Army's own studies concluded that cultural sites will be destroyed and that there will be serious impacts due to fire, erosion and other environmental damage.

Navy University Affiliated Research Center (UARC)

The University of Hawai'i (UH) administration wants to establish a Navy University Affiliated Research Center (UARC) at UH. The proposed Navy UARC would conduct Navy weapons related research, including development and testing of various components of the "star wars" missile defense program and other advanced military research programs. This would have harmful impacts to Mauna Kea and Haleakala where astronomy and astrophysics research is conducted, and the sand dunes of Nohili and the oceans off the north shore of Kaua'i, where missile launches and undersea warfare and sonar experiments are conducted.

A coalition of students, faculty and community launched a series of actions to protest the UARC that culminated in a week-long occupation of the UH President's office demanding cancellation of the UARC. The UH Administration has continued to pursue the UARC, but contract negotiations have been delayed due to the continued protests.

"Star Wars" Missile Defense

Hawai'i is used to test a number of missile defense programs including the Groundbased Mid-course Defense, the Aegis Missile Defense, and Theater High Altitude Area Defense programs. U.S. officials have continuously demonized North Korea as an "axis of evil" country that poses a threat to Hawai'i in order to generate fear and justify the expansion of these missile defense programs.

The 'star wars' facilities span the island chain: Pacific Missile Range Facility in Nohili, radar tracking stations at Koke'e, Makaha Ridge, and Ka'ena Point, the Air Force Optical Tracking Station on Haleakala mountain, and the supercomputer at Kihei, Maui. Lasers are tested on Haleakala. Target missiles are launched from Kaua'i.

Aircraft Carrier Strike Group

One of the largest militarization threats facing Hawai'i is the proposal to homeport an aircraft carrier strike group in Hawai'i or Guam.[10] A carrier strike group would include a nuclear powered aircraft carrier, a cruiser, two destroyers, an attack submarine and a fast combat support ship and 74 aircraft. In addition to the 3000 officers and crew of the carrier, the air wing would bring 2,600 persons. Overall, the carrier strike group could increase the population by as many as 20,000 military personnel and their family members.

Because Pearl Harbor is not large enough to homeport an aircraft carrier, major dredging and construction would be required, causing adverse environmental impacts. Due to the insufficient air base facilities to house the fighter air wing, politicians have offered to turn over the recently closed and transfered Barber's Point Naval Air Station back to the military. The final decision will be determined in the near future.

Ku'e: Current Resistance to Militarization

DMZ-Hawai`i / Aloha 'Aina

DMZ-Hawai'i / Aloha 'Aina is a network of organizations and individuals working to demilitarize and reverse the negative impacts of the enormous military presence in Hawai'i. The network was conceived at the Rethinking Militarism in Hawai'i

The Save UH / Stop UARC coalition of students, faculty and community members occupied the University of Hawai'i administration building to protest the UARC.

Conference in 2000 organized by American Friends Service Committee that brought together activists representing various movements and communities in Hawai'i as well as international resource people. The DMZ-Hawai'i / Aloha 'Aina network united environmental, peace, anti-nuclear, womens, religious and Kanaka Maoli sovereignty and independence groups for the common purpose of demilitarization. The term "DMZ" stands for Demilitarized Zone, a term reclaimed from its usual military context. "Aloha 'Aina" expresses the core Kanaka Maoli value of "love for the land" and places Hawaiian cultural and political struggle at the center of this diverse grouping.

The four key demands / points of unity of DMZ-Hawai'i / Aloha 'Aina are: (1) No Military Expansion in Hawai'i; (2) Clean up and return military occupied lands; (3) Develop sustainable economic alternatives to military dependency; and (4) Provide just compensation for harm caused by the military in Hawai'i.

The main campaigns of DMZ-Hawai'i / Aloha 'Aina are: opposing the Stryker Brigade, opposing the Navy UARC at the University of Hawai'i, supporting the struggle for clean up and return of Makua valley.

The public awareness and opposition to the Strykers have grown. Actions have included pickets, marches, civil disobedience, lawsuits and Kanaka Maoli cultural forms of resistance. The 9th Circuit Court of Appeals ruled that the Army violated the National Environmental Policy Act in stationing the Stryker Brigade in Hawai'i and ordered a halt to most projects until a proper environmental impact statement was conducted.

International solidarity has been a crucial element in the movement in Hawai'i. Hawai'i groups have taken actions to support the movements in Vieques, the Philippines, Guam, Okinawa, and the Marshall Islands. Hawai'i activists have participated in solidarity exchanges with groups in Korea, Japan, Okinawa, the Philippines, Puerto Rico, Guam, the Marshall Islands and the U.S. continent.

Demonstration at Schofield Barracks. Photo: Kapono Souza

Conclusion:

- ▲ The military occupation of Hawai'i violates Hawai'i's sovereignty and the human rights of Hawaiian nationals. Demilitarization must be a key element of a restorative justice process in Hawai'i.
- ▲ The military presence in Hawai'i generates serious and widespread negative social, cultural and environmental impacts and consequences. Of particular concern are forms of military environmental racism and threats to Kanaka Maoli cultural survival.
- ▲ Resistance to U.S. militarization in Hawai'i continues because of the enduring and cumulative harms and injustices caused by the military in Hawai'i. The U.S. must clean up and return the lands that it wrongfully occupies in Hawai'i, beginning with the areas that are most hazardous to human health and the environment.
- ▲ The military in Hawai'i is a lynchpin of U.S. empire in the Pacific that exports war and conflict around the world. Solidarity efforts, especially within the U.S. will be essential for the success of demilitarization efforts in Hawai'i, which in turn would contribute to peace in the Pacific region.

Endnotes

1. Brian McAllister Linn, Guardians of Empire: The U.S. Army and the Pacific, 1902-1940 (Chapel Hill: University of North Carolina Press, 1997) 6.
2. The infamous "Bayonet Constitution" was never properly ratified. It shifted power to the white foreigners, barred Asian immigrants from voting and naturalizing and imposed property and income requirements for voting, which resulted in the disenfranchisement of the majority of Kanaka Maoli.
3. See Noenoe K. Silva, Aloha Betrayed, Native Hawaiian Resistance to American Colonialism (Durham: Duke University Press, 2004). Also, David Keanu Sai, "American Occupation of the Hawaiian State: A Century Unchecked." Hawaiian Journal of Law & Politics 1 (Summer 2004) 46-81.
4. With the defeat of Spain the U.S. added the former Spanish colonies of Puerto Rico, Cuba, the Philippines and Guam to its list of imperial possessions. American Friends Service Committee, Resistance in Paradise: Rethinking 100 Years of U.S. Involvement in the Caribbean and the Pacific (Philadelphia: American Friends Service Committee and the Phildelphia School District, 1998).
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10. U.S. Pacific Command 1998.
11. U.S. Department of Defense. Office of the Deputy Under Secretary of Defense (Installations & Environment), Base Structure Report (A Summary of DoD's Real Property Inventory), Fiscal Year 2004 Baseline <http://www.acq.osd.mil/ie/irm/index.html>
12. U.S. Pacific Command <http://www.pacom.mil/about/pacom.shtml>
13. U.S. Department of Defense, Under Secretary of Defense (Personnel and Readiness) Report to Congress - Implementation of the Department of Defense Training Range Comprehensive Plan (February 2004) <https://www.denix.osd.mil/denix/Public/News/OSD/i366/366Final04.pdf>
14. State of Hawai'i, Department of Business, Economic Development & Tourism. State of Hawai'i Data Book 2003, Table 1.03 -- Resident Population by Military Status, 1990 to 2003. In 2003, the Department of Defense listed 54,036 active duty military personnel in Hawai'i. U.S. Department of Defense, Department of Defense Base Structure Report Fiscal Year 2003 Baseline.
15. Stanford BC Yuen. E-mail to undisclosed recipient, Subject:

"REVISED: Your Military in Hawaii Briefing" U.S. Pacific Command briefing to Neighborhood Boards (November 8, 1999)

16 Timothy Hurley, "State's military percentage tops nation," Honolulu Advertiser, August 25, 2003.

17 Sheryl Miyahira, "Hawaii's Ceded Lands," UH Law Review 3-4 (1981-82): 101-148.

18 Judy Lee Rohrer. Hawaii and the Military: The Conflict Over Land unpublished report (Honolulu: American Friends Service Committee Hawai'i Area Program, 1987).

19 Commander in Chief, U.S. Pacific Command, Hawaii Military Land Use Master Plan (1995). The figure of 54% may be low since does not include "ceded land" that was returned to the State after 1959 and then leased by the military.

20 40% of the homeless or houseless are Kanaka Maoli; 31% of Kānaka Maoli receive annual incomes less than $4000; 32% drop out of high school; only 5% have college degrees; and approximately 27% of welfare recipients are Kanaka Maoli. Office of Hawaiian Affairs, State of Hawai'i, Native Hawaiian Data Book (Honolulu: Office of Hawaiian Affairs, 2000) Table 5.4.

21 Kanaka Maoli have the highest mortality rate, the lowest life expectancy (4 years less than all other groups in Hawai'i), the highest cancer mortality rate, the highest stroke mortality rate, the highest diabetes mortality rate, and the highest infant mortality and suicide rates. Kekuni Blaisdell, "The Health Status of the Kanaka Maoli," Asian American and Pacific Islander Journal of Health 1:2 (Autumn 1993).

22 Office of Hawaiian Affairs, State of Hawai'i, Table 7.13.

23 David Keanu Sai, "American Occupation of the Hawaiian State: A Century Unchecked," Hawaiian Journal of Law & Politics 1 (Summer 2004) 63.

24 State of Hawai'i, Department of Business, Economic Development and Tourism, State of Hawai'i Data Book (Honolulu: State of Hawai'i, 2000) Tables 10.4, 10.21, 1.03, 1.29.

25 U.S. Department of Defense, Defense Environmental Restoration Program, Annual Report to Congress, Fiscal Year 2004 database search for Hawai'i projects at <http://derparc.egovservices.net/Derparc_FY04/do/home>

26 Navy Environmental Public Affairs Office, Commander Navy Region Hawaii, Site Summary Evaluation Pearl Harbor Naval Complex, Hawaii, Fact Sheet 6 June 2002.

27 U.S. Environmental Protection Agency, Hawaii Report: 2003 Toxics Release Inventory, May 2005.

28 Nadine Scott, "Pearl Harbor Problems with Radioactive Waste." Honolulu Star Bulletin, April 4, 1979.

29 Sisters Offering Support <http://www.soshawaii.org/cseproblem.html>

30 http://www.nationalpriorities.org/militaryrecruitment

31 It is important to note that the first ROTC program in Hawai'i was established in 1916 at Kamehameha Schools, a private school for Native Hawaiian elites. Walter Wright, "Kamehameha to drop Junior ROTC," Honolulu Advertiser, January 18, 2002.

32 Linn, 155.

33 Jacy L. Youn, "Tanks a lot: increased federal spending fuels the local economy," Hawaii Business, 50/8 (February 2005):24-30.

34 Stu Glauberman, "Long, winding road of controversy over H-3." Honolulu Advertiser, April 13, 1992; Kris M. Tanahara, "Halawa Valley still in dispute," Honolulu Advertiser, April 6, 1993; Kris M. Tanahara, "Marchers mark delay in Halawa Valley work," Honolulu Advertiser, August 30, 1993. Pat Omandam, "Rocky Road: Even with the opening at hand, many Hawaiians say protests may not end," Honolulu Star Bulletin, December 4, 1997; Mike Yuen, " Open Road: After decades of controversy, the 16.1-mile highway will soon open for business." Honolulu Star Bulletin, December 3, 1997.

35 The Pacific Missile Range Facility website states: "PMRF is the world's largest instrumented multi-environment range capable of supporting surface, subsurface, air, and space operations simultaneously. There are over 1100 square miles of instrumented underwater range and over 42,000 square miles of controlled airspace." <http://www.pmrf.navy.mil/>

36 U.S. Department of the Navy, Pacific Missile Range Facility Enhanced Capability Final Environmental Impact Statement (December 1998).

37 U.S. Army Space and Missile Defense Command, National Missile Defense Deployment Final Environmental Impact Statement (July 2000), U.S. Army Space and Missile Defense Command, Theater High Altitude Defense (THAAD) Pacific Test Flights Environmental Assessment (December 20, 2002); U.S. Army Space and Missile Defense Command, Ground-Based Midcourse Defense (GMD) Extended Test Range (ETR) Final Environmental Impact Statement (July 2003); and Department of Defense, Missile Defense Agency Ballistic Missile Defense System (BMDS) Draft Programmatic Environmental Impact Statement (September 1, 2004)

38 U.S. Marine Corps, Draft Environmental Assessment (EA) for the Proposed United States Marine Corps (USMC) Jungle Warfare Training Waikane Valley, Oahu, Hawaii (September 2004).

39 William Cole, "Army to transform on O'ahu," Honolulu Advertiser (April 22, 2002).

40 Commission on Review of Overseas Military Facility Structure of the United States, Report to the President and U.S. Congress (May 9, 2005) 28-29.

Unexploded ordnance in Makua. Photo: Ed Greevy

Links:

- ▲ DMZ-Hawai'i / Aloha 'Aina: dmzhawaii.org
- ▲ AFSC Hawai'i: afschawaii.org
- ▲ Save UH / Stop UARC: stopuarc.info
- ▲ KAHEA: kahea.org
- ▲ 'Ilio'ulaokalani Coalition: ilio.org
- ▲ Malu 'Aina: malu-aina.org
- ▲ Na Maka O Ka 'Aina (film and video) namaka.com
- ▲ Protect Kaho'olawe 'Ohana: kahoolawe.org
- ▲ Hawaiian Independence Blog: hawaiiankingdom.info
- ▲ Hawaiian Kingdom: hawaiiankingdom.org
- ▲ Nation of Hawai'i: hawaii-nation.org

DMZ-Hawai'i / Aloha 'Aina
c/o the American Friends Service Committee Hawai'i Area Program
2426 O'ahu Avenue, Honolulu, HI 96822
(808) 988-6266
dmzhawaii.org

This paper was made possible with the generous support of the Hawai'i People's Fund, the Funding Exchange and the Unitarian Universalist Fund for a Just Society.

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: Danny Li

ADDRESS: HC 1 Box 5295
Keaau, HI. 96749

PHONE/EMAIL: dlimay7@flex.com

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

The most obvious omission of this process is that the vast majority of citizens in Hawaii do NOT want our tax dollars being wasted in building up the military forces of the USA. The USA is a global empire that spends more on military preparations than the rest of the world combined, and the USA is involved in many illegal wars of aggression worldwide. We concerned citizens demand that we cut back drastically on the military. Hence we do not want the stationing of more Marines in Hawaii.
Peace & Aloha!

Submit your comments at the meeting today, or mail or email no later than September 7, 2010, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

This form may be used as a mailer if folded, taped or stapled, and stamped.

Please email or call government officials and candidates and urge action. Mahalo. Jim

Dear government officials and candidates,

Please help citizen voices be heard! Please urge that public speaking be allowed on the following actions, by contacting military officials beforehand, and/or by attending relevant events in person:

1. MARINE AIRCRAFT SQUADRONS bringing about 1000 active duty personnel, 1000 dependents, 40 aircraft, and extensive construction.
2. NAVY SONAR, EXPLOSIVES, GUNNERY, AND SHIP-SINKING near Hawai'i and California.
3. ARMY DEPLETED URANIUM (DU) Human Health Risk Assessment.

No public speaking will apparently be allowed at these events, despite the tremendous amount of land, ocean, and airspace put to military use in Hawai'i, the severity of impacts to our environment and to native Hawaiian culture, and the plans for continued military expansion. It is important that the community be given an opportunity to speak and hear the concerns expressed by the community. To deny that public hearing is to disempower the community.

Details follow. Mahalo for your consideration.
Jim Albertini
Malu 'Aina Center for Non-violent Education & Action P.O.Box AB Kurtistown, Hawai'i 96760
phone: 808-966-7622 email: JA@interpac.net Visit us on the web at: www.malu-aina.org

MARINE AIRCRAFT SQUADRONS scoping meetings--

HILO August 24, 5-8 pm, Hilo High School Cafeteria, 556 Waianuenue Avenue, Hilo
WAIKOLOA August 25, 4-7 pm, Waikoloa Elementary & Middle School Cafeteria, 68-1730 Ho'oko Street, Waikoloa
KANE'OHE August 26, 5-8 pm, King Intermediate School Cafeteria, 46-155 Kamehameha Hwy
MOLOKA'I August 28, 2010, 1-4 pm, Kaunakakai Elementary School Library, Ailoa Street
WAIMANALO August 30, 5-8 pm, Waimānalo Elementary & Intermediate School Cafeteria
CONTACT--mv22h1eis@beltcollins.com (808) 472-1196
Department of the Navy, Naval Facilities Engineering Command, Pacific Attn: EV21, MV-22/H-1 EIS Project Manager258 Makalapa Drive, Suite 100 Pearl Harbor, HI 96860-3134

NAVY SONAR, EXPLOSIVES, GUNNERY, AND SHIP-SINKING scoping meetings--

KAUA'I August 24, 4-8 pm, Kauai Community College Cafeteria, 3-1901 Kaumualii Highway, Lihue
HONOLULU August 25, 4-8 pm, Keehi Lagoon, Disabled American Veterans Hall - Weinberg Hall, 2685 North Nimitz Highway
HILO August 26, 4 -8 pm, Hilo High School Cafeteria, 556 Waianuenue Ave, Hilo
MAUI August 27, 4-8 pm, Maui Waena Intermediate School Cafeteria, 795 Onehee Ave, Kahului
CONTACT— http://www.hstteis.com/GetInvolved/OnlineCommentForm.aspx
Mr. Kent Randall - HSTT EIS/OEIS Naval Facilities Engineering Command, Southwest
1220 Pacific Highway, Building 1, Floor 5 San Diego, CA, 92132

DEPLETED URANIUM Human Health Risk Assessment presentation for invited guests only--

POHAKULOA August 31, 2 pm
CONTACT Mike Egami, Army Public Affairs 808-656-3152
--Celso Tadeo (808) 969-2401/2402 celso.tadeo@us.army.mil

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: Jim Albertini

ADDRESS: Malu 'Aina
PO Box AB Kurtistown, HI 96760

PHONE/EMAIL: 808-966-7622 ja@interpac.net

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

No Military Expansion, We need to demilitarize Hawaii
No Training at Pohakuloa- which is Contaminated with DU.
Hawaii County Council by a vote of 8-1 on July 2, 2008 Said stop all live fire & anything that create dust at PTA until independent assessment & clear up of DU
End US occupation of Hawaii. Reinstate the independent Nation of Hawaii.

Submit your comments at the meeting today, or mail or email no later than September 7, 2010, to:

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Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: ~~Dekine Kind~~ L.V. KELLY

ADDRESS:

PHONE/EMAIL: DeKineKind@hotMAIL.COM

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

1) How does the influx of personnel going to impact tourism regarding the heavy presence of military uniformed population in public view?

2) Regarding the influx of a large scale population, how will the increase of prostitution and behavior unbecoming a soldier be address?

3) How will the influx of support personel (civilian) impact housing availability (including additional land acquisition impact housing availability for the low income Hawaiian citizen?

4) How will Island resources in all affected areas be bolstered to accept this influx and who pays for it?

5) who pays for the additional wear and tear on the existing infrastructure?

Submit your comments at the meeting today, or mail or email no later than September 7, 2010, to:

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258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

This form may be used as a mailer if folded, taped or stapled, and stamped.

6) Should this part of the military quit the islands how will that impact be dealt with?

From: Lee Ballard
To: mv22h1eis;
Subject: Comments - EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii
Date: Tuesday, August 24, 2010 8:05:18 PM

Please complete the following information:

Name:lee ballard
Company/Organization:resident
Mailing Address:po box 6054
City:kamuela
State:HI
Zip Code:96743

Add to Mailing List? (Yes or No):yes

Comments:Pleas do not expand in Hawaii. We are already paying a heavy price for the US Military Industry. There is no enemy here.We are still cleaning up from the last expansion. Why dont you try contraction.

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: Leland Pa

ADDRESS: P.O. Box 7569
Hilo, Hawaii 96720

PHONE/EMAIL:

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

Please see Attachment "A".

Submit your comments at the meeting today, or mail or email no later than September 7, 2010, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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Attachment "A"

It has come to my attention there are two executive agreements that were entered into between Queen Lili`uokalani of the Hawaiian Kingdom and President Grover Cleveland of the United States in 1893, whereby Hawaiian executive power was temporarily and conditionally assigned to the President to administer Hawaiian Kingdom law throughout the Hawaiian Islands. This executive agreement, known as the *Lili`uokalani assignment* (January 17, 1893), was assigned under threat of war, and binds President Cleveland and successors in office in the administration of Hawaiian Kingdom law until such time as the Hawaiian Kingdom government has been restored in accordance with a second executive agreement between the Queen and President, known as the *Agreement of restoration* (December 18, 1893), whereupon the executive power would be returned and the Hawaiian Kingdom would grant amnesty to those individuals who participated or supported the 1893 insurrection.

The violations of these executive agreements are now the subject of a Federal law suit recently filed in the United States District court for the District of Columbia see Sai vs. Obama etal. Civil Case No. 1:10-CV-00899CKK. And for more information on the complaint visit Hawaiiankingdom.org.

Gentlemen, because these executive agreements exits the only way to be in compliance suggests that the U.S. Military would have to establish a provisional government as required by ARTICLE 43 of the Hauge conventions. I would strongly encourage the STAFF JUDGE ADVOCATE to review the Federal complaint to see what are it's legal ramifications, because it will not only have a profound impact on how the Military operates in Hawaii but also on all the who live here.

Leland Pa
P.O. Box 7569
Hilo, Hawaii 96720

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: Nelson Ho, Self. 8/24/10

ADDRESS:

PHONE/EMAIL: nho.hoku@gmail.com

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

1- How many bird strikes have been recorded by Marine Air Corp in Hawaii? 20yr pd?

2) What are overland routes for th that would be used to do training in PTA?

3) What endangered, threatened or rare birds would be affected by use of MV-22's at PTA & Kaneohe?

4) How will ~~the~~ C-17's be used for this proposal, if any?

Submit your comments at the meeting today, or mail or email no later than September 7, 2010, to:

Naval Facilities Engineering Command, Pacific
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258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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— see over —

5) What methods do you use to clean up large (over 50gallon) petro chemical spills? Assume initial containment measures are not effective - How do you handle soil contamination ~~of~~ by petro chemical liquids?

6) How much dust would be thrown into the air due to flying & weapon system training/use? The concern here is ability of heavy metals to become airborne & affect human health outside the impact area?

fold here

Place First Class Postage Here

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

fold here

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: PATRICK L. KAHAWAIOLA'A (KEAUKAHA COMMUNITY ASSO)

ADDRESS: 1260 ELAMA RD
HILO 96720

PHONE/EMAIL: (808) 937-8217

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

WILL MILITARY FLIGHT USE THE HILO INTERNATIONAL AIR PORT FOR ANY TRAINING MISSIONS? TOUCH & GO? NIGHT FLYING?

IF SO IMPACTS NEEDS TO ~~[illegible]~~ ASSES NOISE ISSUES AS THERE IS A NATIVE HAWAIIAN COMMUNITY CALLED KEAUKAHA NEXT TO AIRFIELD,

NOISE IMPACTS

Submit your comments at the meeting today, or mail or email no later than September 7, 2010, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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Scoping Open House Group Memory
Hilo High School
August 24, 2010

A public scoping open house for the MV-22/H-1 EIS was held at the Hilo High School cafeteria on August 24th from 5PM to 8PM. It was structured to be as an open house for all three hours. One participant, Mr. Albertini, requested that a public hearing be allowed. Because this meeting was originally designed as an open house, a public hearing session was not planned for. However, around 6:30PM, Mr. Albertini brought in his own sound system and microphone and started a public hearing. Attendees' comments and questions were recorded generally as topics, providing a "group memory" as follows.

Retired sergeant major….name? Uncle Sam

- People most affected are the kanaka maole. We come from the land. We are a neutral nation.
- Mauna Kea, Mauna Loa, Pohakuloa, Kulani. Wants to make Kulani a pu'u honua as an alternative to prisons.
- Not enough people here from the community for this show to be effective.
- Intent: justice.

2nd testimony:

- What we are doing now is damaging to generations to come.
- Only a few people run the U.S. The rest of us are pawns & slaves.
- Many good people in the military; it's the system that's bad.

Jim Albertini

- Wants a public hearing at this scoping meeting. Community hasn't been involved. This is not the way to involve the community.
- For the Stryker Brigade scoping meeting, a public hearing was held.
- There are too many meetings this week. In addition to the Marine Corps, there is a Navy meeting Thursday at this high school, and an Army meeting the following Monday at PTA.
- History of overthrow, annexation.
- Military training on the island of Hawaii.
- Pohakuloa: fire originated at Mauna Kea Park.
- High radiation readings in May 2007 at the park. Radiation at the park is from the winds.

- Hawaii County Council asked for the stopping of live-fire at Pohakuloa. Any live fire exercises creates dust. Mr. Albertini asked the Army for public meetings—dialog with community—but the Army has not done this.
- Mr. Albertini used to teach at St. Anne's in Kaneohe, but had to stop classes because of the noise from the jets.
- Kaho'olawe: history.
- Wants to see bombing at Pohakuloa stopped and would like to see it cleaned up. Cumulative impact of 57 former military sites, comparable to 9 Kaho'olawes. Concerned about depleted uranium, including impact on troops who train here. Analogy with Gulf War syndrome. Dust and winds and vehicles that travel through Pohakuloa could spread depleted uranium throughout the island. Need cleanup, not buildup.
- Made a reference to Mr. David Hencken, lawyer, stating that by failing to have a public hearing, this meeting is not in compliance with NEPA.
- Mokapu—desecrated.
- Having a bombing range in Pahokuloa is a tremendous desecration.
- Stop live fire.
- Army mission must proceed, health and safety is ignored.
- The Army has not done proper monitoring to see extent of contamination of depleted uranium.
- Dozens of weapons in arsenal contain depleted uranium. Suspicious that a lot more d.u. is being used at Pohakuloa and elsewhere, e.g., at Kwajalein in the Marshall Islands.
- Hundreds of thousands of acres on this island contaminated by unexploded ordnance (UXO).
- Testing nerve gas in the Hilo watershed.
- Lots of land at Pohakuloa is state land; wants the lease cancelled.
- Waikoloa maneuver area was used during WWII and needs to be cleaned up.
- Depleted uranium monitoring with 5-micron filters totally inadequate. Monitoring needs to use finer filters.
- Concerned about more live fire over contaminated areas with the addition of Marine Corps aircraft.
- Impact on Kurtistown—over the saddle.

Cory Haden

- Armed forces are misused: big budget, corporations,
- Concern about the Ospreys—not safe, difficult to maneuver, "deviations and waivers," not reliable or safe, "a flying shame," Marines cut corners in testing program, fires, crash in N.C. in which 4 people died.

G____ Kelly

- Daughter served in Iraq. She's 31 and sick with rheumatoid arthritis. Has impacted her family. More than 250,000 vets who are ill. Terrible suicide statistics.
- Kaneohe peninsula is dead.
- Why are people responding with terrorism.
- "Resource wars" – oil, water, etc.
- Should restore U.S. as a peaceful, productive nation.
- Hope we can build some kind of affinity or communication.

Dan Li

- Why is there need for military expansion? People want it cut but more and more money is being spent. Citizens want withdrawal from Iraq and Afghanistan. Military is carrying out illegal expansion. We need jobs and housing, not military expansion.

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: Star Newland
ADDRESS: P.O. Box 1645
Pahoa, Hawaii 96778
PHONE/EMAIL: 808 896 8658, & siriusinstitute@yahoo.com

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

Your staff left me reassured that whatever had to be done/constructed/modified/considered would be done with the utmost Regard for the aina/culture/life of Hawaii.
Give thanks for people of good heart everywhere.
Star

Submit your comments at the meeting today, or mail or email no later than September 7, 2010, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

This form may be used as a mailer if folded, taped or stapled, and stamped.

Anika Glass 808-937-2309
Waikoloa HI 96738
malamawaikoloanightingale@gmail.com

MV-22 tiltrotor Osprey aircraft and H-1 Cobra and Huey attack helicopters in support of III Marine Expeditionary Force

TESTIMONY
AUG 25
WAIKOLOA SCHOOL

Please make a requirement aircraft do not fly in the airspace directly over the parcels between Waikoloa Village and Mamalahoa Highway where approximately 500 - 700 feral donkeys roam.

Scattering and terrifying donkeys would result in serious health concerns for donkeys. It could likely cause them to panic and break down fences that enclose them.

Donkeys outside of fencing are an extreme danger to motorists.

Escaped donkeys destroy landscaped property of homeowners.

Donkeys that break down fences also then enter other property fenced off for cattle grazing, causing expenses for ranchers to repair fences, plus the expenses of their food and water going to donkeys instead of cattle.

Once out of fencing, the Marines and Army or other users of Pohakuloa will need to capture, provide veterinary care, and find property owners willing to accept them. It is possible ranchers or land owners would seek reimbursement for damages.

Thank you. Re-homed / re-located donkeys must go only to homes approved by the Humane-Society of the. U.S. in Honolulu +/or the Hawaii Island Humane Society.

Please publish a phone # that observers can call if they notice low-

flying / loud aircraft in these areas + over Waikoloa Village

Mahalo
AGlass

My group has 100 members political ~~Support~~, community, rancher, govermental, and many other supporters.

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: Bette Green

ADDRESS: 68-1844 Pilikai Pl.
Waikoloa, HI 96738

~~PHONE~~/EMAIL: bette.green@yahoo.com

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

Would like to see more pressure put on USAF to lengthen/strengthen the PTA Runways so – less heavy duty vehicle traffic on Waikoloa road.

Submit your comments at the meeting today, or mail or email no later than September 7, 2010, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: BILL SIMONSMA

ADDRESS: 68-1907 LINA POEPOE WAIKOLOA HI 96738

PHONE/EMAIL: 808-883-2134

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

CONCERNED ABOUT THE NOISE ON WILDLIFE (DOMESTIC & WILD), PEOPLE AFFECTED WHO LIVE IN WAIKOLOA.

CURRENTLEY I HEAR LOUD BOOMS WHEN YOU ARE CONDUCTING MANUEVERS AT THE POHAKULOA TRAINING AREA FROM MY HOME.

MILITARY TRAFFIC ON THE WAIKOLOA ROAD (CONVOYS) IS CAUSING WEAR & TEAR ON THE ROAD IT WOULD BE NICE IF THE MILITARY COULD FINACIALLY HELP WITH REPAIRS OR UPGRADES.

CULTURAL & ENVIRONMENTAL things ARE ALSO A CONCERN I HAVE.

Submit your comments at the meeting today, or mail or email no later than September 7, 2010, to:

Naval Facilities Engineering Command, Pacific
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mv22h1eis@beltcollins.com

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WRITTEN COMMENT FORM
Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: EDWARD K. AHUNA
ADDRESS: P.O. BOX 391109
KAILUA, Hi 96739
PHONE/EMAIL: 808-937-1225

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

Aloha Pina: Is love the land as like to your mother. I'am sure the Envisomental Impact Statement should be aceptable for Pohakuloa has been in opeoation for a number of decades. Put me on file if you need any type of community support. A concerned american.

Submit your comments at the meeting today, or mail or email no later than <u>September 7, 2010</u>, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

This form may be used as a mailer if folded, taped or stapled, and stamped.

WRITTEN COMMENT FORM
Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: Gail Jackson
ADDRESS: 68-1907 Lina Poepoe St
Waikoloa HI 96738
PHONE/EMAIL: billogail.hi@gmail.com

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*
Re: Hawaii

Noise — be aware of cattle, horses, donkeys afraid of noise & low flying aircraft!
Traffic — if additional traffic from Kauai be sure adequate notification of convoys.
Our roads are substandard — support $ for maintenance of roads used?
Cultural, historical, environmental concerns — do not harm!

Submit your comments at the meeting today, or mail or email no later than <u>September 7, 2010</u>, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
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WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: Michael & Arline O'Brien

ADDRESS: Waikoloa, HI

PHONE/EMAIL:

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

Thank you for the excellent presentation!

Submit your comments at the meeting today, or mail or email no later than September 7, 2010, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
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WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: Minoru Hanato

ADDRESS: PO Box 1283 Capt. Cook Hi 96704

PHONE/EMAIL: H 323-2356 / C 896-5563

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

I'm glad to hear/know that our USMC are basing a Helo Sqd in the state.

Submit your comments at the meeting today, or mail or email no later than September 7, 2010, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
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WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: ______________________

ADDRESS: ______________________

____

PHONE/EMAIL: ______________________

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

That goal is most effective training + that such effectiveness is validated. It would be a shame to spend resources inefficiently as part of a drive to do something different

Submit your comments at the meeting today, or mail or email no later than <u>September 7, 2010</u>, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

This form may be used as a mailer if folded, taped or stapled, and stamped.

From: Ryan Terayama
To: mv22h1eis;
Subject: Comments - EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii
Date: Wednesday, August 25, 2010 1:36:56 PM

Please complete the following information:

Name: Ryan Terayama
Company/Organization:
Mailing Address: 46-145 Humu Street
City: Kaneohe
State: HI
Zip Code: 96744

Add to Mailing List? (Yes or No): Yes

Comments: I am a life time resident of Kaneohe.

My dad worked on base and retired several years ago. I have a friend that operated a business on base, and I've worked on several projects on base over the years. I fully support our military and the bulk of my career has been related to the military.

My first experience with jets flying over our house was several years ago when the Blue Angels were practicing for the Bay Fest. There was no advance notice of their flight path or potential noise concerns. One of my dogs is permanently afraid of any planes flying over the bay. The only way we found out about their practice runs was from a neighbor who was home during the day. Now we have to put our dogs in a kennel from one week prior to the Bay Fest so they don't "freak out". We absolutely enjoy the air show, but it also costs us over $500.00 for the kennel stay.

Our next "bad" experience with jets were the F22's that were flying over for the RIMPAC exercises this year. Again, we weren't notified of the flights. Now whenever my 2 year old hears any planes he drops what he's doing and covers both his ears afraid of the loud noise and says "it's the loud jets". He even does it when he hears motorcycles. Before the F22's, he was fine with any planes flying over the Bay.

We live in one of the most beautiful places, in the world. I understand the economic and military impact of stationing the units on Base, but I am also concerned about our quality of life. It seems like the flight path doesn't need to come near the residential area. There were also times when jets were flying well past 10:00 PM. I know night flying exercises are essential, but they should stop at a reasonable time.

My concern is the flight path of the helicopters, the noise they'll create, and the times they'll be flying. I'm also an avid boater and sometimes the jets at full throttle over the Bay is deafening.

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: STEVE TROUTE

ADDRESS: HQ, POHAKULOA TRAINING AREA BOX 4607
808.969.2405 HILO 96720

PHONE/EMAIL: STEPHEN.W.TROUTE@US.ARMY.MIL

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

PLEASE PROVIDE UPDATES ON YOUR EIS PROCESS + COPIES (2) OF DRAFTS TO THE ABOVE ADDRESS AS THEY ARE AVAILABLE

THANK YOU

Submit your comments at the meeting today, or mail or email no later than September 7, 2010, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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TESTIMONY FOR
The Upgrading and Increasing of Helicoptors at Hawaii Bases
Submitted on August 26, 2010
King Intermediate School
Kaneohe, Hawaii

We, the undersigned, live at Pu'u Ali'i, a townhouse development of approximately 1,000 residents, situated close to the flight patterns used by Navy and other military aircraft approaching the Marine Corps Base Hawaii (MCBH) runway on Kaneohe Bay. Currently we hear the sounds generated by planes landing at the base. When the planes make their approaches over the water, the sound is annoying, but not deafening. However, often the planes come close to or over the land and the noise makes it impossible for residents to hear the telephone or TV, much less have a conversation or conduct condominium meetings. All talking ceases.

During the recent RIMPAC exercises, the jets used, whether flying over land or water, made even more noise than the planes we usually hear. The sound made by the jets reverberates off the mountains and is heard throughout the Bay.

In addition to the noise created by the Rimpac jets, biennially the Blue Angels come for a show and can be observed and heard flying over heavily populated areas including schools and churches. Again the noise from the jets is thunderous and disturbing.

Last year the Marines announced the replacement of PC-3 Orions with P-8A jet aircraft. This will bring bigger, noisier aircraft to the Kaneohe Bay area.

Now we read that there are two more changes coming to Marine Corps Base Hawaii:

1) Addition of 24 MV-22 tilt-rotor Osprey aircraft, 18 Viper attack helicopters and 9 Huey helicopters, and
2) Increased training and testing activities within the Hawaii-Southern California area.

We are concerned that with the increased frequency of flights and increased intensity (jets) of the aircraft in these three projects, that the noise produced by these aircraft will become intolerable for the residents whose homes adjoin Kaneohe Bay.

The fact that there are three projects going on at one time, but each having a separate Environmental Impact Statement (EIS) is worrisome.

The impact of each of these projects has been or is being studied, but when will the Navy consider the cumulative impact being made on our environment?

The Pu'u Ali'i Community Association with 540 units bordering Kaneohe Bay is a planned unit development permitted by the City and County of Honolulu in 1975. At that time, Ordinance No. 4421 was passed under which the development was allowed to proceed. This ordinance is affixed to the Declarations of Covenants, Conditions & Restriction (DCC&R) of all PCA governing documents. It reads in part "In addition, and pursuant to said Ordinance, each and every lessee and occupant of said property is hereby advised that said property is within the United States Marine Corps "Normally acceptable" to "Normally unacceptable" aircraft noise area for less than five percent (5%) of the time during Kona wind conditions."

We hope the preparers of the EIS's for these projects are aware of this Ordinance and that it will be considered in the EIS preparation.

D
Claire Durham
46-060 Konane Pl. Apt. 3617
Kaneohe, HI 96744

235-3073
cdurham@hawaii.rr.com

TESTIMONY FOR
The Upgrading and Increasing of Helicopters (Aircraft) at Hawaii Bases
Submitted on August 26, 2010
King Intermediate School
Kaneohe, Hawaii

I, the undersigned, live at Pu'u Ali'i, a townhouse development of approximately 1,000 residents, situated close to the flight patterns used by Navy and other military aircraft approaching the Marine Corps Base Hawaii (MCBH) runway on Kaneohe Bay. Currently my neighbors and I hear the sounds generated by planes landing at the base. When the planes make their approaches over the water, the sound is annoying, but not deafening. However, often the planes come close to or over the land and the noise makes it impossible for residents to hear the telephone or TV, much less have a conversation or conduct condominium meetings. All talking ceases.

During the recent RIMPAC exercises, the jets used, whether flying over land or water, made even more noise than the planes we usually hear. The sound made by the jets reverberates off the mountains and is heard throughout the Bay. In addition to the noise created by the RIMPAC jets, the aircraft can be observed and heard flying over or near heavily populated areas including schools and churches. Again the noise from the jets is thunderous and disturbing.

Last year the Marines announced the replacement of PC-3 Orions with P-8A jet aircraft. This will bring bigger, noisier aircraft to the Kaneohe Bay area.

It's been recently announced that there are two more changes coming to Marine Corps Base Hawaii:

1) Addition of 24 MV-22 tilt-rotor Osprey aircraft, 18 Viper attack helicopters and 9 Huey helicopters, and
2) Increased training and testing activities within the Hawaii-Southern California area.

I am concerned that with the increased frequency of flights and increased intensity (jets) of the aircraft in these various projects, that the noise produced by these aircraft will become intolerable for the residents whose homes adjoin Kaneohe Bay. The fact that there are three projects going on at one time, but each having a separate Environmental Impact Statement (EIS) is worrisome.

The impact of each of these projects has been or is being studied, but I respectfully request that the United States Department of Defense consider the 'cumulative' impact being made on our island lifestyle and environment!

Respectively submitted,

David Clymer

David Clymer
46-060 Konane Pl. #3622
Kaneohe, HI 96744
Email: DRClymer@yahoo.com

WRITTEN COMMENT FORM
Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: ELAYNE POOL
ADDRESS: 46-082 PUULENA #1213
KANEOHE, HI 96744
PHONE/~~EMAIL~~: NONE) 808/235-6500

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

BE SURE THAT YOUR DRAFT/FINAL EIS IS ACCURATE RE DENSITY, POPULATION AND NOISE. NOT TRUE IN RECENT P8-A EIS.

THE JET NOISE RATTLES OUR WINDOWS SOMETIMES, AND THE NOISE IS HORRIBLE.

We can't imagine why you would even consider bringing the Osprey helicopter to Hawaii, the land of tour operators whose helicopters have crashed with relative frequency in the past. The Osprey's record of crashes and casualties far exceeds the tours'. The~~ir~~ terrible record of accidents and the noise they promise (especially when combined with all of the present and contemplated military aircraft) make for a resounding

NO!

Subject: testimony for MCBH hearing on new airplanes
From: Bob Gould <bob.gould@stanfordalumni.org>
Date: Sun, 22 Aug 2010 13:36:22 -1000
To: Gretchen Gould <gretchen.gould@stanfordalumni.org>

Thank you for the opportunity to testify about new aircraft at MCBH.

My name is Gretchen Gould. I have lived in the community since 1967. (Please do NOT add up how many years that has been!)

When there were jets at the Base particularly the F-4s, things got pretty out of hand around the Bay in the noise department and we started a Windward contingent of Citizens Against Noise.

The Base was quite cooperative over the years. They established quiet hours at the Base from 2200-0600, thereby relieving the community of jet run-ups in the middle of the night.

We found that the AICUZ study, which was used at many bases, was little help to anyone here, as it averaged the noise over a 24 hour period and our problem in the Kaneohe Community is mainly aircraft takeoffs and engine runs, which have caused and can cause many very loud single events throughout the day and night.

Things got much better when the noisy jets left, as the P-3's are much quieter and do not affect as much of the community. The helicopters also are not quite as noisy, but are very persistent. We also lost the promise of quiet hours at night and the ability to work with the base commander.

Another thing that seems to be often forgotten are the flight paths that were established, with helicopter routings following the ridgeline of the hills between Kaneohe Bay Drive and Kailua, which means they do not directly overfly any houses. Helicopters now seem to go pretty much wherever they please and be can be very disruptive. The published arrival routes show direct from the quarry to Pad 101, which is not the agreed upon noise abatement routing. We would be grateful if both the tower and the squadron commanders can ask the pilots to perform this courtesy.

Having said that, your newer planes "sound" as if they will be quieter. That's good, if they do not have to run up before takeoff and will not be running at night. And since there will a slight rise in the number of planes, perhaps less use, at least at night? By the way, maintenance running of engines is something we've never quite understood. I have spoken with mechanics for commercial airlines and they say they almost never run the airplanes when they are working on them. Why, then, do the Marines have to? And helicopters......... helicopters seem to run forever (an hour sometimes) on the ground before they finally take off, often at night. Is there any way to cut the preflight running time down?

One remaining question is whether the MV-22 Ospreys will fly airplane routes or follow helicopter routings. The thought of an Osprey meeting a light plane in the Nuuanu Valley is frightening. The noise footprint is something we have not experienced here in Kaneohe, but the suspicion is that the Ospreys could be noisier than the CH-53s when flying at low altitudes over residential areas.

The Hueys and Cobras, with only two rotor blades, are particularly noisy; even worse than the CH-53s, and the thought of lots of Cobras and Hueys is not heartening.

Another attention to detail that I think would help is keeping base leg of the pattern tight, so planes do not overfly Kaneohe town. It really is pretty scary to see a big plane coming right over at low altitude and could be dangerous. And, again, it is noisier for the citizenry.

As the article in the newspaper that talked about noise problems hinted at, many people do not know how dangerous noise is to their own health. We get "used to" it, but our ears are still affected by it, as is our brain. After a busy day at the Marine Base, I find people get grouchy and combative. Especially over time, noise can be very physiological and psychologically damaging--something not to be taken lightly. The World Health Organization has recommended that exposure to noise over 40 decibels at night should be officially limited. So that is mainly what we are asking for. Anything to keep the incidence of noise down, especially at night.

8/26/2010 10:25 AM

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: Guy Ballou

ADDRESS: 46-[illegible] Plantation Dr
[illegible] HI 96744

PHONE/EMAIL: gyballou@hawaii.rr.com

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

1. Peace Meal of Aircraft (AF, NAVY)
2. Model w/ mountains, water, wind
3. PRICE of Property going down
4. Cummative sound of large group A/C
5.

Submit your comments at the meeting today, or mail or email no later than September 7, 2010, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: Janet Ness

ADDRESS: 46-065 Konohiki St. Apt. 3642, Kaneohe

PHONE/EMAIL:

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

Flight (tracks) plans should avoid residential areas, especially around Kaneohe Bay where the geography causes echoes and reverberation. Currently flights to and from MBH ignore such flight regulations.

Canoe paddlers have complained that the planes "buzz" them while practicing, making it impossible to hear paddling commands.

Timing needs to be much more considerate. Evening and late night flights are extremely disrupting.

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WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: Jean S. Reiriss

ADDRESS: PO Box 1517 / 126 Kaluamo St.
Kailua 96734

PHONE/EMAIL: jean.stromberg@gmail.com

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

Kailua resident concerns – Noise, air & water pollution:

- Noise & drifting aircraft pollution already effect Kailua Bay blowing sound & smells at high levels, already at quite unacceptable conditions.
- We hear "bomb" sounds that shake us regularly. Are we to expect even more? Again, noise.
- Population concerns on an already crowded area – how will it effect infrastructure and services outside the base?
- Are there areas that are undeveloped now going to be additional runways, hardening green areas and taking more of our beautiful island away forever.

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Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
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WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: KIMBAL THOMPSON

ADDRESS: 46-100 NAHIKU ST.
KANEOHE 96744

PHONE/EMAIL: kimbal@akta-Hd.com

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

THE CURRENT LEVEL OF C17 ACTIVITY SIGNIFICANTLY HAS NEGATIVE ENVIRONMENTAL IMPACT ON THE ALII SHORES COMMUNITY IN TERMS OF NOISE AND FUME ODOR. THIS IS PROBABLY OF INCREASED CONCERN TO THE RESIDENTS DUE TO INCREASED ACTIVITY IN THE EARLY TO MID EVENING HOURS.

THE COMMUNITY IS CONCERNED THAT BASING OF THE MV-22 AND H-1 AIRCRAFT MAY INCREASE SUCH CURRENTLY NEGATIVE ENVIRONMENTAL ~~[illegible]~~ IMPACT.

Submit your comments at the meeting today, or mail or email no later than September 7, 2010, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
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Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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Scoping Open House Group Memory
King Intermediate School
August 26, 2010

A public scoping open house for the MV-22/H-1 EIS was held at the King Intermediate School cafeteria on August 26, 2010 from 5PM to 8PM. This scoping meeting was also attended by television news crews from KITV and KHON. During the open house, one participant asked everyone at the meeting if they would like to get together and offer public testimonies/ comments to the EIS team. An open forum was quickly organized, with the open house resuming afterwards. The comments and questions were recorded generally as topics, providing a “group memory” as follows.

- There will be P-8s taking off from Kaneohe Bay. Will this be accounted for in the EIS?
- What is the impact of noise on property values? This needs to be in the EIS.
- The EIS focuses on the 24-hour average for noise. The noise should focus on a particular moment (single event).
- The number of aircraft is doubling?
- Marines are not being trained properly in Hawaii for fighting. The Marines should relocate somewhere else.
- This Marine Corps EIS is being done piecemeal (separating out the Marine Corps and Navy). It should include the P-8.

(laptop was moved at this time to be closer to the front speaking area)

- Housing.
- Noise and safety. RIMPAC jets are loud. Do not want jets in Kaneohe Bay
- There is an agreement with Marine Base, there is no reason for planes to fly over the land for landing. It seems the agreement was adhered to for while then stopped.
- How quiet are the Ospreys when flying?
- Safety factor of the aircraft (reference to the jets). Noise rattling house. Blue Angels. Planes do crash.
- Can noise mitigation procedures to aircraft be used, such as revetments?
- Noise pollution. Flying over Coconut Island.

  REPLY: Yosh replied that the direction of the wind over the runway will place landing aircraft over Coconut Island.

- Why are jets running engines at night?
- Noise model needs to factor in the Koolau.
- Where are the aircraft now?
- Why not have the MV-22 fly here now so that we can hear what they sound like?
- What about the C-17s?
- We have nuclear submarines in Hawaii. Does the Marine Corps aircraft have nuclear capabilities? Does this need to be included in the EIS? Commenter expanded comment to include ANY aircraft in Hawaii that might have nuclear armaments.
- When the aircraft are finally based at Kaneohe Bay, will they train over the land?

  REPLY: Training areas are Army lands such as PTA, and Navy areas such as PMRF. C-17s were mentioned as belonging to the Air Force.

- What are the unique capabilities of the Osprey?
- Will Ospreys do both fix and vertical training?
- Will the air traffic pattern expand with multiple aircraft in pattern (flight path)?
- When jets lands, there is a loud noise when landing. My house is located across from end of runway. Noise travels from water to Kaneohe Town.
- Will noise be averaged over 24 hours? AICUZ was done with average and does not accurately reflect what is going on – AICUZ modeling not good enough. We need to have noise studies as a single event. Averaging is not the right way.

  REPLY: Yosh provided background on how the noise model is created.

- Maj Crouch asked what is the legislation for noise in Hawaii?

  REPLY: Yosh replied that there is a law that when buying property, there needs to be a disclosure for noise affects.

- What are the hours for air station operations, especially at night?
- Flight patterns.
- Noise over Kaneohe Bay has always been a problem. Sound travels far – I can hear the bell from the high school. Carries over the whole bay.
- Noise in community is at a point of tolerance. Will noise level go up with the doubling of aircraft?
- We need an EIS for all aircraft at Kaneohe Bay.

  REPLY: All aircraft impacts will be looked at as cumulative impacts

- Does the Marine Corps control their own airspace?
- Would like to have MV-22 here just to hear it. How can the cumulative effect of all those Ospreys here be determined without hearing them first?
- There will be damage to the bay.
- Does noise model include wind?
- What is the 24-hour standard?
- Does the noise model actually reflect what is being heard?
- Does the noise study include engine run ups? Why is the engine run-ups necessary?

  REPLY: The run-ups are conducted as maintenance checks.

- Does the noise model actually measure the noise along the flight track?

  REPLY: The noise analysis is a computer model.

- We want to have actual measurements for the noise study.
- The last AICUZ noise measurements were made in the city, but without actual aircraft.
- This open forum format is better. I want to hear what other people have to say.
- Chemicals from the fuels are infiltrating our farm food.
- Where is the sand coming from for the new runway construction? Concern that the concrete for the new runway will come from the sand dunes that have known burial sites. (This comment may have been used in a TV interview).
- Screening process only shows Kaneohe Bay as the only choice. Is this EIS already putting the aircraft at Kaneohe Bay despite the EIS process? Is this an already done deal – minds have made up already.
- Who says yes or no to proposed plan?

WRITTEN COMMENT FORM
Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: STANN REIZISS

ADDRESS: P.O. Box 1517
KAILUA HI 96734

PHONE/EMAIL: KALUSTANN @ YAhoo. COM

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

- Light polution impact on Kailua from New housing.
- The effect of wind on propelling polution + noise.
- The effect of the prevailing incoming current on polution of public beaches.
- Danger of flyovers of residential neighborhoods
- Where are the new proposed landing areas?
- What is the effect of flights on birds?
- Hours of operations?
- Effect on civilian aircraft + the necessity to reroute over residential areas
- What about the nuclear impact on safety + health?
- Evaluate noise impact by single events not averages.
- Extensive engine maintenance should be done away from the windward side.

Submit your comments at the meeting today, or mail or email no later than September 7, 2010, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

This form may be used as a mailer if folded, taped or stapled, and stamped.

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

August 27, 2010

Ms. Karen Sumida
Naval Facilities Engineering Command, Pacific
258 Makalapa Drive, Suite 100
Pearl Harbor, Hawaii 96860-3134

Attn: EV21/H-1 EIS Project Manager

Dear Ms. Sumida:

Subject: Your Letter Dated August 3, 2010 Requesting Comments Concerning the EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

Thank you for the opportunity to comment on the basing of support facilities in Hawaii.

The Environmental Impact Statement should address the estimated increase in water requirements due to the proposed support facilities, along with the schedule of the proposed increases.

If you have any questions, please contact Robert Chun at 748-5443.

Very truly yours,

FOR PAUL S. KIKUCHI
Chief Financial Officer
Customer Care Division

Water for Life . . . Ka Wai Ola

From: Erich Wida
To: mv22h1eis;
Subject: Comments - EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii
Date: Friday, August 27, 2010 12:47:59 PM

Please complete the following information:

Name: Erich Wida
Company/Organization:
Mailing Address: 44-543B Kaneohe Bay Dr
City: Kaneohe
State Hi:
Zip Code: 96744

Add to Mailing List? (Yes or No): yes

Comments:
My family and I are big supporters of the U.S. Military. But the RimPac jet exercises were really out of hand. Whole house shaking, windows rattling, just like an earthquake. What do you tell a screaming crying child that is woken up in the middle of the night because they think the house is going to collapse on top of them? That's what happened for weeks thanks to your base. When people complained, you just did it anyway, which will probably be the case with these helicopters. Those jets and the total inconsideration of the base commanders are making it very hard to support anything the military does for people who live around here. If the new choppers are only as loud as the old ones it's not that big of a deal if they don't fly after 9pm when children go to sleep. Something tells me you will keep pushing the flight times later, then a few jets here and there, then a fleet of jets ect. If you have children you understand there's nothing worse than seeing your kids screaming and crying in fear. And to know your government is responsible for it and are doing it with your tax dollars makes it hard to swallow. Helicopters only from 7am to 9pm we can live with. Fighter jets, no way. Please have some consideration for your neighbors, that's all we ask.

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: Jade Bruhjell
ADDRESS: P.O. 945
Kaunakakai Hi 96748
PHONE/EMAIL: 808 553 4243

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

I am concerned about the depleted uranium weaponry. there is problems on Oahu and Big Island with radioactive poisoning from D.U. munitions and training. It is an illegal weaponry worldwide. and hope that it does not manifest itself on this island. Also, a military presence on Molokai would designate us as a target

Submit your comments at the meeting today, or mail or email no later than September 7, 2010, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

This form may be used as a mailer if folded, taped or stapled, and stamped.

WRITTEN COMMENT FORM
Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: Kirk Greenman
ADDRESS: P.O. Box 482151
Kaunakakai Hi 96748
PHONE/EMAIL: 808-757-2399

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

Possible noise at nighttime
Will Training be 24/7/365?

Submit your comments at the meeting today, or mail or email no later than September 7, 2010, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

This form may be used as a mailer if folded, taped or stapled, and stamped.

45-442 ʻŌhāhā St.
Kaneʻohe, Hawaiʻi 96744
August 29, 2010
Ph: 247-1296 (ul)

Naval Facilities Engineering Command Pacific
ATTN: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Ste. 100
Pearl Harbor, Hawaiʻi 96860-3134

Re: MCBH EIS

Aloha,

We have lived in the Pikoiloa subdivision of Kaneʻohe since 1964 so are more than familiar with the Kaneʻohe Marine Base and your activities. Pikoiloa is located between Castle High School on Kaneʻohe Bay Drive and the Hawaiian Memorial Park Cemetery on Kamehameha Highway.

We were extremely upset recently to learn that there are plans to expand your operations to bring in Osprey helicopters as well as others, and all that entails. I've been waking up nightly in a panic because of what I fear we are all going to be subjected to. Over the past few years – presumably since Barber's Point closed -- the activity at MCHB has increased exponentially. We are frequently subjected to greatly increased noise from helicopters flying directly over our house, sometimes to the point of shaking the entire house, to the constant drone from a large cargo (?) plane presumably practicing landings over and over again, to flight line noise that awakens us anytime between 3 and 5 AM, and other flight-related noises And, of course, during Rimpac the noise went on almost unabated, especially in the evening and at night. When we bought our home we chose the location we did because it was quiet and relaxing. We did not anticipate the level of noise that we are now subjected to.

Compounding that issue, we are daily contending with tour helicopter flyovers (as many as 15 times a day) almost directly over our house, other military (Coast Guard) flyovers, sometime police and fire helicopters, and private planes which often fly in circles above our home.

Needless to say it is emotionally, mentally, and physically exhausting to contend with that level of noise on a daily basis; it is the same on many weekends. I've had to ask phone callers to repeat what they've said because I could not hear them or, less important but still annoying, to turn up the television or radio to hear the audio. In addition, the constant noise makes it difficult to concentrate and, since I work at home, it affects my livelihood.

We still remember vividly a marine jet crashing into a Kailua school and homes many years ago. It was our understanding that, largely to avoid another similar mishap, once H3 was completed the military flights were supposed to essentially follow the H3 configuration rather than flying a straight line from the Pali Highway direction to the marine base. That often is not the case. It appears that they fly directly from the Pali and in a straight line to the base (and that goes directly over our house).

Given all of that, we are very much afraid of the impact of the greatly increased noise and activity if the Marine base is allowed to carry through with its plans. We should not have to consider selling our home and moving because we are bombarded. I'm sure that sounds somewhat dramatic but it would be something we would have to seriously consider. Please reconsider what you are planning.

Sincerely,

Ellen L Akaka

Ellen L. Akaka and family

cc:
Senator Daniel Inouye
Senator Daniel Akaka
Representative Mazie Hirono
Representative Charles Djou
State Senator Jill Tokuda
State Representative Ken Ito

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: Andrew M Jamila Jr

ADDRESS: 41-640 Poalima St
Waimanalo 96795

PHONE/EMAIL: ajamila @ hawaiiantel.net

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

I don't like the idea of having any aircraft rotor or propeller being based at Bellows. I don't mine the touch and go but as far basing any of the aircraft and support units here is a bad idea. I don't want to see any refueling because that would mean fuel trucks with flammable aviation fuel would have to pass thru our small town, which would not be good for the community. Mahalo

Submit your comments at the meeting today, or mail or email no later than September 7, 2010, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

This form may be used as a mailer if folded, taped or stapled, and stamped.

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: BOB VERICKER

ADDRESS: 164 AIKAHI Loop
KAILUA, HI 96734

PHONE/EMAIL: 808 254-5484
verickerbob@hawaii.rr.com

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

FLIGHT PATTERN – I WELCOME + SUPPORT THE EQUIPMENT + TROOPS. FOR A WIN-WIN BOTH MYSELF + SEVERAL OF MY NEIGHBORS REQUEST SERIOUS CONSIDERATION BE GIVEN TO ALL FLIGHTS OVER THE WATER + NONE OVER OR NEAR THE AIKAHI PARK COMMUNITY OF 260 HOMES FOR QUALITY OF LIFE IN AIKAHI PARK + THE USE OF THE NEW AIRCRAFT. CURRENTLY HELICOPTERS FLY NEAR THE CIVILIAN HOMES WHEN TRAVELING TO BELLOWS FIELD + OTHER ISLANDS – TWEEKING ROUTE FOR THESE WOULD MAKE MANY HAPPY + STILL NOT ADVERSLY EFFECT THE MISSION. (CON'T. BELOW)

Submit your comments at the meeting today, or mail or email no later than September 7, 2010, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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∴ LESS COMMUNITY NOISE + GOV'T LIABILITY BY ALTERING ROUTING BY GOING TO THE OCEAN WITH OLD AND NEW AIRCRAFT!

DEPARTMENT OF FACILITY MAINTENANCE

CITY AND COUNTY OF HONOLULU

1000 Uluohia Street, Suite 215, Kapolei, Hawaii 96707
Phone: (808) 768-3343 • Fax: (808) 768-3381
Website: www.honolulu.gov

KIRK W. CALDWELL
ACTING MAYOR

JEOFFREY S. CUDIAMAT, P.E.
DIRECTOR AND CHIEF ENGINEER

GEORGE "KEOKI" MIYAMOTO
DEPUTY DIRECTOR

IN REPLY REFER TO:
DRM 10-653

August 30, 2010

Department of the Navy
Naval Facilities Engineering Command, Pacific Division
Attn: EV21, MV-22H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, Hawaii 96860-3134

Attn.: EV21, MV-22/H-1 EIS Project Manager

Subject: EIS for Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

Thank you for the opportunity to provide comments on the Notice of Intent for the EIS for the proposed basing of the subject aircraft in Hawaii.

We have no comments to offer as the aircraft will be based on federal property and will have negligible impact on our facilities and operations.

Since the proposed activity will not affect our facilities or operations, we request the Department of Facility Maintenance be removed from the Environmental Assessment process for this project.

Should you have any questions, please call Charles Pignataro of the Division of Road Maintenance, at 768-3697.

Sincerely,

Jeoffrey S. Cudiamat

Jeoffrey S. Cudiamat, P.E.
Director and Chief Engineer

William P. Kenoi
Mayor

William T. Takaba
Managing Director

Ivan M. Torigoe
Deputy Director

County of Hawai'i
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
25 Aupuni Street • Hilo, Hawai'i 96720
(808) 961-8083 · Fax (808) 961-8086
http://co.hawaii.hi.us/directory/dir_envmng.htm

August 30, 2010

Department of the Navy
Naval Facilities Engineering Command
Pacific Division
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

RE: EIS for the Basing of MV-22 and H-1 Aircraft I Support of III Marine Expeditionary Force Elements in Hawai'i

We have no comments to offer on this project.

Thank you for allowing us to review and comment on this project.

Sincerely,

Ivan M. Torigoe
DEPUTY DIRECTOR

12686R

County of Hawai'i is an Equal Opportunity Provider and Employer.

1 of 5
Pages

①

8/30/10

Aloha,
Thank you for giving me opportunity to make comment on the (NOI) for Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii.
I understand that this (NOI) leads to the process of an EIS. It is also my understanding as a resident and active advocate in the Community that it is my obligation to make sure that our residents are informed and kept in the process of making decisions for themselves for the well-being and safety of our families here in Waimanalo. I also know that I must be pro active during the public scoping process and not be used just for the purpose of being part of the elimination process.
This project puts our whole community at risk. Waimanalo is considered a Target Area. Waimanalo geographically falls under EO 12898 which makes us at a high potential for health and environmental effects, which includes traffic, sewer,

②

ozone and particulate levels. Waimanalo is also a Target Population consisting primarily of Hawaiian descent or indigenous to this land, low-income and elderly. This project in question is within tradewind to our entire community. It fronts the health center, Emergency fire, ambulance, church, elementary school, Intermediate School, public library, grocery stores, laundromat, gas station, low-income housing and the rest of the community. Given the fact that we are in tradewind line of the project it subjects all of us to health risks, clean air, noise, high hazard potential and more. This project will also disrupt the migration of sea birds, marsh land birds and sea life as well. We have numerous Sanctuary sites where monk seals and sea turtles also have their young there.
This project is Environmental InJustice.

③

This project is the final example to permanent fixtures. This is why people in a community fight so hard to keep their community from being infiltrated with military abuse. We as a community fought so hard to clean our land because the military didn't have the funding. We lobbied together with Congress woman Mazie Hirono and got the funding. We did this to benefit our community not to clean and prepare this land for the next military breech to do as they please. Not Fair!
As a community and a dying race we face an ongoing battle with a military branch only focused on their wants disregarding the needs of a predominant Hawaiian Community. Bellow's is crowned lands, sacred never to be sold but left in trust to the indigenous people of it's lands. This land rich in culture, known for it's bountiful food and fish and surmountable healing resources our Kahuna La'au Lapa'au our herbal healers are once again at risk.

4

This project intends to do major infrastructure. This will lead to disturbance and ultimately the desecration and destruction of Archaeological Sites and Kupuna Iwi. This project threatens our every being of a culture. Our Cosmology. Which is the linkage of a people to a place of origin. Worst of all this project will be the stepping stone to keep the Community from accessing Bellows. It's just a matter of time. Thru Safety and security. I need not ask how many people are in a squadron? The answer is too many for our community. The marine Expeditionary Forces are the largest task organized Squadron that is centered around permanent fixtures. Given we will have to accommodate two VMM Squadrons and one HMLA Squadron. When only three other places have this kind of forces. Pendleton, Okinawa and Camp LeJeune. Which are all large land mass locations. We are just not an appropriate place for this project.

5

Waimanalo has one continuous three mile stretch of white Sandy beach. People come from all over the World to see. They come for its pristine, unobstructed view of beauty. This project is detrimental to our community in every capacity physically, morally and spiritually. It threatens the values we treasure most.

Mahalo, Kimberly A.M. KALAMA
41-1016 Waikupanaha St.
Waimanalo, HI 96795
(808) 853-0772

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: MAKALANIA WOLFGRAMM

ADDRESS: 41-279 HULI ST.

PHONE/EMAIL: 778-0758 / makawolfgramm@email.com

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

NOT IN OUR BACK YARD!

Submit your comments at the meeting today, or mail or email no later than __September 7, 2010__, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

This form may be used as a mailer if folded, taped or stapled, and stamped.

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: Noel Richardson

ADDRESS: Waimanalo Elementary and Intermediate School

PHONE/EMAIL: 808-259-0460 Noel_richardson@notes.k12.hi.us.

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

Please provide the school with a flight scedule for operations at Bellows.

Thank-You.

Submit your comments at the meeting today, or mail or email no later than __September 7, 2010__, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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Scoping Open House Group Memory
Waimanalo Elementary and Intermediate School
August 30, 2010

A public scoping open house for the MV-22/H-1 EIS was held at the Waimanalo Elementary & Intermediate School cafeteria on August 30th from 5PM to 8PM. The meeting was facilitated by Leslie Kahihikolo. It was structured to start as an open house, followed by a one-hour open forum to allow the public to present comments and ask questions, and concluded in an open house format. Prior to the open forum, Captain Derek George, MCB Hawaii Environmental Director, welcomed the attendees and introduced team members, and Sue Sakai explained the scoping process and EIS schedule. Attendees' comments and questions were recorded generally as topics, providing a "group memory" as follows.

- Because this meeting was not adequately publicized, can the deadline for scoping comments be extended? We do not have enough time to provide comments. This scoping meeting was not mentioned at the Neighborhood Board meeting. There is also some confusion with the website address as the "1" and the "L" look alike.

  REPLY: Capt George offered to do a presentation at the next Neighborhood Board meeting. Maj Crouch apologized for not mentioning this at the last Neighborhood Board meeting.

- What is the baseline of aircraft/operations and what will happen at Bellows and when? What is the number of current operations?

  REPLY: Maj Issacs replied that the basing will occur over about a year, starting with a partial squadron. The number of operations will be determined during the writing of the Draft EIS.

- When all aircraft are here, what can we expect in terms of number of aircraft, flight, and operation hours?

- Will any aircraft by based at Bellows?

  REPLY: No aircraft will be based at Bellows. Bellows will be used as a training site.

- Will flight patterns change? Will Ospreys need a bigger flight path? There have been flight paths that shouldn't have been taken, but may have been other branches (Army, Air Force) or "hot dog" pilots. Any fueling?

  REPLY: Flight paths should be about the same

- Will there be any night maneuvers at Dillingham Airfield. (Note: commenter, who lives in the North Shore area, attended this meeting because there are no scoping meetings scheduled for the North Shore area.)

  REPLY: Dillingham Airfield needs to be surveyed, but is a feasible option.

- If there is a problem of aircraft flying at night over residential homes and we make a complaint to MCBH, how will complaint be fixed. There seems to be a big disconnect between MCB Hawaii Public Affairs Office (PAO) and the squadrons.

- If amendment takes place, is it made by Army or Marine Corps.

  REPLY: Airspace rules are governed by the FAA, Army, and Marine Corps depending on where the flight activity occurs at.

- How frequent is training at Waimanalo?

  REPLY: Training frequency should be about the same as it is now. The mix of aircraft will be different.

- With the various armed forces branches doing their own thing, what impact will there be to Waimanalo?

- What kind of improvements will occur at the Bellows landing zones?

  REPLY: Improvements at the landing zones (LZs) are expected to be repairs, no new construction. The Marine Corps will need to conduct a site survey of the LZs.

- What is the noise of the MV-22 with a full load?

- What is the downwash on the MV-22 like? What about dust kickup during landings? Will the LZ improvements deal with dust kickup?

  REPLY: The MV-22 has a similar downwash to the CH-53.

- Describe the vortex ring state below 1600 feet.

- CH-53 operations and firing blanks produces a lot of noise during school hours. Can the [King Elementary and Intermediate] school be notified in advance of any exercises/flights so that the teachers can prepare their classes for the disruption?

- Who owns the land on the areas being built? There is an Executive Order for the military to vacate Bellows.

- How will vehicle traffic affect Tinker Road?
- Will new aircraft increase the amount of ground training?
- What is the reliability of MV-22 parts? Will MV22 have parts falling out of the sky? What is the safety record of the MV-22 now? Commenter offered the comparison that home computer software is often patched. What about the MV-22 software?
- Will the MV-22 present a safety hazard to the community – will the Ospreys be falling out of the sky?

  REPLY: Safety factors and record have increased since 2000.
- Will the MV-22 do night flying qualifications in Hawaii?
- Land issues at Bellows -- sovereignty groups and ceded lands.
- Radical Hawaiians "are getting ready for target practice"
- What is the expected lifespan for the MV-22 program?
- Air force is planning restoration projects near LZ Owl. (Comment from Bellows AFS Env Prog Mgr.)
- Could a scoping meeting be held in North Shore, because of Kahuku and Dillingham Airfield areas? (Leslie Kahihikolo asked if the word got out about the meeting what kind of attendance would there be. The commenter replied that the EIS team would get a lot of feedback.)
- Will the MV-22 carry external loads, like howitzers?
- Is there some air traffic control for the MV-22 when carrying loads?
- Is there any way to demonstrate the MV-22 in Hawaii?
- Why base in Hawaii?

  REPLY: Maj Isaacs replied that the Marine Corps trains aviation and ground units together. The 3rd Regiment at Kaneohe Bay does not have all the air assets it needs to do integrated training. Basing the new squadrons here will make up for that deficiency.

- On the alternative of No Action, if there is no basing in Hawaii, what kind of training will occur?
- Will impacts to ocean resources be considered in the EIS?
- Is there another alternative to the MV-22 as a medium lift aircraft?
- Will there be any cross training between the Marine Corps and the national guards?
- Is the Hawaii Department of Health notified about this EIS?
- Can we as a community request another scoping meeting? (Along with the comments extension mentioned earlier in the meeting?)
- Did Senators/Congress approve this EIS?
- Is the governor aware of this EIS and the scoping meetings?
- Cultural practices and animals. Whatever construction is done, make sure that cultural areas and animals are considered. Will the analyst be local?
- What are the basing decisions for the aircraft? Why not PTA, etc.?
- Why not Maui?
- What will be built at the LZs at Bellows?
- Cost effective to use existing infrastructure versus building new/better facilities?
- What is the impact on use of recreation areas at Bellows?
- Is the MOUT village to be incorporated with aviation training, e.g., drop offs?
- With the number of aircraft doubling, will duration of sound be doubled, such as take offs? (commenter lives in Kaneohe)
- Regarding the incoming personnel: where is the housing and will it be analyzed in the EIS. We (community) cannot accommodate incoming personnel, we can't even accommodate our locals. Value of the land.

WRITTEN COMMENT FORM
Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: ______________________

ADDRESS: ______________________

____

PHONE/EMAIL: ______________________

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

1. eco system of Kaneohe Bay
2. noise levels impacting residential areas (including King Intermediate School across the bay.

Submit your comments at the meeting today, or mail or email no later than September 7, 2010, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

This form may be used as a mailer if folded, taped or stapled, and stamped.

From:	Kelly.ThomasP@epamail.epa.gov
To:	mv22h1eis;
Subject:	Basing of MV-22 and H-1 Aircraft
Date:	Wednesday, September 01, 2010 2:43:02 PM
Attachments:	Basing MV-22 and H-1 Aircraft.pdf

Tom Kelly
U.S. EPA Region 9
Environmental Review Office (CED-2)
75 Hawthorne Street
San Francisco, CA 94105
Phone: 415-972-3856

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

9/1/2010

Department of the Navy
Naval Facilities Engineering Command
Pacific Division
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

The Environmental Protection Agency (EPA) has reviewed the Notice of Intent to prepare an environmental impact statement (EIS) for the **Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii.** Our review is pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and our NEPA review authority under Section 309 of the Clean Air Act.

EPA has no formal comments on the Notice of Intent at this time. Please send one copy of the Draft EIS (DEIS) to this office at the same time it is officially filed with our Washington D.C. Office. If you have any questions, please call me at (415) 972-3856

Sincerely,

Tom Kelly

Tom Kelly
Environmental Review Office
Communities and Ecosystems Division

Ms. Carol Hinton
HC 1 Box 142
Kaunakakai, HI 96748

Naval Facilities Engineering Command
EV21, MV-22/H-1

Sept. 2, 2010

Dear EIS Project Manager,
We on Molokai treasure our peace and quiet. DO NOT bring your military presence here and DO OPT for your NO-ACTION ALTERNATIVE.

Thank you for your kind and considerate attention to This matter.

Sincerely,

[signature]

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 3RD FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8305 • Fax: (808) 768-4730 • Internet: www.honolulu.gov

KIRK W. CALDWELL
ACTING MAYOR

WAYNE Y. YOSHIOKA
DIRECTOR

SHARON ANN THOM
DEPUTY DIRECTOR

KENNETH TORU HAMAYASU, P.E.
DEPUTY DIRECTOR

TP8/10-378702R

September 2, 2010

Ms. Karen Sumida
Business Line Manager
Environmental
Department of the Navy
Naval Facilities Engineering Command, Pacific
258 Makalapa Drive, Suite 100
Pearl Harbor, Hawaii 96860-3134

Dear Ms. Sumida:

Subject: EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

This responds to your letter of August 3, 2010, requesting our comments concerning this proposed project.

The Department of Transportation Services (DTS), Traffic Engineering Division (TED) has the following comments:

- The tax map key(s) of the project site should be identified.
- The Draft Environmental Assessment should include a Traffic Impact Assessment Report (TIAR) that discusses transportation impacts on the surrounding street system, including short-term impacts during construction and proposed mitigating measures.
- The area Neighborhood Board, as well as the area residents, businesses, etc. should be kept apprised of the details for the proposed project and the impacts the project may have on the adjoining local street network area.

The DTS, Public Transit Division (PTD), Fixed Route Operations Branch, has the following comments:

- The EIS should include a description of Public Transit, the impact of the project on Public Transit during construction and as a result of population. Basic information is available on these websites: www.thebus.org and www.honolulu.gov/dts. For more details, you may contact the PTD, Fixed Route Operations Branch staff at 768-8370.
- Construction notes should include the following transit note related to public transit:

STANDARD CONSTRUCTION NOTE

This project will affect bus routes, bus stops, and paratransit operations, therefore, the Contractor shall notify the Department of Transportation Services, Public Transit Division at 768-8396 and Oahu Transit Services, Inc. (bus operations: 848-4578 or 852-6016 and paratransit operations: 454-5041 or 454-5020) of the scope of work, location, proposed closure of any street, traffic lane, sidewalk, or bus stop and duration of project at least two weeks prior to construction.

Also, should construction work affect any local street (temporary closure of street, coning, etc.) then a Department of Transportation Services street usage permit is required.

Thank you for the opportunity to review this matter. Should you have any further questions, please contact Michael Murphy of my staff at 768-8359.

Very truly yours,

WAYNE Y. YOSHIOKA
Director

William P. Kenoi
Mayor

BJ Leithead Todd
Director

Margaret K. Masunaga
Deputy

County of Hawai'i

PLANNING DEPARTMENT

Aupuni Center • 101 Pauahi Street, Suite 3 • Hilo, Hawai'i 96720
Phone (808) 961-8288 • Fax (808) 961-8742

September 2, 2010

Department of the Navy
Naval Facilities Engineering Command, Pacific Division
ATTN: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

To Whom It May Concern:

SUBJECT: Notice of Intent Basing of MV-22 and H-1 Environmental Impact Statement (EIS)
Project: VMM and HMLA Training at Pōhakuloa Training Area
TMK: (3) 4-4-015:008; (3) 4-4-015:014; (3) 4-4-016:005; (3) 4-4-016:012 and (3) 7-1-004:007, Ka'ohe, Hāmākua and Pu'uanahulu, North Kona, Hawai'i

We are in receipt of the Notice of Intent for the preparation of an Environmental Impact Statement (EIS) for the basing of MV-22 and H-1 aircraft in support of III Marine Expeditionary Force elements in Hawai'i. We understand as part of the proposed action, VHM and HMLA training and readiness operations may occur at training facilities statewide including the Pōhakuloa Training Area.

The subject area is located within the State Land Use Conservation District. Therefore, the County of Hawai'i has no land use jurisdiction over the subject area. In addition, the subject area is not located in the County's Special Management Area (SMA). Therefore, Special Management Area rules and regulations are not applicable.

We have no further comments to offer, at this time. However, due to the potential for environmental impacts please keep us informed and provide our department with a copy of the Draft Environmental Impact Statement for our review.

Hawai'i County is an Equal Opportunity Provider and Employer

Department of the Navy
Naval Facilities Engineering Command, Pacific Division
ATTN: EV21, MV-22/H-1 EIS Project Manager
Page 2
September 2, 2010

If you have any questions, please feel free to contact Bethany Morrison of this office at (808) 961-8138.

Sincerely,

BJ Leithead Todd

BJ LEITHEAD TODD
Planning Director

BJM:cs
P:\wpwin60\Bethany\EA-EIS Review\NOI Basing of MV-22 and H-1 EIS.doc

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

September 3, 2010

Department of the Navy
Naval Facilities Engineering Command
Pacific Division
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive Suite 100
Pearl Harbor, Hawaii 96860-3134

Ladies and Gentlemen:

Subject: EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR), Land Division distributed or made available a copy of your report pertaining to the subject matter to DLNR Divisions for their review and comment.

Other than the comments from Division of Boating & Ocean Recreation, Land Division, Division of Aquatic Resources, the Department of Land and Natural Resources has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0433. Thank you.

Sincerely,

Charlene Unoki
for Morris M. Atta
Acting Administrator

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

3291

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

August 17, 2010

RECEIVED
LAND DIVISION
2010 AUG 25 A 10: 12
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

MEMORANDUM

RECEIVED
AUG 19 2010
AQUATIC RESOURCES

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
x Div. of Boating & Ocean Recreation
x Engineering Division
x Div. of Forestry & Wildlife
x Div. of State Parks
x Commission on Water Resource Management
x Office of Conservation & Coastal Lands
x Land Division –Oahu/Maui/Hawaii/Kauai
x Historic Preservation

Charlene

FROM: Charlene Unoki, Assistant Administrator
SUBJECT: EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii
LOCATION: Statewide
APPLICANT: US Department of the Navy

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 1, 2010.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

(X) We have no objections.
( ) We have no comments.
( ) Comments are attached.

Signed:
Date: 23 Aug 2010

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

August 17, 2010

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
x Div. of Boating & Ocean Recreation
x Engineering Division
x Div. of Forestry & Wildlife
x Div. of State Parks
x Commission on Water Resource Management
x Office of Conservation & Coastal Lands
x Land Division –Oahu/Maui/Hawaii/Kauai
x Historic Preservation

RECEIVED
LAND DIVISION
2010 AUG 25 P 2: 14
DEPT. OF LAND & NATURAL RESOURCES STATE OF HAWAII

Charlene

FROM: Charlene Unoki, Assistant Administrator
SUBJECT: EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii
LOCATION: Statewide
APPLICANT: US Department of the Navy

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 1, 2010.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

( ) We have no objections.
(X) We have no comments.
( ) Comments are attached.

Signed:
Date: 8/23/10

AUG 17 '10 PM 12:43

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

August 17, 2010

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
x Div. of Boating & Ocean Recreation
x Engineering Division
x Div. of Forestry & Wildlife
x Div. of State Parks
x Commission on Water Resource Management
x ~~Office of Conservation~~ & Coastal Lands
x Land Division –Oahu/Maui/Hawaii/Kauai
x ~~Historic Preservation~~

Charlene

FROM: Charlene Unoki, Assistant Administrator
SUBJECT: EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii
LOCATION: Statewide
APPLICANT: US Department of the Navy

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 1, 2010.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

( ) We have no objections.
(✓) We have no comments.
( ) Comments are attached.

Signed:
Date: 8/18/2010

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

RECEIVED
LAND DIVISION
2010 SEP -1 A 10:39
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

August 17, 2010

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
x Div. of Boating & Ocean Recreation
x Engineering Division
x Div. of Forestry & Wildlife
x Div. of State Parks
x Commission on Water Resource Management
~~x Office of Conservation & Coastal Lands~~
x Land Division – Oahu/Maui/Hawaii/Kauai
~~x Historic Preservation~~

Charlene

FROM: Charlene Unoki, Assistant Administrator
SUBJECT: EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii
LOCATION: Statewide
APPLICANT: US Department of the Navy

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 1, 2010.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

( ) We have no objections.
(✓) We have no comments.
( ) Comments are attached.

Signed: [signature]
Date: 8.31.10

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

RECEIVED
LAND DIVISION
2010 SEP -1 A 10:29
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

August 17, 2010

MEMORANDUM

~~TO:~~ From **DLNR Agencies:**
x Div. of Aquatic Resources
x Div. of Boating & Ocean Recreation
x Engineering Division
x Div. of Forestry & Wildlife
x Div. of State Parks
x Commission on Water Resource Management
x Office of Conservation & Coastal Lands
x Land Division – Oahu/Maui/Hawaii/Kauai
x Historic Preservation

Charlene

To ~~FROM:~~ Charlene Unoki, Assistant Administrator
SUBJECT: EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii
LOCATION: Statewide
APPLICANT: US Department of the Navy

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 1, 2010.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

(X) We have no objections.
( ) We have no comments.
( ) Comments are attached.

Signed: [signature]
Date: 8/25/10

Jana Sasada
Po Box 485
Hoolehua, HI 96729

September 3, 2010

Naval Facilities Engineering Command Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

To Whom It May Concern:

I am a full-time resident on the island of Molokai and have lived here all 25 years of my life. I am a person that cares deeply for our aina (land) and natural resources, but I'm also extremely fascinated with military choppers. I feel that if an Environmental Impact Statement (EIS) provides assurance that there will be little to no environmental damages to our island, then I am in full support for your future plans of establishing a fueling station here on Molokai. I work just two miles away from the airport and have a clear view of the airport from my office window and I honestly enjoy the days when I hear those choppers flying above me and doing "practice drills" (or whatever you call it). For me, being a huge fan of military aircrafts, especially the Chinooks, I enjoy the sound and excitement of wondering what it's like to be sitting in the aircraft and feeling the intensity of the vibrations, looking down upon everyone below……I can go on and on, but I just wanted to give you folks my full support upon a positive EIS and look forward to seeing you folks fly by every week. If you folks ever need an office personnel (I'm currently an Administrative Assistant)…… sign me up. I'd be there in a heartbeat. I'd even volunteer my services (cleaning, washing or anything) and enlist in the Marine Corps just to be around these aircrafts. Keep up the fantastic work and see you guys around!

Sincerely,

Jana Sasada

Jana Sasada
(808)-658-9990

9/3/10

Patricia S. Collins
HC1 Box 295
Kaunakakai HI 96748

Naval Facilities Engineering Command Pacific
Attn: EV21, MV-22/H-1 EIS
Project Manager,

This is to object firmly to any escalation of Military presence on the island of Molokai, Hawaii. Aircraft training should be done on the east side of Oahu where there have been facilities for many years. There are other uninhabitated areas in the state.

Molokai is a very sensitive and small island. Unemployment is the highest in the state. The activities of three Marine Expeditionary Force units and Army cooperating agency placing 24 MV-22 aircraft. 18 AH-1Z and 9 UH-1Y helicopters plus training facilities would greatly stress the people of Molokai as they deal with everyday pressure dealing with lack of income and maintaining family life.

I have lived on Molokai for 41 years and have had to put up with the noise of helicopters flying military squadrons down the chanel as well as private helicopters covering Molokai and adjaicent areas. The tiltroter VMM aircraft would be insult to injury. Please NO NEW MILITARY PRESENCE. Patricia S. Collins

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

BRENNON T. MORIOKA
DIRECTOR

Deputy Directors
MICHAEL D. FORMBY
FRANCIS PAUL KEENO
JIRO A. SUMADA

IN REPLY REFER TO:

STP 8.0220

September 3, 2010

Ms. Karen Sumida
Business Line Manager
Department of the Navy
Naval Facilities Engineering Command, Pacific
258 Makalapa Drive, Suite 100
Pearl Harbor, Hawaii 96860-3134

Dear Ms. Sumida:

Subject: MV-22 and H-1 Aircraft Support of III Marine Expeditionary Forces Elements in Hawaii – Notice of Intent (NOI) to Prepare an Environmental Impact Statement (EIS)

Thank you for requesting the State Department of Transportation's (DOT) review of the subject project.

DOT understands that the subject Department of the Navy, U.S. Marine Corps project is for the basing and operation of MV-22 tiltrotor (MV-22) and Osprey aircraft and H-1 Cobra (H-1) and Huey attack helicopters in support of III Marine Expeditionary Force (MEF) training and readiness operations in Hawaii. While project personnel (approximately 2,100 persons) will be located at Marine Corps Base (MCB) Hawaii Kaneohe Bay, beach landing zones are planned at Marine Corps Training Area Bellows (Bellows). Other airport facilities identified in the NOI that may be used for training include; Wheeler Army Airfield, Dillingham Airfield, Pohakuloa Training Area, Molokai Training Support Facility and Kalaupapa Airfield, and Pacific Missile Range Facility.

Given the project location (at MCB) and the landing training facilities (Bellows) including the various statewide airport facilities, DOT highway and airport facilities can be impacted with more personnel stationed or traveling to the operations or training areas, and equipment being transported to and from those areas. Therefore, DOT requests that the draft EIS address the project impacts to the various State airport and highways facilities.

DOT appreciates the opportunity to provide comments and requests four copies of the Draft EIS when it is available. If there are any questions, please contact Mr. David Shimokawa of the DOT Statewide Transportation Planning Office at telephone number (808) 587-2356.

Very truly yours,

BRENNON T. MORIOKA, Ph.D., P.E.
Director of Transportation

From: Dave Kisor
To: mv22h1eis;
Subject: Comments - EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii
Date: Saturday, September 04, 2010 12:20:28 PM

Outlook is such a piece of garbage, I'll use my own e-mail. The link provided in Big Island Weekly didn't work

Dave Kisor
14-3444 Tutu Ln., 2244
Pahoa, HI 96778

Why doesn't someone perform a full radiological test on the PTA and report the findings? Secondly, how long has the Army been operating rotary wing aircraft in the PTA, especially CH-47s, their equivalent to the CH-46? If the Marines already have CH-53Ds operating here, then that concern is belated. It appears to me someone is violently against the V-22, especially from the authors use of the word "controversial". (Big Island Weekly, as noted below)

As a Veteran of Naval Aviation, 10.5 years active and 8 inthe Reserves, I will stand with my brothers and sisters in arms. If the public want to complain, they can gripe at the congress, not at the branch, as they don't have the choices to make. The warfighters have nothing to do with what weapons they use
and probably wouldn't have chosen what they have to work with now. Scream at congress and scream loudly at them! Scream at the Department of Defense as they
are layers above the individual branches and have more to do with weapons acquisition and training situations, like the one here at PTA. So much of our weapon acquisition process is pork related. The F-16 was chosen, not because it was the superior aircraft in the competition, but because the facility that built them was in Texasand LBJ was on Capitol Hill.

If theyare that concerned about DU ammunition, then complain loudly to congress
and have the munitions manufacturers taxed heavily on every round they make. They get the spent fuel rods free and make a sizable profit selling the ammunition. They should also be charged a large hazardous materials waste disposal fee, forcing them to develop and manufacture non radioactive ammunition.

The primary concern with the Marines coming to the PTA seems to be with the V-

22
kicking up DU, sand and beating up the countryside with its rotor wash. Any large heavy lift rotorcraft will have that effect. When I was on CV-43 (USS Coral Sea), we had undergone a VertRep (Vertical Replenishment) and there were a
lot of men on the flight deck. The PLAT FLOLS (pilot landing and takeoff Fresnel Lens Optical Landing System) camera on the island was focused forward, watching the evolution when a CH-46 (not C-46 as written in the Big Island Weekly, 1 Sep 2010, pg 4) hovered at a slight angle just off of El 2 (elevator #2, on a Midway class carrier, was at the forward end of the angle) where someone had stacked 5 heavy wooden pallets.

Take 5 leaves, place them in the palm of your hand and blow on them, which was
just what happened to those 5 heavy wooden pallets. Three of them sailed overboard, while two of them struck the island with such a force they were splintered. It happened so quickly that nobody realized they were in danger until it was over and it was a wonder nobody got clobbered with a flying pallet. I got to see this in the relative safety, via PLAT FLOLS, below decks.

While mentioning the AH-1Z Huey Cobra, a bird I've come to know as "Hovering Death,"the author (see B.I.W.notation above) states the Cobra has been firing guns and Hellfire missiles since the Vietnamera. The Hellfire is a recent development and wasn"t used during Vietnam. There were pods of unguided rockets and the TOW (Tube launched, Optically tracked, Wire guided) missiles utilized at that time. I'm unaware if the TOW was used in Vietnam. Hellfire replaced the TOW.

The Big Island Weekly has an ad for an investigative reporter. It would be best if reporters honed their reporting skills prior to becoming investigators.
Prior to obtaining a BA in Geography at CSU, Northridge, I majored in Speech Communications and had to take mass communications courses. If one is going to
become a reporter, one must pay strict attention to detail. Troops are called GI because an illiterate reporter didn't ask anybody what the letters meant, not knowing they stood for "General Issue." Anyone called my Dad 'GI', would face the wrath of a Master Sergeant who did not like being called General Issue.

Ooh Rah!

Aloha & Anchors Aweigh,
Dave Kisor, Veteran Aviation Electrician, USN / USNR deployed aboard CV-19 A-4F;
CV-43 A-7E; Dets on CVN-65 A-4F; CVN-68 FA-18A; Kadena AB P-3B

||||||||||||||| =^.^= |||||||||||||||

<hr>
Cats & computers. Bring them into your home and your life is no longer your own.
Don't get upset when things don't work, but rather be amazed when they
do!

From: Cory (Martha) Harden
To: mv22h1eis;
Subject: Comments - EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii
Date: Monday, September 06, 2010 4:51:45 PM

Please complete the following information:

Name: Cory Harden
Company/Organization: none
Mailing Address: Box 10265
City: Hilo
State: Hawai'i
Zip Code: 96721

Add to Mailing List? (Yes or No): yes

Comments: Please analyze how much of the decision to base aircraft and personnel in Hawai'i is due to military need, and how much is due to a wish to contribute to Hawai'i's economy.

From: Gorsuch, Craig H CTR USAF PACAF 18 FSS/CEVQ
To: mv22h1eis;
cc: Pelzl, Rick T Maj USAF PACAF 18 FSS Det 2 Bellows/CC; Dao, Nhut L Civ USAF PACAF 18 FSS, Det 2/CD;
Subject: Written Comments:EIS for Basing MV-11 and H-1 Aircraft
Date: Tuesday, September 07, 2010 9:30:07 PM

Dear Sirs,

I would like the Marine Corps to consider the following questions and comments during preparation of the MV-22/H-1 Environmental Impact Statement:

1) What effects will the Aircraft Basing have on traffic in Waimanalo and along Tinker Road?

2) Please provide a description of anticipated "noise" from the training activities that will impact Bellows AFS. What flight patterns will the aircraft use and with what frequencies? Will training impact the air space directly over Bellows AFS? What are the anticipated training days and hours of training operations?

3) Will there be cumulative environmental effects from other Marine Corps Training Area Bellows (MCTAB) activities such as the MOUT activities?

4) Will the Aircraft Training at MCTAB have any effect on the community access to Bellows on weekends under the City and County lease agreement?

5) Please be aware that Bellows AFS is restoring an oxbow wetland area to provide habitat for endangered Hawaiian wetland birds on the lower reach of Waimanalo Stream just above the second gate. This is very near to one of the training landing zones identified at the scoping meeting.

6) Suggest the Marine Corps consider ways to give back to the Waimanalo community, such as using local construction contractors and developing community outreach programs. Perhaps there is an area on MCTAB that can be cleaned up and restored with native plants.

Mahalo for your consideration.

Craig

CRAIG GORSUCH, LEED AP
Environmental Program Manager

Environmental Compliance Technical Support Booz Allen Hamilton

Bellows Air Force Station
Det 2, 18 FSS/CEE, Contractor
515 Tinker Road
Waimanalo, HI 96795-1903

DSN: 259-4213; COMM: 808-259-4213
FAX DSN: 259-4227; FAX COMM: 808-259-4227
MOBILE 808-927-1867
email: craig.gorsuch.ctr@hickam.af.mil

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: DONALD MUNRO

ADDRESS: 46-251 IKIIKI ST.
KANEOHE 96744

PHONE/EMAIL: donm@lava.net 808 235 1126

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

WHY WERE NOT ALL RESIDENTS OF KANEOHE NOT INFORMED OF THE AUGUST 26 MEETING? I DID NOT LEARN OF IT UNTIL AUGUST 29. THE COMMUNITY IS OVERBURDENED WITH THE TOUCH & GO FLIGHTS, RIMPAC, THE UPCOMING BLUE ANGELS SHOW. THE NOISE LEVELS ARE TOO GREAT. AND THE STENCH OF FUEL IS OVERPOWERING. THE ADDITION OF MORE & NOISY AIRCRAFT IS TOO GREAT A BURDEN. IN ADDITION, THIS IS A SHALLOW BAY + THE FALLOUT OF ALL THESE FLIGHTS MUST POLLUTE IT.

THE ENDING OF THE TOUCH + GO FLIGHTS WOULD BE OF HELP. SO WOULD THE REALIGNMENT OF THE HANGARS FACING THE BAY. ENGINES BEING RUN IN THOSE HANGARS ARE AMPLIFIED + BROADCAST ALL OVER THE BAY

BECAUSE I WAS NOT INFORMED OF THE MEETING (NONE OF US WERE)

I DONOT KNOW IF THERE WAS ANY INFORMATION GIVEN ON TIMING + NUMBER OF FLIGHTS. THE PRESCENCE OF THE BASE IS A FACT. BUT THAT DOES NOT EXCUSE YOU FROM HAVING CONSIDERATION TO, AND COOPERATING WITH, THE RESIDENT POPULATION. THERE ARE MANY VETERANS LIVING IN THIS AREA. WE ARE NOT AGAINST YOUR WORK OR YOUR PRESENCE BUT WE ASK THAT YOU BE PARTNERS, NOT COMBATANTS.

Submit your comments at the meeting today, or mail or email no later than September 7, 2010, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

This form may be used as a mailer if folded, taped or stapled, and stamped.

WRITTEN COMMENT FORM
Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: EDWARD Y. HIRATA
ADDRESS: 46-255 IKIIKI ST.
KANEOHE, HI 96744
PHONE/EMAIL: edhirata@hawaii.rr.com

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

STUDY THE NOISE IMPACT ON THE SURROUNDING COMMUNITY. AS WELL AS THE NOISE FROM EXISTING TOUCH-AND-GO LANDINGS OF FOUR-ENGINE AIRCRAFT ON THE COMMUNITY.

THE EXISTING NOISE CREATED BY FOUR-ENGINE AIRCRAFT IS LOUD ENOUGH THAT IT DROWNS OUT TV SOUND IN OUR LIVING ROOM.

Submit your comments at the meeting today, or mail or email no later than September 7, 2010, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

This form may be used as a mailer if folded, taped or stapled, and stamped.

FROM: John Carse
R.R. 2, Box 4852
Pahoa, HI 96778

TO: Department of Navy
Naval Facilities Engineering Command, Pacific
Attn: EV 21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

DATE: September 7, 2010

RE: Environmental Impact Statement for Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

Aloha,

I am very concerned about the impact to the environment that will be caused the proposal to deploy more aircraft on the already overburdened and under-monitored air space of the Island of Hawaii.

First, what is the minimum height that these aircraft will be allowed to fly over our residential areas and national parks? And how much noise will that create? Although the Federal Aviation Administration requires all aircraft to maintain a standoff distance of 1500 feet for safety reasons, the Honolulu FAA Flight Standards District Office has voided this commonsense regulation on the Island of Hawaii. Currently, air tours are allowed to buzz our homes at 500 feet and vast swaths of our precious Hawai`i Volcanoes National Park at 200 feet. Will the military aircraft be operating at these ridiculously unsafe heights, too, despite the fact that these new regulations were created -- in violation of the FAA's own written policies -- without an Environmental Impact Statement?

And how will we report the inevitable barnstorming that pilots seem unable to suppress? Will there be someone to contact when immature pilots start strafing our communities? And will reporting unacceptable behavior achieve anything? Currently, the FAA claims to have the sole jurisdiction when it comes to enforcing aircraft regulations, despite the fact the inspectors have failed miserably at this task. In fact, although the Honolulu FAA FSDO has received literally thousands of complaints, there is no evidence that it has ever found a pilot guilty based on the details provided by concerned citizens. Will the military follow the FAA's example and completely ignore complaints from residents of the Island of Hawaii? Or will you help us to identify and prosecute pilots who violate laws, rules, regulations and ordinances?

Also, it wasn't that many years ago that a showboating military pilot strafed Spencer Beach Park so low that the prop wash collapsed tents and caused the injury of a Boy Scout so severe that he required hospitalization. Will the names of the offending pilots be made available to that we can seek financial restitution from them in our civil courts for damages caused?

And what method will be used to track these aircraft when they operate over our neighborhoods? The FAA currently has no way to identify any aircraft without a photograph clearly showing the N-number, despite the fact that these numbers are impossible to be seen when aircraft fly overhead. And they have absolutely no way to identify any aircraft operating at night. Will anything be done to rectify this travesty?

Also, according to HVNP Superintendent Cynthia Orlando, the park is planning to use the entry fees provided by air tours to establish a monitoring program, even though they refuse to tell their neighbors what it will be or how it works. Will you be contacting the NPS to make sure that their monitoring efforts are synchronized with those created for the proposed aircraft?

Because of the tremendous damage currently be done to the environment by irresponsible pilots and uncaring FAA officials, efforts are now being made to establish state and county monitoring systems that include specific route and height regulations as well as penalties for pilots who violate them. Will the military be joining us in our efforts to make aviators accountable?

Currently, pilots are destroying the Big Island citizens' right to privacy, land values, and quality of life. What will you be doing to prevent further increasing this mayhem?

Sincerely,

John Carse

From: John Cusick
To: mv22h1eis;
cc: dpenn@hawaii.edu; rappa@hawaii.edu;
Subject: Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements Hawaii (Statewide)
Date: Tuesday, September 07, 2010 9:10:18 PM
Attachments: Comment_Letter_Military_Aircraft_EISPN.pdf

To: Mr. John Bigay, Project Manager

Dear Mr. Bigay,

The Environmental Center's comments on the EISPN for the subject proposed action are attached.
If you have any questions about these comments, please contact David Penn, Environmental Review Assistant, at 956-3974.

Sincerely,

John Cusick
Environmental Center

Water Resources Research Center
Environmental Center

UNIVERSITY of HAWAI'I MĀNOA

September 07, 2010
RE: 0802

Department of the Navy
Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-I EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

Dear NAVFAC,

Environmental Impact Statement Notice of Intent
Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements
Hawaii (Statewide)

The U.S. Marine Corps proposes to base and operate up to two VVM squadrons and one HMLA squadron in Hawaii. The proposed action would include (1) new construction and replacement and/or renovation of airfield facilities, support facilities, and infrastructure, and (2) conducting training and readiness operations and special exercise operations at training facilities statewide, including the construction of new landing zones and improvements to existing landing zones.

These comments were drafted with the assistance of Davianna McGregor, Ethnic Studies/UH Manoa; George Curtis, Affiliate Professor/UH Hilo; and Peter Rappa, Environmental Center/UH Manoa.

General Comments

How would the operational effects of the Osprey aircraft and H-1 Cobra and Huey attack helicopters be similar to or different from the effects historically and presently caused by the operation of these types of military aircraft and helicopters, including Army and National Guard activities?

Specific Comments

Although the proposed action appears to include the use of Kalaupapa airfield, a scoping meeting was not scheduled for Kalaupapa. We suggest that the Marine Corps consult with the Kalaupapa Patients Council about any plans to use the Kalaupapa airfield.

2500 Dole Street, Krauss Annex 19 Honolulu, Hawai'i 96822
Telephone: (808) 956-7361 Fax: (808) 956-3980
An Equal Opportunity/Affirmative Action Institution

September 07, 2010
Page 2

Thank you for the opportunity to comment on this notice of intent to prepare a Draft Environmental Impact Statement (EIS). When the Draft EIS is distributed for public review, please send two printed copies to the Environmental Center.

Sincerely,

John Cusick
Environmental Center Assistant Specialist

c: Chittaranjan Ray, Interim Director, Water Resources Research Center, UH Manoa
Davianna McGregor
George Curtis
Peter Rappa

Lucy M. Akau
41-792 Kalanianaole Hwy
Waimanalo 96795

Comment – EIS Statement Aircraft using Bellows Airfield for their Base Yard

The Kingdom of Hawaii Motto is "Ua mau ke ea o ka aina ika PONO " which translates to "The Life of the Land is Perpetuated in Righteousness"

These words is stating that these lands of Hawaii should be used as a haven for families who are in needed of shelter, foods, clothing including financial advise. The culture of these lands is Perpetuated in ALOHA.

Waimanalo has a country style of living, at peace with each other living day by day in a world that preach war with others. Increase of any kind of military use of Bellows would disturb the quiet country life of Waimanalo

E Every I Important S Statement should be analyst by one who has KNOWLEDGE and WISDOM.

In the year July 1893 The Republic of Hawaii was established who overthrown Hawaii last monarch, Queen Lili'oukalani and America excepted that illegal gift of land.

Please do not close your eyes to the truth histories of Hawaii. The Kingdom of Hawaii still excess

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: Marilyn Morita

ADDRESS: 46-316 Ikiiki St.
Kaneohe HI 96744-4061

PHONE/EMAIL: 808-235-2450

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

I am concerned both with noise & safety – If these tall noisy planes (including Blue Angels) would adhere to not flying over our homes, I'd be satisfied – when any of your big jets or especially fighter jets (F22 Raptors) fly over ~~land~~ (over my house), the noise is horrible & I have a crack in my house because of previous flights vibrations.

The loud noise interferes w/ hearing others in our home 2 feet away & scares – terrifies my grandchildren – Auwe! Please be good neighbors –

Submit your comments at the meeting today, or mail or email no later than September 7, 2010, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

This form may be used as a mailer if folded, taped or stapled, and stamped.

Substitue for original Navy form
to allow sufficient space

Polly Elayne Pool
46-082 Puulena St. #1213
Kaneohe, HI 96744

Phone: 808/235-6500

WRITTEN COMMENT FORM -EIS for the
BASING OF MV-22 and H-1 Aircraft in
Support of III Marine Expeditionary
Force Elements in Hawaii

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement:

GENERAL QUESTIONS RELATING TO THIS STUDY:

1. Please name your source of Current population (2010) figures (due March '11?) density estimates, minorities, all important data you use.
2. Please do on-site research and see, listen. (ie,Kaneohe Bay) Unlike P-8A.
3. Include "Alternative" Locations please. Being considered and/or studied. (Why on this dense, crowded tiny, fragile island with postage stamp landing?)
4. Considering the safety records of the HH-1 Cobra & Huey attack helicopters and the V-22 Osprey ("Accidents & incidents involving ghd V-22 Osprey" http:en.wikipedia.org/wiki/Accidents and incidents) we are understandbly worried about them flying over us. Please list past problems and how they have been solved, certified safe. (Where can we find your response?)

PLEASE PREPARE A CUMULATIVE IMPACTSSTUDY OF THE OSPRY, HUEY AND COBRA taking into consideration the present Kaneohe MCB aircraft, planned aircraft (ie P-8A) and the V-22 Ospry, the Huey & Cobra attack Helicopters. Including

	OSPREY	COBRA	HUEY
Hazardous Materials, Storage and waste			

Noise (including Stress, quality of life, PROPERTY VALUES, health problems)

Threatened & Endangered Species

Traffic/Transportation

Brown tree snake carried in

Socioeconomics

Marine life.

SAFETY (No. 4 above.)

I look forward to having a disk copy of the DEIS, or paper if you choose. I hope you will tell us the name and (government) department of the folks you will send this to for review AND APPROVAL from the standpoint of the citizens, as you do for the marine life, the environment, etc. etc.

THANK YOU.

Polly Elayne Pool

Polly Elayne Pool

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

NAME: Randy Kennedy

ADDRESS: 46-170 Lilipuna Road
Kaneohe HI 96744

PHONE/EMAIL: rkennedy52@hawaii.rr.com

I would like the Marine Corps to consider the following during preparation of the MV-22/H-1 Environmental Impact Statement: *(Please print legibly)*

Every effort should be made to restrict flights over a near the residential areas, especially at night. During the last Rim Pac exercise, my family went essentially without a full night sleep for over 30 days, leading to sleep deprivation. - Keep the planes out over the Bay + prohibit flights 10pm-7am. I believe there are laws prohibiting those flights that have become common. Enforce those laws!

Submit your comments at the meeting today, or mail or email no later than September 7, 2010, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

This form may be used as a mailer if folded, taped or stapled, and stamped.

United States Department of the Interior

Hawai`i Volcanoes National Park
P.O. Box 52
Hawaii National Park, HI 96718-0052
808/985-6000
808/967-8186 (FAX)

In Reply Refer to:
L7619

September 7, 2010

Department of the Navy
Naval Facilities Engineering Command Pacific
EIS Project Manager (EV21, MV-22/H-1)
258 Makalapa Drive Suite 100
Pearl Harbor, HI 96860-3134

This letter is in response to your agency's request for comments regarding the proposed basing and operation of MV-22 Osprey aircraft and H-1 Cobra and Huey attack helicopters for Marine training and readiness operations in Hawaii. Our concerns lie specifically with the potential for military over flights above Hawai'i Volcanoes National Park due to increased training activities in airspace related to staging at Pōhakuloa Training Area on Hawaii Island or any other staging areas that could result in airspace above park lands being used for training activities. We appreciate the opportunity to offer the following comments.

The National Park Service (NPS) is a cooperating agency with the FAA to develop an Air Tour Management Plan and environmental impact statement for Hawaii Volcanoes in order to mitigate or prevent the significant impacts of air tour operations over the park. Congressional and NPS concerns regarding the impacts of over flights on the national parks led to passage of the National Parks Air Tour Management Act (NPATMA) in 2000. The impacts to national park resources (natural, cultural, visitor experience and safety) from low-level flights occurring over Hawai'i Volcanoes have revealed a number of issues:

- Since March of 2008, Kīlauea Volcano has experienced an ongoing summit eruption at Halemaumau Crater. The FAA has issued a Temporary Flight Restriction, (TFR) for aircraft safety for explosive eruptions and presence of ejected volcanic particulates at Kīlauea Summit (NOTAM: Hilo Vortac (ITO) 209 degree radial at 24.6 miles (Latitude 19°24" 20" N, Longitude 155° 17"26"W for a radius of 3 nautical miles). This is from the surface up to and including 4000'agl. Eruptive activities are continuing to produce a hazardous ash cloud which may cause aircraft engine damage/failure and abrasion damage due to airframe and windshield surfaces. Plume size fluctuates. Explosive events with large amounts of ash can appear with no warning. In addition the TFR is also necessary due to the need for frequent helicopter flights by the U.S. Geological Survey-Hawaiian Volcano Observatory to complete their mission of monitoring the volcano for the safety of all island residents. Military over flights pose safety concerns for these administrative flights. On July 1, 2010, two military fighter jets flew above our park helipad into the TFR as an incoming contract helicopter was preparing to pick up two geologists for monitoring. An on-going dialogue with military entities and the FAA is ongoing to prevent this type of incident from occurring in the future.

- Hawaii Volcanoes is designated a National Park and World Heritage Site/ Biosphere Reserve due to its volcanic, ecological and cultural significance. Any over flights pass over nesting, breeding and recovery areas of six endangered and threatened bird species and one bat species, which includes Hawai'i Creeper, Hawai'i Akepa, Akiapola'au, Hawaiian Petrel, Hawaiian Goose, Hawaiian Hawk and the Hawaiian Hoary Bat. In addition Hawaiian Petrels are nocturnal flyers whose breeding and nesting activities occur within the park at 8,000'-10,000' elevation on Mauna Loa, which borders the military restricted airspace at Pōhakuloa Training Area. Military over flights have the potential to impact these species.

- In terms of cultural concerns, Moku'aweoweo on Mauna Loa and Halemaumau Crater at Kilauea are considered two of the most sacred places for Native Hawaiians. In addition, the entire park is associated with the birth and creation of Hawaiian culture. The Kupuna group, an informal group of Hawaiian elders, has stated that they feel the sight and presence of these low-flying aircraft to be culturally inappropriate.

- Since 2007, Hawaii Volcanoes staff have participated in the Western Pacific Airspace/Range Council meetings. The purpose of this annual meeting is to provide an opportunity for dialogue among the various branches of the military and land management agencies. The meeting is attended by active duty and civilian representatives from the US Air Force, US Navy, and Air National Guard units from throughout the western United States and top brass from Washington D.C. At this meeting, Hawaii Volcanoes has presented a log of military over flights and related photos. An ongoing dialogue with military representatives has resulted in a reporting procedure for incident follow-up and has led to a reduction in the numbers of military over flights due to increased awareness of our issues. Collectively the military at these meetings has stated that military aircraft operating at low levels and at high speeds over the national parks are not operating within the standard operating procedures of the military. At their urging we have developed a 24-hour reporting procedure for incident follow up.

Legally, the presence of military flights over national parks is in conflict with our park mission. Visitors come to their national parks to experience the natural quiet and solitude. Park managers are charged with protecting critically endangered species and park sound scapes as well as limiting activities that cause unnecessary noise or threaten the natural quiet. The Hawai'i Volcanoes visitor comment record and recent social science research for the park's ATMP reinforces the belief that our national constituency overall does not want unnatural sounds or visual intrusion into the park airspace.

We anticipate working with you to build a cooperative relationship and resolve our concerns as the EIS progresses. Please feel free to contact me at Hawai'i Volcanoes, if you have any further questions.

Sincerely,

Cindy L. Orlando
Park Superintendent

From: Peter Rappa
To: John Cusick;
cc: mv22h1eis; dpenn@hawaii.edu;
Subject: Re: Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements Hawaii (Statewide)
Date: Wednesday, September 08, 2010 10:34:45 AM

Aloha John and Dave:

Nice work. Thanks for filling in.

Peter
----- Original Message -----
From: John Cusick <jcusick@hawaii.edu>
Date: Tuesday, September 7, 2010 9:10 pm
Subject: Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements Hawaii (Statewide)
To: mv22h1eis@beltcollins.com
Cc: dpenn@hawaii.edu, rappa@hawaii.edu

> To: Mr. John Bigay, Project Manager
>
> Dear Mr. Bigay,
>
> The Environmental Center's comments on the EISPN for the subject proposed action are attached.
> If you have any questions about these comments, please contact David Penn, Environmental Review Assistant, at 956-3974.
>
>
>
> Sincerely,
>
>
> John Cusick
> Environmental Center

Glenn I. Teves
P.O. Box 261
Kualapuu, HI 96757

September 13, 2010

Naval Facilities Engineering Command Pacific,
Attn: EV21, MV-22/H-1 EIS Project Manager,
258 Makalapa Drive, Suite 100,
Pearl Harbor, HI 96860-3134.

RE: EIS for a Molokai Refueling Landing

Aloha. I live on Molokai, and reside in Hoolehua about 11/2 miles away from the airport. I have strong concerns about a refueling landing on Molokai. I realize that I have missed the deadline because I had a difficult time finding what agency was involved through the internet, and actually thought it was the Army. However, I still want my comments to be recorded in these records. Here are my concerns:

Noise
The noise generated by such an activity is a major concern. Anytime there's a lack of prevailing trade winds, either no winds or a light southerly, noise generated at the airport is magnified and reverberates throughout our native Hawaiian community of Hoolehua. Even the first flights in the morning about 5 am can sound like there's an airplane outside your door. The military has done exercises on Molokai in the past, and some of the activities were not only noisy but very obtrusive and disruptive to the activities of this island.

Night Flights
We are a quiet community with limited night activities, so residents stay home and enjoy their families or go to sleep early. To have these helicopters flying around at night disrupts our quiet evenings and is unacceptable. In the mid-1980's, the army conducted night maneuvers in the Kalamaula area just west of Kaunakakai town. They would fly low over residential areas near Kalae with simulated gun fire, and would fly directly over my house. My child, who was around a year old at that time would wake up screaming, and it used to anger me to the point that I wanted to go outside and make some noise with my rifle as well. I am adamantly opposed to night flying. Even with day flights, the military needs to come on shore straight from the south and leave straight to the south to minimize noise and other impacts to populated areas. There should be no crossing over the isthmus of Molokai island to minimize impacts to our rural community of Hoolehua.

Potential for Fires

Former military maneuvers near Kalamaula endangered the community when a helicopter crashed, there were casualties, and a fire ensued. Residents had to fight a fire that threatened their homes. As a result, the Department of Hawaiian Home Lands cancelled the agreement to allow the Army to conduct military maneuvers on Molokai. Molokai is a very dry island, and wildfires run rampant through here. A 10,000 acre fire is not uncommon. We need to minimize the potential for fires on this island whether it's from helicopter exhaust or training maneuvers.

In closing, thank you for this opportunity to provide input.

Sincerely

Glenn I. Teves

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 768-8000 • FAX: (808) 768-6041
DEPT. WEB SITE: www.honoluludpp.org • CITY WEB SITE: www.honolulu.gov

KIRK W. CALDWELL
ACTING MAYOR

DAVID K. TANOUE
DIRECTOR

ROBERT M. SUMITOMO
DEPUTY DIRECTOR

2010/ELOG-1649(DS)

September 16, 2010

Department of the Navy
Naval Facilities Engineering Command
Pacific Division
258 Makalapa Drive, Suite 100
Pearl Harbor, Hawaii 96860-3134

Attn: EV21, MV-22/H-1 EIS Project Manager

To Whom It May Concern:

Subject: Notice of Intent to Prepare an Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft Support of III Marine Expeditionary Force Elements in Hawaii

Thank you for the opportunity to review the Notice of Intent to Prepare an Environmental Impact Statement for the above-referenced project. We have no comments to offer at this time.

Should you have any questions, please call Dennis Silva, Jr. of my staff at 768-8284.

Very truly yours,

David K. Tanoue, Director
Department of Planning and Permitting

DKT:lh
798231

From: Gary Sue Pekarsky
To: mv22h1eis;
Subject: Summary of Comments - EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii
Date: Tuesday, September 21, 2010 5:17:12 PM

Hi

I was off island during your community input meetings on BIg Island last month.

Where can I find minutes for those meetings?

Have you issued a report yet? If not, when will it be available? If so, where I get a copy of the report?

Many thanks.

Sue Pekarsky Gary
808 882 7367

United States Department of the Interior

NATIONAL PARK SERVICE
Pacific West Region
300 Ala Moana Blvd., Box 50165
Room 6-226
Honolulu, Hawaii 96850

IN REPLY REFER TO
N3615 (PWRH)

September 27, 2010

EIS Project Manager
Department of the Navy, Naval Facilities Engineering Command, Pacific Division
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

To Whom It May Concern:

Thank you for scoping issues to be considered by a draft Environmental Impact Statement (DEIS) for the basing of MV-22 and H-1 aircraft in support of Marine Expeditionary Force elements in Hawaii.

Five national park units on the Island of Hawaii: Pu'ukohola Heiau National Historic Site, Kaloko-Honokohau National Historical Park, Pu'uhonua O Honaunau National Historical Park, Ala Kahakai National Historic Trail and Hawaii Volcanoes National Park and Kalaupapa National Historical Park on the island of Molokai. Numerous National Natural and Historic Landmarks and National Register listed properties could also be adversely impacted by the proposed actions.

The National Park Service (NPS) recommends that the DEIS includes an evaluation of impacts to the human and natural environment for the areas noted above. Specific issues to evaluate in the DEIS include:

Complete Description of the Proposed Action and Alternatives

Specific flight paths, altitudes, or operating times of the flight profiles should be included in the DEIS for the proposed action and alternatives. Number of flights should include a typical day and busy day. Number of events over specific locations would also helpful. Include "contingency operations" within the evaluation. This information is necessary in order to provide a reader the basis for evaluating the impacts from the flight operations that will be associated with the proposed action.

Due to the high volume of low altitude commercial air tour activity in the vicinity of the Hawaii National Parks, we encourage you to contact the FAA Flight Standards District Office in Honolulu. Their comments on the undertaking regarding safety issues or potential conflicts with air tour operations on Hawaii Island will be essential.

TAKE PRIDE IN AMERICA

Soundscapes

Because of potential impacts of this proposed action on national park soundscapes the NPS suggests that the DEIS include analysis of impacts to national park and other applicable natural area soundscapes. In all of the parks noted above, there is a long and varied history of human interaction with the land, free from disturbance caused by the sights and sounds of military aircraft and other mechanized sounds. Natural and cultural sounds are integral components of the suite of resources and values National Park managers are charged with preserving and restoring. A soundscape refers to the total acoustic environment of an area. The soundscape of a national park, like air, water, scenery, or wildlife, is a valuable resource that can easily be degraded or destroyed by inappropriate sound levels and frequencies. An area's ability to transmit ecologically significant sounds is a function of the amount of extraneous noise intrusion.

We are aware that DOD typically uses the day-night average sound level (DNL) metric in environmental impact statements. DNL is an energy-based noise averaging metric widely used by the Federal Aviation Administration (FAA) and the Department of Defense as the primary means for determining the cumulative noise energy exposure of individuals to noise resulting from aviation activities. Hence, thresholds of significance that have been established by the FAA are based on community response. FAA Order 1050.1E notes that special consideration needs to be given to the evaluation of the significance of noise impacts on noise sensitive areas within national parks. Since assumptions regarding DNL levels are community-based in relation to airports, this metric is not adequate to assess impacts of noise to park resources, values and visitor experience.

The NPS uses audibility based metrics or "time above" metrics in order to express the time the sound level is above ambient. This takes into account the duration of aircraft noise events, the number of aircraft noise events, and the absolute sound level of events. Time above metrics correlate better with flight operations than day-night average metrics, which obscure the dynamic range of acoustic events (www.fican.org/pdf/HanscomNoise.pdf). These supplemental metrics should be used to better satisfy the requirements under the National Environmental Policy Act to characterize impacts to the environment in terms of intensity, context and duration (40 CFR 1508.27).

Rare, Threatened and Endangered Species

The DEIS should evaluate impacts to rare, threatened and endangered species. This section contains a minimal and incomplete description of plant and animal resources for proposed action. Information about these species and their locations are readily available in USFWS and NMFS documents and should be included. For example, green and hawksbill turtles occur in KAHO. Dozens of species of birds protected under the Migratory Bird Treaty Act have been observed at the affected parks.

Direct and indirect impacts from flights over or near areas were wildlife and T&E species are breeding and foraging in affected sites and potential impacts should be analyzed. The potential for introduction of exotic plant or animal species during normal and "contingency operations" should be analyzed.

Cultural Resources

Nationally significant cultural resources are preserved within the potentially impacted national park areas. The DEIS should evaluate the potential impacts to these resources.

Safety

Is there a potential for inadvertent or intentional discharge of jet fuel during normal or emergency flight operations? If so, it should be discussed in the DEIS. The NPS is concerned about the potential contamination of park lands and offshore coral reef habitat from such discharge.

Cumulative Impacts

The DEIS, as is required by NEPA, should analyze cumulative impacts, both geographical and temporal, to resources. For example, cumulative impacts to air quality and air traffic, and affects from increasing air traffic (military and commercial) in the future to noise and cultural resources.

The DEIS should also analyze impacts of the proposed action and alternatives to surface water, coastal zones, wetlands, air quality, outdoor recreation and visual resources.

The NPS appreciates being included in this initial project scoping. We look forward to a continued dialogue on this proposal as you move forward and request that you include the parties listed below in your regular mailings. Please contact me at 808-541-2693 ext. 723 if you have questions regarding our comments.

Sincerely,

Frank Hays

Frank Hays
Pacific Area Director

cc:
Superintendent, Kaloko-Honokohau NHP/
Pu'uhonua o Honaunau NHP
Superintendent, Ala Kahakai NHT
Superintendent, Kalaupapa NHP
Superintendent, Pu'ukohola Heiau NHS

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

September 30, 2010

Department of the Navy
Naval Facilities Engineering Command
Pacific Division
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive Suite 100
Pearl Harbor, Hawaii 96860-3134

Ladies and Gentlemen:

Subject: EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR), Land Division distributed or made available a copy of your report pertaining to the subject matter to State Historic Preservation for their review and comment.

The Department of Land and Natural Resources has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0433. Thank you.

Sincerely,

Charlene Unoki

Charlene Unoki
Assistant Administrator

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RUSSELL Y. TSUJI
ACTING FIRST DEPUTY

LENORE N. OHYE
ACTING DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

September 27, 2010

Log No. 2010.2913
Doc No. 1009MV26

MEMORANDUM

TO: Charlene Unoki, Land Division
PO Box 621
Honolulu, HI 96809

RECEIVED
LAND DIVISION
2010 SEP 29 A 11:25
DEPT OF LAND & NATURAL RESOURCES
STATE OF HAWAII

FROM: Theresa K. Donham, Deputy SHPO/Archaeology Branch Chief

SUBJECT: **National Historic Preservation Act (NHPA) Section 106 Review - Environmental Impact Statement Preparation Notice for the Basing of MV-22 and H-1 Aircraft in Support of the III Marine Expeditionary Force Elements in Hawaii Kaneohe Ahupua'a, Ko'olaupoko District, Island of Hawai'i**
TMK: (1) 4-4-008

Thank you for providing SHPD with this Notice of Intent (NOI) that was received by our office on August 24, 2010. The Department of the Navy plans to prepare an EIS for the basing of MV-22 and H-1 aircraft in support of the III Marine expeditionary force elements in Hawaii. According to the letter, all of the proposed alternatives, except 'No Action', involve the construction of aviation facilities at the Marine Corps Base Hawaii Kaneohe Bay. A review of our records indicates that there are three sites listed on the National Register of Historic Places (NRHP) that share the same TMK plat as the proposed project, and could be potentially affected by this action. These sites are the Kane'ohe Naval Air Station (80-10-1386) and the Mokapu Burial Area (80-11-1017), which are both located within TMK 4-4-008:001, and the nearby Kapapa Island Complex 80-10-1153 located in 4-4-008:004. In addition, sand fill from the Mokapu Burial Area has been used on utilities projects across the peninsula. This fill has been shown to contain disarticulated human skeletal remains in secondary contexts.

We recommend that the EIS address project impacts to the above known historic properties and potential impacts to currently unknown historic properties. We would like to request the opportunity to review and comment on the draft EIS.

If you have any questions, please contact Michael Vitousek at (808) 692-8029.

KO`OLAUPOKO HAWAIIAN CIVIC CLUB

October 5, 2010

Naval Faclities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@belcollins.com

Re: Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft
<u>In Support of III Marine Expeditionary Force Elements in Hawai`i</u>

To whom it may concern:

The Ko`olaupoko Hawaiian Civic Club is deeply concerned about plans to locate additional aircraft and personnel at Marine Corps Base Hawai`i, located here at Kane`ohe bay, island of O`ahu, Hawai`i.

The Ko`olaupoko Hawaiian Civic Club, established in 1937, has long advocated for the preservation of our area's culture, heritage and people. Our mission statement reads: *to malama our members, their families, and the communities in which we live.* "Malama" means, to care for, advocate and protect the residents who live in the nine ahupua`a (traditional communities) around Kane`ohe bay. We are also very supportive of the efforts of the U.S. government to provide and prepare military personnel to protect our islands.

Our primary concern with the proposed plan is that it will involve basing hundreds of additional military personnel, and their families – an estimated 2,300 people - here in Kane`ohe bay. When that has occurred with previous assignments of military contingents, there have been significant social, economic and cultural impacts upon our community.

One of the more significant impacts has been the loss of adequate affordable rentals here in the communities surrounding the base. Our island residents cannot compete for affordable rentals with military personnel who receive housing allowances for living off-base. As a result, many island families are forced to live in already crowded relative homes, or have been forced to live in temporary shelters, in their vehicles, or other inadequate housing.

Noise and aircraft flights over the land area around Kane`ohe bay have also been of concern to our communities. While most of us can tolerate occasional noise interruptions, the flights have become daily nuisances and interrupt teachers as they teach students in the classroom and workers as they conduct business in their meetings or other areas. Flights at low altitudes are often noted over land areas, creating other concerns among residents.

There are also cultural concerns. The Marine Base has allowed degredation of the banks of Nu`upia ponds, once a part of a rich cultural heritage for our native Hawaiian community; they continue to use sand from burial areas at the base for construction of runways and other structures on the base, despite the fact that human remains are contained in those resources; and they uphold inconsistent policies regarding access to native Hawaiian cultural areas on base vs. access to recreational activities for non-Hawaiians to visit the peninsula.

For these and other reasons, we request that the Navy prepare a socio-economic-cultural impact study prior to the assignment of this new enterprise to Marine Corps Base Hawai`i at Mokapu.

In addition, we also request that, following completion of this study, if adverse impacts are anticipated, the Navy must prepare and implement a mitigation plan to address those adverse impacts before the plan can be executed.

We appreciate the opportunity to offer our mana`o (comments) regarding the proposed expansion of military aircraft and facilities at Kane`ohe. If you have any further questions, please contact us at (808) 235-8111 or via e-mail at malamapono@aol.com.

Me kealoha pumehana,

Mahealani Cypher

MAHEALANI CYPHER
President

cc: Kane`ohe Neighborhood Board
Kahalu`u Neighborhood Board
Kailua Neighborhood Board
Kailua Hawaiian Civic Club
Rep. Ken Ito
Rep. Pono Chong
Rep. Jessica Wooley
Sen. Jill Tokuda
Sen. Clayton Hee
Councilmember J. Ikaika Anderson

P. O. Box 664
Kaneohe, HI 96744
Ph. (808) 235-8111
koolaupokohcc.org

EV21 [handwritten initials]

Hawaiian Electric Company, Inc. • PO Box 2750 • Honolulu, HI 96840-0001

EIS

October 12, 2010

Ms. Karen Sumida
Department of the Navy
Naval Facilities Engineering
Command, Pacific
258 Makalapa Drive - Suite 100
Pearl Harbor, HI 96860-3134

Dear Ms. Sumida:

Re: Basing of MV-22 & H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

Thank you for the opportunity to comment on the above-referenced project. We sincerely apologize for the delay in responding to your request for comments. Hawaiian Electric Company, Inc. (HECO) has no comments or objections at this time.

Should HECO have existing facilities/easements on the subject properties, continued access for maintenance purposes will be needed. In addition, HECO reserves the opportunity to further comment on the protection of existing power lines and electric power facilities that may be affected by the project.

As the project develops and construction plans are finalized, please continue to keep us informed so that we may be better able to evaluate any effects on HECO's system facilities.

To ensure HECO's continuing input in this project, we suggest that you work directly with Mr. Rouen Liu of our Engineering Department, Project Management Division (543-7245). Thank you again for the opportunity to comment on this project.

Sincerely,

Kirk S. Tomita
Senior Environmental Scientist

cc: Ms. Catherine P. Kealoha (OEQC)
R. Liu

Appendix A-5 is organized into three sections for the purposes described below:

I. List of Commenters – This is a directory of the letters. This list is used to find the letter of interest and the assigned letter number.

II. DEIS Comment Letters – In this section, copies of the letters are presented by letter number. Within each letter, comment numbers are identified in the margins on the letters.

III. Responses to Comments – This table provides the responses to the comments and is organized by letter number.

List of Commenters

Agency Organization/Department	Title of Person	Last Name	First Name	Letter Number
Federal Agency				
Environmental Protection Agency Region 9	Life Scientist	**Sturges**	Susan	108
United States Department of the Interior National Park Service Ala Kahakai National Historic Trail	Superintendent	**Arakaki**	Aric	154
United States Department of the Interior National Park Service Hawaii Volcanoes National Park	Park Superintendent	**Orlando**	Cindy	98
United States Department of the Interior National Park Service Kalaupapa National Historical Park	Superintendent	**Prokop**	Stephen	96
United States Department of the Interior Office of Environmental Policy and Compliance Pacific Southwest Region	Regional Environmental Officer	**Port**	Patricia	54
State Agency				
Department of Hawaiian Home Lands	Chairman	**Nahale-a**	Albert	160
Department of Education	Superintendent	**Matayoshi**	Kathryn	124
Department of Health Environmental Planning Office	Acting Manager	**Salmonson**	Genevieve	76
Department of Land and Natural Resources Land Division	Land Administrator	**Ysuji**	Russell	158
Department of Transportation	Director of Transportation	**Okimoto**	Glen	169
University of Hawaii at Hilo Office of Mauna Kea Management		**Nagata**	Stephanie	75
State Environmental Council for Molokai			Malia	38
State Elected Official				
House of Representatives	State Representative - District 50	**Thielen**	Cynthia	20
Senate District 3	Senator	**Green, M.D.**	Joshua	156
City and County of Honolulu				
Department of Planning and Permitting	Director	**Tanoue**	David	125
Department of Facility Maintenance	Director and Chief	**Chun**	Westley	86

Agency Organization/Department	Title of Person	Last Name	First Name	Letter Number
	Engineer			
Department of Parks and Recreation	Director	**Cabato**	Gary	87
Department of Transportation Services		**Yoshioka**	Wayne	80
Honolulu Fire Department	Fire Chief	**Silva**	Kenneth	167
Police Department	Chief of Police	**Kealoha**	Louis	168
County of Hawaii				
Department of Environmental Management	Acting Director	**Beck, P.E.**	Dora	99
Planning Department	Planning Director	**Leithead Todd**	Bobby Jean	137
Department of Water		**Pavao**	Milton	91
Hawaii Fire Department		**Rosario**	Darren	90
County of Maui				
Department of Planning		**Spence**	William	163
Department of Transportation	Director	**Winer**	Jo Anne	164
Department of Parks and Recreation	Director of Parks and Recreation	**Correa**	Glenn	77
County of Kauai				
Department of Water	Chief of Water Resources and Planning Division	**Fujikawa**	Gregg	78
Organization				
Hawaii's Thousand Friends	Executive Director	**Wong**	Donna	142
Koʻolaupoko Hawaiian Civic Club	President	**Hewett**	Alice	141
Kohala Lihikai, Inc.		**Withington**	Toni	106
Kohala Merchant's Association	Vice President	**Slaven**	Alyssa	82
Koolaupoko Hawaiian Civic Club		**Hewett**	Alice	47
Maikaʻi Kamakani ʻO Kohala, Inc.		**Laxton**	Stephanie	161
Mohala Lehua Farms, LLC		**Logan, III**	Ralph	134
Native Hawaiian Researchers Ohana		**Cachola**	Fred	166
Ocean Conservation Society	President	**Bearzi**	Maddalena	126

Individuals		
Last Name	**First Name**	**Letter Number**
Akaka	Ellen	128
Anderson	Ross & Stefanie	111
Arnold	Forrest	29
Arnold	Les	40
Babben	Kathie	157
Baku	Steffani	30
Ballard	Lee	7
Ballou	Guy	44
Barclay	Micah	27
Belmarez	Jamie	25
Benjamin	Jonathan	151

Individuals		
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Benjamin	Patricia	5
Bermudez	Kahu Richard	52
Biederman	Carolann	127
Bonahan	Michael	84
Bowart	Sophia	12
Brigham	Cathy	100
Cameron	Steve	62
Cappelle	Jane	159
Carey	Phil and Anita	115
Carlson	Mitch	171
Carrillo	Michal	24

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Channon	Jim	6
Ching	Sherrie	144
Chun	Debbie	103
Coates	George	94
Coster	Robert	95
Cruz	Dillon	89
Cunningham	David	136
Curtis	Laura	150
Davison	David & Marietta	69
de Vos	Paul	133
Dodson	Travis	22
Dote	James	130
Dunn	Richard	139
Estores	S. Joe	18
Fanning	Flo	49
Fanning	Harold	61
Fessler	S.	42
Fleckles	John	43
Ford	Kitti	72
Fowler	Noelani	119
Frame	Joshua	53
Gebauer	Otto	135
Gibson	Deborah	122
Gilbert	Jody	110
Goldstein	Jack & Laurie	152
Graham	Joan & Paul	50
Harden	Cory	31
Harden	Cory	58
Harden	Cory	71
Hildebrandt	Volker	118
Hilton	Eileen	120
Hopson	Gaylene	8
Hummel	William & Kathleen	143
Huyler	HW	21
Isayama	Pamela & Koichi	102
Kahukauhane		175
Kalama	Kimberly	56
Kane	Jerry	3

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Last Name	**First Name**	**Letter Number**
Kau	Dagmar	112
Kisor	Dave	1
Kittell	Steve	79
Knoll	Carolyn	70
Krainer	Margaret	148
Krainer	Peter	149
Laich	Linda	10
Laich	William	13
Land	James	85
Laughlin	Susan	153
Levey	Joel	147
Levey, M.A.	Michelle	146
Lewis	Paul	59
Logan	Neil	170
Losey	George	2
Lysanght	Corinne	17
Masterson	Thomas	51
McCann	Robin	113
McKellar	Sherree	129
Metzler	John	74
Minton	Barbara	60
Mitchell	Tom & Michelle	105
Mizuta	Lea	15
Moore	James & Laurie	132
Naka	Haloa	32
Nakoa	Makaʻala	35
Nedved	Kelly	23
Newell	Jacqueline	88
Nichols	Vanessa	145
Olmsted	Coert	165
Oram	Valerie	162
Orihuela	Jeanette	48
Orr	Katherine	114
Palma-Glennie	Janice	121
Parrish	Frank	41
Perchan	Mark & Leilani	116
Perez	Theresa	26
Perry	Carol	123

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Porter	Carol	107
Price	Megana	9
Pyuen	Kyle	65
Quick	Susan	97
Reed	Rob	66
Rossoff	Leonard	37
Russell	Susan & Charles	11
Sager	William	93
Shima	Jan	138
Shulman	Corinne	68
Slaven	Alyssa	81
Snyder	Robert	109
Stephenson	John	19
Sterne	Bob	117
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Tayama	Steven	174
Thielen-Harry	Cynthia	49
Tillotson	Cliff	67
Toledo	Richard	172
Tomey	Kim	131
Turner	James	57
Unknown	Judy	73
Van Lier Ribbink	Peter	63
Vericker	Bob	4
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Werjefelt	Christian	101
Wida Family		92
Wiecking	Ken & Donna	104
Willie	Margaret	16
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Wulzen	Renee	64
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(not available)	Kawika	45
(not available)	Poster from Waimea public meeting	33
(not available)	mahinahula	83

001

From: Dave Kisor
To: mv22h1eis;
Date: Friday, November 11, 2011 12:11:45 PM

People will grouse about anything they don't understand. It doesn't appear operations will be increased that significantly, so I don't see
001-1 that as much of a problem. It's the construction and so long as the government only hires local companies, that shouldn't be an issue.
001-2 Make certain all buildings receive the Hawaiian blessing. The real
001-3 issue here with Hawaiians is the ceded lands and they don't want the US government to take any more of their land away from them, so don't even think of using the reserves around the PTA as a training area. If someone in the observatory complains, remind them that U of H only pays $1.00 per year rent, so they can't complain.

001-4 Some people are worried about safety as a result of the checkered history of the MV-22, but then again the news media does tend to blow things way out of proportion just to sell mini vans and other expensive toys we really don't need. I was an Aviation Electrician USN/USNR, Airwing Light Attack and understand you have safety crammed down your throats, as I recall having it crammed down mine, and rather often. Crossing the parking lot at Malama Market has my head on a swivel every bit as much as it was on the flight line and flight deck.

Other than the live fire exercises, I don't believe operations will be nearly as loud as stiff wing attack aircraft. I've jumped from UH-1N Huey Twins and even though his voice wasn't too clear as he shrieked above the rotor sound (even with tinnitis and frequency loss from adjusting the bleed air switches on TF-30-P408 turbojets on the A-7B, I can't call that sound noise), I could still her my Jump Master. It's the losing ground to militarization that bothers the locals more than anything. They resent the ceded lands, so if anybody considers extending the PTA to the forest reserves, tell them not to bother thinking about It.

001-5 I like the baseline "do nothing" action, as that is one end of the usual government pendular swing, the other being massive overkill. Governments don't seem to have much in between. An issue that

001

001-6 concerns me and possibly others is the disturbance of depleted uranium power in the soils. There has been a great deal of concern by doctors in places where DU has been fired, as there are increased multiple cancers in families where singular forms of cancer has been uncommon, especially where children played in tanks and other armored vehicles that had been taken out by DU ammunition. You state there is no credible evidence, but then there was no credible evidence for agent orange either. It would be worth monitoring, never the less. Our skin protects us from it, but once it gets inside of the skin or any other system, all bets are off.

Wading through an EIS is mind numbing! Rambling as it Is, I shall send this out Into the aether. Ooh Rah!

Aloha & Anchors aweigh,
Dave Kisor, Veteran USN / USNR, Airwing Light Attack, Fleet Logistics & Antisubmarine & Maritime Patrol

Cats & computers. Bring them into your home & your life is no longer your own.

002

From: George Losey [losey@hawaii.edu]
Sent: Wednesday, November 16, 2011 9:27 AM
To: mv22h1eis
Subject: Comments - EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

Please complete the following information:

Name: Prof. George Losey
Company/Organization: University of Hawaii Mailing Address: 44-432 Kaneohe Bay Dr
City: Kaneohe
State: HI
Zip Code: 96744

Add to Mailing List? (Yes or No): yes

002-1 Comments: I searched the EIS to see what the proposed rules would be for night time maintenance operations and could find nothing. When the fighter jets were based at MCBH in the 60's and thereafter, we were told that rules were in effect such that the maintenance crews were restricted as to noise production after 10 PM, particularly in the test cell. These rules were sometimes violated with crushing noises late at night.
Are there any proposed rules to restrict such operations?
Mahalo for your attention and Semper Fi.

--
George Losey
Dept of Zoology& Hawaii Inst of Marine Biology Univ of Hawaii

1

003

From: Jerry Kane
To: mv22h1eis;
Subject: Comments - EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii
Date: Monday, November 21, 2011 11:29:57 AM

Please complete the following information:

Name: Jerry Kane
Company/Organization: n/a
Mailing Address: 71-1689 Puu Kamanu Loop
City: Kailua Kona
State: HI
Zip Code: 96740

Add to Mailing List? (Yes or No): yes

Comments: I am concerned about noise impacts from aircraft operations on the Big Island. I live at Puu Lani Ranch near mile marker 20 on Mamalahoa Highway in Puuanahulu on the Big Island. Puu Lani Ranch is a small community populated by people who pay higher living costs in exchange for peace and quiet that comes from being 20 miles away from

003-1 the relatively congested communities of Waimea and Kailua Kona. Aircraft flying near Puu Lani Ranch will destroy the peace and quiet we pay for. There are already occasional aircraft that fly near Puu Lani Ranch, and their noise is very irritating and uncalled for. My request is simple: All military aircraft should be directed to not fly over land within 5 miles of Puu Lani Ranch. Thank you.

004

RECEIVED

'11 NOV 23 A10:53

NAVFAC

Bob Vericker
164 Aikahi Loop
Kailua, Hawaii 96734
T- 808-254-5484
verickerbob@hawaii.rr.com

November 21, 2011

Department of the Navy
Naval Facilities Engineering Command
Pacific Division
Attn: EV 21, MV 22/
H 1 EIS Project Manager
258 Makalapa Drive Suite 100
Pearl Harbor, HI 96860-3134

Dear Project Manager,

Several neighbors in the Aikahi Park development, which borders MCBH to the South, have "selected" me to provide the following information. Be advised that I, and many of us, are retired or active military or civilian federal employees. Be assured the Marines have our full and unending support and prayers. Thank you for their many sacrifices.

004-1 The focus of concern is the flight path to and from Pad 101 by rotary wing aircraft. (SEE ATTACHED PAGE). Clearly the additional aircraft will increase the noise levels. This request is for consideration and additional assessment of relocating the flight paths north. The current proposal includes flights over the Wetlands of Nuupia Ponds and bordering Kailua civilian homes, with a higher density than a mile north on the base. Further, Aikahi Elementary School is close to the flight path. A short move north to the area of Eagle or Boondocker would not only improve the quality of life for the residents of Aikahi Park and Kaimalino civilian housing areas with more than 300 homes, it would also lend added protection to the many endangered and other birds in the Nuupia Ponds Wildlife Management Area.

I was unable to locate the results of the noise analysis over the Mokapu Blvd. back gate. Now appears a good time to address this issue as the annoying noise levels appear to have increased over time. A small deviation could greatly assist all within these noise sensitive areas.

The Pond species can only be adversely by increased military flyovers. This request is not only "for the birds". This is a plea for MCBH to move the "sounds of freedom" while maintaining the volume necessary. This would enhance the quality of life of those who live in the residences, the ponds and nearby school.

1 of 3

004

A copy of this letter is being forwarded to Representative Thielen for her information.

Sincerely yours,

Bob Vericker

Bob Vericker

cc: Representative Cynthia Thielen

50th Representative District

State Capitol

415 S. Beretania Street

Honolulu, HI 96813

2 of 3

004

3 of 3

005

November 30, 2011

Dear Marine Corps:

Recently there was an article in West Hawaii Today providing information about a meeting in Waimea on the use of Upolu airport. The airport is being considered for use in military practice. This activity would primarily impact North Kohala. There are numerous meeting places in North Kohala.

This appears to be a poorly conceived plan. If one considers the impact on citizens, military, environment, observatories, windmills, and the infrastructure it is definitely not thoroughly thought out.

005-1 Last week the wind gusts are listed on the media as 48 mph at Upolu airport. The wind gusts have been consistently as high as 60 to 70 mph with variability on direction. There are windmills. These are training efforts. Injury could easily occur. How do you propose to deal with this?

005-2 When flying to Upolu from Saddle Road or Kaneohe how do you propose to keep the lights down for the observatories?

005-3 There are at least two threatened species and one endangered species that may live there. How do you propose to keep from killing them in the helicopter rotors? Recently, replanting was started to ensure protection of the reef. Rotors will damage vegetation.

005-4 The infrastructure at Upolu may only be engineered for lighter aircraft. How do you propose to deal with this when you have heavy aircraft utilizing it? Akone Pule infrastructure is also questionable for having any convoys or heavy equipment on it. How do you propose to deal with this?

005-5 Have you really considered the people who live in the surrounding areas? Will these military efforts be conducted at night or in the daytime? How loud will this be? What lights will be shown? How high will they have to fly? Over 1,000 feet up which is the federal regulation for commercial aircraft, or will they be excluded from that requirement since they are military? Stories abound from fishermen and citizens in North Kohala about bright lights and huge aircraft overhead and in the gulches with lights.

005-6 How did you arrive at your statistic? They appear to be questionable with an increase of 250 exercises amounting to only 23% use increase. Please explain your methods for arriving at this percentage.

005-7 What is the necessity of using Upolu airport? What national security need does this serve?

005-8 What about the significant historical places that exist in the immediate area? Kupuna Marie Solomon said that there are small he'iau in this area that are only a few stones and that they should be preserved.
005-9 This is a very sacred area according to her. Will the area be kept open to the public? North Kohala has the least open space of the seven Hawai'I districts.

These are a few questions that I have of the military. The planned use of this airport for military training is clearly misconceived. Please reconsider.

Yours truly, Patricia Benjamin P.O. Box 509 Kapaau, HI 96755

005

RECEIVED

'11 DEC 22 A8 :03

NAVFAC Pacific

December 20, 2011

Dear Persons:

Please read the attached information as a protest to the draft Environmental Impact Statement. There are other issues that are not acceptable but I only had one week to analyze this draft. After reviewing numerous EIS (EIR) statements in the past it is clear to me that this EIS is not complete. More research on environmental impact to the community and environment needs to be done. All of the reports were inadequate and outdated. None of the writers of the EIS surveyed or came to North Kohala.

Studies that are over a decade old and misinformation abound in the EIS. An example is that the hoary bat is seen frequently here in North Kohala. None were observed after two nights of observing at Upolu by the scientists over a decade ago.

I suggest that you reexamine the plan to use this airport for military training. It is far too dangerous and not conducive to the health of the environment or the populace.

If my family in the military were asked to train here I would be extremely apprehensive. The wind combined with the windmills is frightening. The nice young man who represented you at the meeting in Waimea is a pilot and he is so very kind and bright. I would be devastated if he or another person were harmed while flying in the location of Upolu airport.

Thank you for your consideration.

Yours truly,

Patricia A. Benjamin

P.O. Box 509

Kapaau Hawaii 96755

005

Recently it came to my attention through one notification in the newspaper and a subsequent meeting in Waimea, 25 miles away that the Marines want to use several military and two civilian airports for military exercises in Hawaii. These exercises would bring over 50 new helicopters including very heavy aircraft to Upolu airport near Hawi, and an addition of military personnel and dependents numbering over 2,100 people from camp Pendleton to Oahu. The cost to build housing and other support facilities will be $773,000,000. The second civilian airport slated for military exercise is on Molokai.

Wind gusts along the shoreline of Upolu and the adjacent areas reach up to 70mph and may come from any direction without warning. We have windmills surrounding the airport. It would seem that this is too dangerous for our service members to practice and learn how to fly helicopters. I would not want my family which is in the military learning there.

According to the Environmental Impact Statement that was published, there would only be an increase of 23% air traffic with the total increase approximately 250 exercises per year. This is based on a "guess" due to inadequate information on the number of planes flying in and out of Upolu. They "guessed" that we have 800 per year. We have more like 8.

Admittedly, in the EIS it was allowed that jet fuel run off and fuel dumping over the ocean and land would occur. However, the EIS stated that, "there would be no damage." We have birthing Humpback whales, Monk seals, Green sea turtles, and according to the EIS it, "is an important roosting site for Golden Plover." They also note the Pueo but ignore the nesting I'o that are there. They take note of the hoary bat that lives there but when the report was done in 1997 the researchers stayed two nights, did not see a hoary bat and assumed that there were none. The biologist for this EIS has never been to Upolu.

We have one of two dairies remaining in the state of Hawaii. There is concern that the noise levels will stop milk production of cows. It is located directly above Upolu airport.

The archeological and cultural impact is one of the most frightening. Children and adults have kuleana rights and people regularly fish in this location. Many of the most significant archeological sites in Hawaii exist here very near Upolu. Access would likely be denied to Mo'okini and Kamehameha's birthplace. There are many other religious and cultural sites that would be impacted. The EIS states that there are, "No archeological resources of any significance."

The EIS also addressed the ground water in this area. The report stated, "Status code of the groundwater is that it is currently being used as fresh drinking water that is irreplaceable and has a high vulnerability to contamination (Mink and Lau, 1993)."

The EIS stated that some of the things considered were land use compatability, noise, air quality, biological resources, socioeconomics, environmental justice and protection of children, aircraft safety, cultural resources, bird aircraft strike hazard, roadways and traffic.

None of the studies done appear to be current. Most of them are at least a decade old. Contact and recommendations do not appear to have come from OHA, NOAA, DLNR, local citizens, Sierra Club, Ocean Conservancy, Nature Conservancy. When looking at planning they used the state plan, not our county plan which shows that North Kohala has less "open space" than any of the 7 districts on our island. Please reconsider this plan of training at Upolu Airport. It will harm the community.

Patricia A. Benjamin

Please weave these thoughts into your appeals as you need:

006-1 We are concerned about noise pollution in our country world ...many of came here and have invested our life fortunes to stay in this pristine setting ...what is the decibel level of this intrusion? We will require the same legal noise restraints in measurable amounts equal to that required by law of all enterprises like industrial and entertainment facilities.

Our entire economy is a tourist and charm based economy.... we keep the weed wackers out of town for a reason. Constant over flights would destroy that very designed small town reality.

006-2

Our farm economy was stripped away when our farmers moved to the gold coast for more packaged employment. We import 90 % of our food now so if the tourist economy crashes we will be refugees.

006-3 1. What is our recourse if you exceed those rates and is their money in reparation available to repay our social services like the hospital for damages?

006-4 2. Can there be an enforceable off shore approach and take off corridor so that noise and air traffic do not over fly pedestrian sights.

006-5 3. Will there be reparation rates for farmers with milking stock /cattle and residents near the airport if the aircraft reduce their productivity in a equal value to loses incurred.

006-6 4. What guarantee can you provide the base will remain an enroute support base for aircraft and not the beginning of troop support installation?

006-7 5. What is our expectation to be in terms of the attendance in town at night of single men and women and their respective education levels?

006-8 6. If there are over flights of our inhabited areas what will the altitude minimum be?

006-9 We are mindful that we have an obligation to support the proper training of our defense forces but some aircraft just make more noise (give honest figures) and the numbers of them landing all at once are controllable. Dig into this data and include that in your final planning.

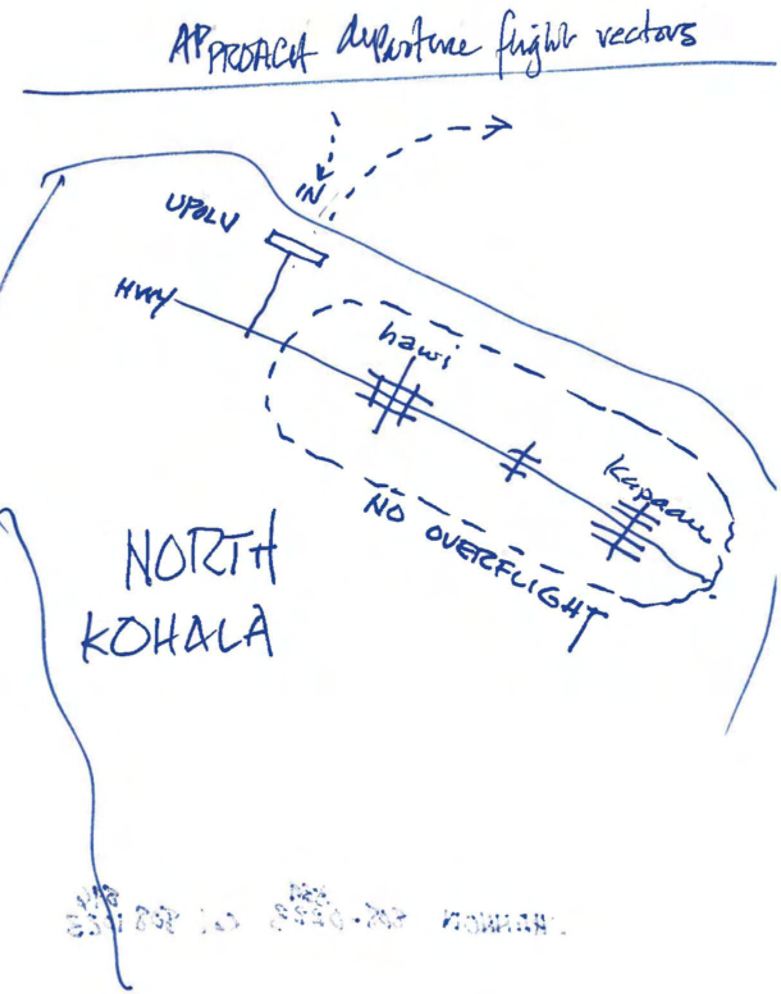
We have a potent cadre of communications talent in our midst ...the world will hear about this if you don't lay a respectable foundation of data and protocols tp make this work.
A full on week of test flights would be a minimum requirement.

I personally will not support whining ... we have a lot at stake here ...but must create a professional no bullshit exchange of reality based information and a real test ... to determine the realities of the intrusion.

Respects, Jim

Meanwhile I am working on the next world ...cheers

btw violence in a world protected by force of law/ has reduced 30 times in the last 200 years



007

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: LEE BALLARD

ADDRESS: P.O. BOX 6054 Kamuela

PHONE/EMAIL: 1

COMMENTS: *(Please print legibly)*

007-1 PLEASE TAKE YOUR KILLING MACHINES AND DEATH SQUADS AND GO TO WASHINGTON DC. WE DON'T WANT YOU HERE. STOP INVADING THE WORLD

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

This form may be used as a mailer if folded, taped or stapled, and stamped.

008

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: Gaylene Hopson

ADDRESS: 75-5480 Kona Bay Dr
Kailua Kona HI 96740

PHONE/EMAIL: 965-4240

COMMENTS: *(Please print legibly)*

008-1 Very pleased to have more military and training here on our Big Island!
Our son's & daughters need better training facilities... and the Big Island needs your business!

Thank you
Gaylene Hopson

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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009

we the people of Kohala say we love Upolu
love light forgive the heart rules all

No thankyou

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: Megana Elizabeth Price

ADDRESS:

PHONE/EMAIL: the Aina truth will prevail

COMMENTS: *(Please print legibly)*

You hide the meeting from Kohala! unaceptable.
the airport will not tolerate your plans
lies to the people.
009-1 No proper notice to the public
009-2 Kohala Meeting needing now!
WE will NOt accept
this Military Plan.
We will forgive you all, but
know this. Love will save
us all. Awaken.
No one is here at Your meeting but all
the Hawaiians that have gone before us will
protect this land from improper
use.

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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♡ light and balance
peace
give back
to gaia
Mother earth

010

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: Linda Perry Lauch

ADDRESS: PO Box 551778
Kapaau, HI 96755

PHONE/EMAIL: 315-8069

COMMENTS: *(Please print legibly)*

I am interested in Keeping Upolu Airport
for emergency use only. the largest
010-1 dairy farm in the island is adjacent
to the run way/air strip and the Wind mills
are much too close. If the military
were to suggest only a small amount
of useage, it would be more and more as time
passes. Once the military is there, there
010-2 is no chance to stopping Anything they do.
the noise day and night would effect the
Peace that prevails in No. Kohala. Hawi
is a very small rural community (it does not →

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

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Attn: EV21, MV-22/H-1 EIS Project Manager
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Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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010

even have a stoplight) and it's livelihood is tourism
the people at this meeting this evening need to
010-3 visit Hawi in the near future. In fact, I
recommend you ~~have~~ the next meeting in Hawi.

fold here

Place First Class Postage Here

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

fold here

011

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: Susan + Charles Russell

ADDRESS: PO BOX 1543
Kapaau HI 96755

PHONE/EMAIL: rockahula3@aol.com

COMMENTS: *(Please print legibly)*

~~I~~ We are opposed to this project on many levels -
011-1 1. The environmental impact - NOISE + pollution
011-2 2. The effect on ~~Our~~ tourist based economy - "Negative"
3. More tax payer dollars spent on military excess
011-3 Spending + less ~~sp~~ spent on public schools
+ health care
011-4 4. Safety - Airport is located next to wind farm
(windmills)
011-5 5. Fears of military expansion in our community.

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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011

RECEIVED

'11 DEC 22 A8:15

NAVFAC Pacific

Charles and Susan Russell
PO Box 1543
Kapaau Hawaii, 96755
808) 889-5365

12/18/11

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

To whom it may concern:

We are writing to you regarding the proposed basing and operation of MV-22 Osprey tiltrotor aircraft and H-1 helicopters in Hawaii and specifically the impacts related to the use of Upolu airport located in the district of North Kohala in the county of Hawaii. Because of the information below we object to the use of this rural airstrip by the military except for any use other than emergency landings

On short notice we attended the Waimea meeting on November 30, 2011 in regard to this issue. After listening to the presentation and following question and answer period, it was soon clear that the Environmental impact statement presented was incomplete and didn't address many important key issues and the negative impact it would have on the people in our community. We were also informed that there would only be a short of time for public comment in regard to this 652 page EIS ending on Dec 27.

011-6 This information, or a lack of a clear understanding of this information, has left our community scrambling, as there are yet many areas of concern: proximity of airport to the ocean, which would affect a whale birthing area and other endangered sea creatures, a nearby dairy farm, wind farm and sacred historical sites (birthplace of King Kamehameha, etc.). Other major concerns are with the noise and pollution that would have a negative impact on the residents of our quiet community, our quality of life, property values, and our fragile tourist based economy.

Sincerely,
Charles Russell — Susan Russell
Charles Russell — Susan L Russell

Cc:

Gov. Neil Abercrombie
Sen. Dan Inouye
Sen. Daniel Kahikina Akaka
Sen. Josh Green
Rep. Mazie Hirono
Rep. Colleen Hanabusa
Rep. Mark M. Nakashima

012

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: Sophia Bowart
ADDRESS: P.O. BOX 519
Kapaau, HI 96755
PHONE/EMAIL: 808 889 0917

COMMENTS: *(Please print legibly)*

012-1 I am in opposition to the "Basing of MV-22 and H-1 Aircraft in support of III Marine Expeditionary Force Elements ~~[illegible]~~ in Hawaii" and especially at Upolu Airport on the Big Island. The area is ~~made~~ special because of the lack ~~presence [illegible] the noise and traffic~~ its I feel that re ur agriculturalists and nature loves would be greatly diminished by such a development ~~[illegible]~~ I will oppose it.

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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012

SOPHIA BOWART
MOHALA LEHUA FARMS, LLC
PO BOX 519, KAPAAU, HI 96755 • (808) 889-0917

12/22/11

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

PEARL HARBOR MAIL CENTER DEC 24 2011 PEARL HARBOR HI 96860

Attn: EV21, MV-22/H-1 EIS Project Manager

Dear Project Manager:

I am writing to you regarding the proposed basing and operation of MV-22 Osprey tiltrotor aircraft and H-1 helicopters in Hawaii and specifically the impacts related to the use of Upolu airport located in the district of North Kohala in the county of Hawaii.

I have thoroughly read your EIS report and was very disappointed with the quality and quantity of information. The research is inadequate and not current to support the stated conclusions. I will outline a few of the issues I have found with your report:

Dubious Source #1 is found in Section 4.9.3.4 that states:

4.9.3.4 Upolu Airport, Island of Hawaii

Operational Impacts

Based upon two archaeological surveys conducted in the immediate vicinity of Upolu Airport, there are no archaeological resources of any significance within and adjacent to the facility. There would be no operational impacts on cultural resources due to the proposed action. No mitigation is required.

The source for this claim is not footnoted and a review of the references listed in Chapter 9 of the report indicates that there was only one "Archaeological Inventory" conducted of the
012-2 site in 1999. The inventory survey was conducted for 28 acres of land and yet it included only "six backhoe trenches on the inland side of the airport buildings" (a space smaller than 1 acre) to test for subsurface cultural deposits. Given the huge archaeological and cultural significance of the adjacent Kamaehameha Birthsite and the equally significant Mookini heiau located less

012

SOPHIA BOWART
MOHALA LEHUA FARMS, LLC
PO BOX 519, KAPAAU, HI 96755 • (808) 889-0917

than 4,572 feet away this circumscribed study calls into question its relevance. Additionally, a 12-year-old study that used only six trenches located in the place where the proposed aircraft would likely have little or no impact is also irrelevant. Moreover, the MV-22 Osprey was not
012-2 fielded until 2007 or used for Marine Corps training until the year 2000. (Wikipedia) This information clearly points to the obsolescence of the source data. Furthermore, . . .

Dubious Source #2 is found in Section 4.9.2.4 that states:

4.9.2.4 Upolu Airport, Island of Hawaii

Areas of Potential Effect

(Fornander 1969:II 33 36; Kamakau 1991:100). Construction of the luakini (sacrificial) heiau

Mookini, located 1.6 mi (2.6 km) south of the airport, is attributed to Paao (Kamakau 1991:100).

and

012-3 *The event is commemorated at a place called Kamehameha Birthsite, located two mi (3 km) south of the airport.*

The distance measurements cited above are inaccurate and thereby call into question the attention to detail of behalf author. The actual distances are 1.1 miles to Mookini and 1.2 miles to Kamehameha birth site. Attached here is a link to a Google map that precisely shows the distances:

http://maps.google.com/maps/ms?msid=218128554696168788292.0004b49bba0e60edbe20c&msa=0&ll=20.260063,-155.869453&spn=0.015943,0.028045

Dubious Source #3: The next source error is absurd and clearly based on outdated and a lack of accurate information about the fragile ecosystem in the surrounding area. Section 4.8.2.4 states:

4.8.2.4 Upolu Airport, Island of Hawaii

012

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MOHALA LEHUA FARMS, LLC
PO BOX 519, KAPAAU, HI 96755 • (808) 889-0917

Information about natural resources at Upolu Airport is derived from the Upolu Airport Final Environmental Assessment prepared for DOT Airports Division (DOT 1999).

And on pages 4-91:

No important coral reef ecosystems are known to exist in waters offshore from Upolu Airport. The ocean bottom consists of hard basalt pavement, boulders, a few sand channels, and sparse coral cover.

And footnote 28 states

28 Tribble, Gordon. Personal communication. June 24, 2011. Mr. Tribble made a large number of dives in the waters off Upolu Point 20+ years ago. He recalled that there was not much coral and concluded that the low abundance was due to big winter surf that pounds the coastline.

012-4 The boldness of including the 20-year-old diving experience from a single individual as evidence that there are no important "coral reef ecosystems" is insulting to our community! Moreover, Gordon Tribble is not cited in the list of reference (EIS Chapter 9), nor are his credentials listed in the footnote above, nor are the exact locations of the dives listed, nor are the exact numbers of dives cited from his recollections. I assume that if Mr. Tribble's 20-year-old recollections are valid then my diving experience from 2011 ought to be as well. As both a SCUBA and free diver with over 20 years of diving experience, I and many others in the community, would be happy to prepare a detailed map of the underwater terrain adjacent to Upolu airport. On that map we are willing to document, in a much more professional manner, not only coral reef ecosystems, but Green Sea Turtle (Chelonia mydas) cleaning stations, known locations of Hawaiian Monk seals (Monachus schauinslandi) sightings, as well as Humpback Whale (Megaptera novaeangliae) birthing sites complete with date stamped video.

Myself and many other community members, would be happy to continue doing your research for you, except for the fact that unlike Belt Collins, we are not being paid for our efforts, nor would the results of our research support the conclusions contained in the EIS. There are many more deficiencies with the report that I have not cited in this letter due to the fact that it seems obvious that contemporary and scholarly studies are necessary before any attempt is made to use Upolu Airport for the proposed operations.

012-5 Finally, our small town of Hawi is completely built around a quasi-agricultural and tourist

012

SOPHIA BOWART
MOHALA LEHUA FARMS, LLC
PO BOX 519, KAPAAU, HI 96755 • (808) 889-0917

012-5 centered economy. We depend on our calm and quiet surroundings for our livelihood as well peace of mind. The noise and even the very presence of war machines and training operations are completely inconsistent with the visions we hold for our community.

At the November 30th informational meeting that was conducted in Waimea regarding the proposed use of Upolu Airport, a question was asked to the assembled military staff and EIA contractors that numbered at least 15 people. Among the military representatives were the archeologist and biologist who studied the Upolu region for this report. The question, which was recorded on video was, "how many of you have been to North Kohala?" Only one person raised their hand and stated that she had lived here 10 years ago. It is very insulting to our community that our peaceful quiet home could be tainted by an effort that includes little or no social contact and studies that do not even meet the most basic of scholarly requirements. I hereby request that the department of the Navy reevaluated the impacts of using Upolu Airport for military operations in a manner that is more precise and accurate concerning the actual impacts of such operations.

Cc: Sen. Dan Inouye, Sen. Daniel Kahikina Akaka, Sen. Josh Green, Rep. Mazie Hirono, Rep. Colleen Hanabusa, Rep. Mark M. Nakashima

Sincerely,

Sophia Bowart
Mohala Lehua Farms, LLC
808-889-0917

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: William Laich

ADDRESS: PO box 551778 Kap , HI

PHONE/EMAIL: bilin@sbcglobal.net

013-1 COMMENTS: *(Please print legibly)* No way should they be allowed to use our Upolu Airport except for emergency. There's an airport closer in
013-2 Kamuela. Practice for the middle east and war is not needed here. This is also very close to the birthplace of King Kam. The military will lie and polute our area. They dropped tons of agent orange on Vietnam vets and the Vietnamese. I like [illegible] as it serves over every [illegible] to the vets of WWI, WW2, Korean, [illegible] Vietnam [illegible]

Submit your comments at the meeting today, or mail or email no later than December 27, 0 , o: next ones

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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013

December 18, 2011

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Dr., Ste 100
Pearl Harbor, HI 96860-3134

To Whom It May Concern:

We attended the Waimea meeting on November 30, 2011 concerning the proposed training activity by the United States Marine Corp. at the Upolu Airport in North Kohala. We object to the use of this rural landing strip by the military for any use other than emergency landings.

After listening to the presentation and the ensuing question/answer period, it was decided that the Environmental Impact Statement that was published did not address many of the most pertinent issues as follows:

013-3 1. Proximity of airport to the ocean and the effect of aircraft fuel runoff and fuel dumping over the ocean and land which would affect whale birthing, endangered monk seals and green sea turtles.

013-4 2. Located above the airport is one of two dairies remaining in the State. The noise level concerns milk production.

013-5 3. Many of the most significant archeological sites in Hawaii exist here near Upolu. Access would likely be denied to Mo'okini and Kamehameha's birthplace. There are many other religious and cultural sites that would be impacted. The EIS states that there are, "No archeological resources of any significance."

013-6 4. The noise level, air quality, biological resources, socioeconomics, environmental justice and protection of children would be detrimental and yet the studies done are not current studies.

013-7 In conclusion, the negative impacts of regular military flight missions

013

013-7 clashes completely with the lifestyle of the Kohala community and our economic reliance on tourism attracted to our uniquely rural atmosphere. The proposed training schedule would directly affect housing values and negatively impact our already fragile tourist economy.

Sincerely,

William L. Laich   Linda Laich   55-588C Hawi Rd, Hawi 96719

CC: The Honorable Dan Inouye
The Honorable Daniel Kahikina Akaka
The Honorable Mazie Hirono
The Honorable Coleen Hanabusa
Representative Mark M. Nakashima
Senator Josh Green, M.D.
The Honorable Neil Abercrombie

014

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: HAP TALLMAN

ADDRESS: PO 411 Hawi Hi. 96719

PHONE/EMAIL: HAPT@HAII.net

COMMENTS: *(Please print legibly)*

014-1 Please have a meeting in Kohala!!

Submit your comments at the meeting today, or mail or email no later than <u>December 27, 2011</u>, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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015

Please send written notice to me when the draft has been prepared. I failed - put my address on the mailing list

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: Lea Mizuta

ADDRESS: P.O. Box 198500-PMB202
HAWI Hi. 96719

PHONE/EMAIL: (808) 889-0761

COMMENTS: *(Please print legibly)* Take Upolu Airport off the option list

015-1 1. Why was this meeting in Waimea? It is a half hour drive or more to get here and the airport is in Kohala NOT Waimea. Why is the 2. Waimea airport no being considered? It
015-2 is not as dangerous in terms of wind, proximity of whales + calves within 500-800ft offshore and sacred Lands (heiau and birthplace of Kamehameha).
015-3 Also with your ability or permission to fly "low" and the vibrations caused by those "larger craft" We find it NOT ~~a~~ a idea worth persueing.

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
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WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: Margaret Wille

ADDRESS: 65-1316 Lihipali Road
Kamuela Hi 96743

PHONE/EMAIL: margaretwille@mac.com

COMMENTS: *(Please print legibly)*

016-1 (1) Exactly what use of the Waimea airport is possible - without requiring an additional "supplemental" environmental environmental study. Note: there is nothing in the E.I.S. saying what the scope of use of Waimea airport is contemplated or permissible
016-2 (2) If the marines begin undertaking an activity that is not supposed to occur ~~on~~ at a location (for example landing in the nene habitat area) will a member of the public be able to bring a lawsuit without being ~~to~~ the military arguing

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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the member of the public does not have standing.

— OVER —

016

016-3 (3) Concern over noise over communities

(4) ~~[illegible]~~ This island is a place of wellness and peace. Equal or money should

016-4 be spent on efforts to achieve peace (such as peace camps and negotiating training areas). Violence is only one way of

fold here

resolving ~~&~~ international disputes.

Place First Class Postage Here

016-5 (5) ~~Use of Waimea~~ and Upolu community airports should be prohibited except in emergencies.

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

(6) Jost of Upolu - is one of only two major whale breeding

016-6 grounds in the entire state — No flying should be permitted over these areas

fold here

(7) Bombing creates instability on the mountain

016-7 and can contribute to the possibility of a major aircraft.

(8) Also Once the military gets approval for this increase in activity - loud aircraft some of

016-8 which is engaged in livefire missions - it will only increase

The fate of the Lalamilo Connector Road + Buffer Study

017

Not in Support

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 ~~Aircraft in Support~~ of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: Corinne Lysaght

ADDRESS: 59-459 Ala Kahua Dr. - Kawaihae

PHONE/EMAIL: Coryisms@gmail.com

COMMENTS: *(Please print legibly)*

This base would be a travesty for the economy + beautiful landscape of our

017-1 North Kohala Coast. This area makes its living as a tourist attraction + helicopters + fighter jets continually flying overhead all the time will decimate the tourist industry. Hawaii already shoulders a large burden of military

017-2 bases + should not be asked to house yet another. The Dairy farm is right near the airport, + all of the air pollution will eventually leach into the soil + effect

017-3 our food. Not to mention the noise pollution, potential pollution of our water.

The demolition of so many historic sites in each of your "alternatives"

017-4 is beyond the pale. Hawaii is known for its rich, cultural history, + how dare the U.S. military deign to be it's destroyer.

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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018

Joe Estores

I appreciate the opportunity to participate and hopefully my comments are going to be contributory to the outcome.

To me, any expansion of the military activities, whether it is basing or training, resizing, or any modernization or changes to the infrastructure as impacts. My concern is that expansions, in gen Hawaii is indicative of a repeat in history which we should learn through lesson of history.

December 7 was a historical event for the military and the people of Hawaii. So I tend to look at expansions like it was in a prelude to December 7, the buildup of military and military bases. The result was a lucrative target for the Japanese to attack. With that as a framework, I look at all military expansion in Hawaii in the same vein. We are repeating history. This buildup is exponentially bigger than what it was prior to 1941. Not only are we putting our best weapon system, best technologies, best military troops and families – all of that constitutes a new target which would be history repeating again. Therefore I object to any type of expansion of military in the islands.

018-1 With that as a background, and acknowledging the military needs training and basing and needs the best technology to win the war, whatever expansions are done in Hawaii must be very sensitive to the finite resources of land, water, fuel, housing, and all of the infrastructure to support a military presence.

The EIS must focus on the entire spectrum of impacts on all of the resources be they land, water, infrastructure, human, ocean, and training areas. That is the background on my comments for the EIS, not having read the EIS, I want to make sure the unique limitations of Hawaii must be carefully assessed to make sure this is the right place for any expansion. From a native Hawaiian cultural perspective, whatever modernization, renovation construction, or change that is part of this overall project will 018-2 ultimately affect the resources culturally, looking at individual areas and sites does not give a true picture of total impacts on the total social, educational, transportation, and limited resources of the Hawaiian islands.

Military training is only one aspect of the activities conducted once the military is firmly in place. The off-duty time of the military families, soldiers, marines, airmen has an impact on the beaches, on the 018-3 traffic, on the malls. And that impact can be negative in terms of bottlenecks in traffic, crime, drugs, running of off-road vehicles over the beaches and forests and all of the recreational areas around each island. That impact is generally not covered as part of the EIS or surveys.

From what I see from the boards, there is not much difference between Alternative A and Alternative B. To me that merely shows a command decision that has to be made to choose whether to place an organization on one side of the runway or on the other side on the same installation. I would have 018-4 expected that an alternative would be to compare all of the factors of cost, basing, training, etc. between Kaneohe and another place either in Hawaii or somewhere in the US. I don't see that as an alternative. Although it is mentioned, there is no substance to what was compared or what factors used to decide to stay in Kaneohe and formulate Alt A and B the way they did. Another perspective from the 018-5 cultural standpoint is Hawaiian culture is an interdependent reality. By this I mean, the interdependence of the land as an element, water, air, the fauna, and flora, and the ocean. All of that is usually described as the ahupuaa. And this interdependency constitutes the framework and environment that needs to be assessed in the EIS, across all these elements at each location. If this not included as a way of evaluating

018

DEIS Public Comments
Mililani Elementary School
Tuesday, December 6, 2011
5:30pm to 8:30pm

018-5 or assessing the impacts, I suggest looking at this interdependent reality as the basis for conducting your evaluations anywhere in Hawaii.

The tendency to look at burial sites, heiau, rock walls, and these elements that are actually associated with the land limits the full impact because it is treated in isolation of the other elements. There is also 018-6 not a clear understanding of the spiritual dimension of this interdependent reality. The very fact that in the Hawaiian culture, the connections to ancestral, spiritual, and multiple forms of deities, is an environment which is not very well understood therefore assessments are not made on impacts in this area.

Another area that I feel needs to be considered when looking at modernization, construction, or renovation of any physical structure is the assumption that no cultural or archaeological site existed because there was already something built on the land. I feel that this is false or this is wrong that we must ensure that we are desecrating any cultural site by taking that position. Some of the structures were built a long time ago prior to anyone paying attention to the environmental impacts as we do today. If we are going to move any land or structure, we need to ensure that during the process of excavation of the landscape there is in fact no cultural or archaeological presence. We cannot assume 018-7 that because a building, parking lot, storage shed, warehouse, was previously built on the land that the previous contractor exercised due diligence in ensuring that there was no disturbance of any cultural/archaeological site.

The DoD recently signed a covenant with native Hawaiian groups agreeing to include local organization 018-8 through all stages of discussion and preparation and decision making on military properties. It is not clear which native Hawaiian organizations have been consulted or included at previous meetings or sessions.

Please mail a hardcopy of my comments.

Page 2

019

John Stephenson
626 Kaimalino Street
Kailua, HI 96734
808 254-3129
jstephenson@hawaii.rr.com

December 5, 2011

Department of the Navy
Naval Facilities Engineering Command
Pacific Division
Attn: EV 21, MV22/
H 1 EIS Project Manager
258 Makalapa Dr. Suite 100
Pearl Harbor, HI 96860-3134

Dear Project Manager,

019-1 Please include this letter as testimony in the EIS hearing scheduled for December 8, 2011. In a meeting with our neighbors and Representative Cynthia Thielen on November 29, 2011 we learned that our neighborhoods – Aikahi Park and Kaimalino – were not included in Environmental Impact Study done in advance of new aircraft being brought to the Kaneohe Marine Corps Base. Our neighborhoods, consisting of more than 300 homes, abut the southern border of the base and are impacted by the east / west helicopter flight path. We request that our neighborhood be included in the study if new or additional aircraft will be using that flight path.

019-2 I have lived on Kaimalino Street more than thirty years and have witnessed the aircraft operation along the southern border of the base all that time. Over the years myself and other neighbors have called the base to report aircraft flying low over the residential area. I don't think civilians should have to monitor and report aircraft straying off their designated flight paths and flying lower than the required altitude. The Marine Corps should be responsible for policing their operations and making sure they don't adversely impact the civilian neighborhoods. There is plenty of uninhabited land along the base's southern border to move those flight paths further away from the good citizens of Kaimalino and Aikahi Park.

Parenthetically, last Thursday, December 1, 2011, while paddling up the Kawainui Canal I witnessed a Marine helicopter on a flight path that took him directly over Aikahi Park Elementary School.

These issues should be address in the Environmental Impact Study before new aircraft are brought to the base. Thank you.

Sincerely,

John A. Stephenson

020

HOUSE OF REPRESENTATIVES

STATE OF HAWAII
STATE CAPITOL
HONOLULU, HAWAII 96813

December 2, 2011

Department of the Navy,
Naval Facilities Engineering Command, Pacific
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
ATTN: EV21, MV-22/H-1 EIS Project Manager

Dear Project Manager:

020-1 I am the State Representative for District 50, which includes Kaneohe Marine Corps Base Hawaii. I am writing to object to omissions in the Environmental Impact Statement (EIS) for the EV21, MV-22/H-1 project.

This EIS has omitted an analysis of the impact of this proposed action on vital parts of our community, particularly in regard to the noise impacts to Aikahi Elementary School and Kaimalino residents.

The EIS identified the schools around the base and 6 points of interest (POI) to gather data for noise disruption. However, the EIS failed to identify one of the closest elementary schools, Aikahi Elementary. That school is just outside of the Base and would be significantly impacted by military training flights in the area. In addition, the POI failed to include a community which is already plagued by noise from military aircraft that fly over their homes, the Kaimalino residential area, just outside the back gate to the Base.

Currently, aircraft leaving and returning at Kaneohe Marine Corps Base Hawaii fly over the residents of Kaimalino. They fly at low altitudes and create a disruption. This new plan appears to increase these flights and would therefore increase the disruption to the residents. I am attaching a map showing current and proposed flight plans. The proposed makai route would reduce the "over-flight" noise at the Kaimalino residential area.

While no one wants to hinder the military's ability to train, I do ask that complete studies on the impact of all areas to be affected be performed and consideration given to adjusting the flight pattern by Nuupia Ponds.

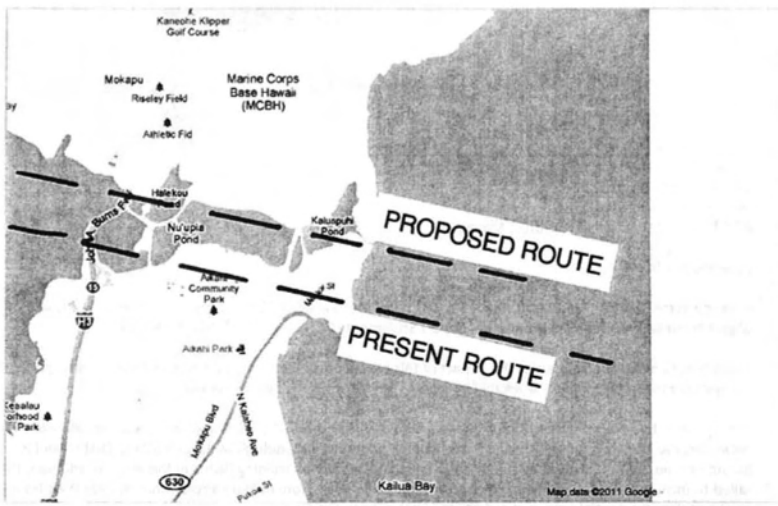
Sincerely,

Representative Cynthia Thielen
Assistant Minority Leader
50th District (Kailua-Kaneohe Bay)

Representative Cynthia Thielen, 50th District (Kailua, Kaneohe Bay)
Hawai'i State Capitol, 415 S. Beretania St., Room 443, Honolulu, HI 96813
Ph: (808) 586-6480 Fax: (808) 586-6481 repthielen@capitol.hawaii.gov www.cynthiathielen.com
Judiciary (Ranking Member), Energy & Environmental Protection (Ranking Member),
Water, Land & Ocean Resources (Ranking Member), Consumer Protection & Commerce, and Housing Committees

To see all the details that are visible on the screen, use the "Print" link next to the map.

Google



Kaneohe Bay Mcaf, Kailua, HI

021

Amy Kepilino

From: hw huyler [hwhuyler@yahoo.com]
Sent: Tuesday, December 06, 2011 5:08 PM
To: mv22h1eis; repthielen@Capitol.hawaii.gov; foster@capitol.hawaii.gov; vacoba@honolulu.gov
Cc: hw huyler yahoo
Subject: No Mention of NOISE LEVEL in DEIS for OSPREY MV-22

Department of the Navy
Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
Tel: (808) 472-1196
Email: mv22h1eis@beltcollins.com

ALL CONCERNED,
Why is there any specific details in the DEIS with refgard to the DECIBELS generated by the MV 22 OSPREY during all pases of take-off, flight, and landing?

ALL I found are paseted here, inlcuding a few other articles.

021-1 WHY DO WE HAVE about 1000 pages with no specific noise level in DECIBELS for the MV-22 during all phases of operation.

Why doesn't the DEIS describe the frequency (times per month or year) and hours of powered flight for MV 22 pilots to include all TRAINING REQUIREMENTS for MV-22 PILOTS. Thi is exteremely important when you are considering the basing of the aircraft near populated areas.

------------------- NOISE EXTRACTS ----------------

modeling of aircraft noise at MCB Hawaii Kaneohe Bay shows changes in noise levels at noise sensitive areas ranging from 1.3 to 3.0 Day-Night Average Sound Level (DNL) compared to baseline, and from 0.3 to 1.1 DNL compared to the No Action Alternative

The maximum sound level is important in judging the interference caused by a noise event with conversation, TV or radio listening, or other common activities. Although it provides some measure of the intrusiveness of the event, it does not completely describe the total event, because it does not include the period of time that the sound is heard.

such levels is unlikely and any exposure is anticipated to be substantially less.) The ground level SEL from a CH-53 conducting LAT at an altitude of 500 ft (152 m) AGL was estimated to be less than 99 dB SEL (Wyle 2011). such levels is unlikely and any exposure is anticipated to be substantially less.) The ground level SEL from a CH-53 conducting LAT at an altitude of 500 ft (152 m) AGL was estimated to be less than 99 dB SEL (Wyle 2011).

....

Draft Environmental Impact Statement (Draft EIS) for the West Coast Basing of the MV-22 Tilt Rotor Aircraft (CEQ # 20090045)
--- The Draft EIS states that unmitigated impacts to land use surrounding MCAS Miramar will result due to increased noise affecting residential, commercial, and recreational complexes (page 8-11) and that the population within the 65 dB CNEL contour would increase. The Draft EIS does not state why these impacts cannot be mitigated and does not identify mitigation measures that were considered and determined to not be feasible. EPA encourages the Navy to incorporate additional mitigation measures to reduce noise impacts to the surrounding communities

....

http://www.globalsecurity.org/military/systems/aircraft/v-22-survive.htm

Overall, as compared to the CH-46, the MV-22 is less noisy while in the aircraft mode, and provides comparable acoustic acquisition cues while operating in the helicopter mode.

021

H Huyler, Kailua Hawaii

2

022

WRITTEN COMMENT FORM
Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: Travis Dodson
ADDRESS: Hawi, HI

PHONE/EMAIL: chillosophy@live.com

COMMENTS: *(Please print legibly)* The people of North Kohala do not appreciate this disruption of peace. We are constantly fighting off developers and corporate interest. The military is no different. Leave the land alone. Leave the people alone. No good will come of basing aircraft at Upolu. Please respect the people who support the military through tax dollars and be content with what you have or better yet give that back to the hawaiians. Thank you and Aloha.

022-1

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

This form may be used as a mailer if folded, taped or stapled, and stamped.

022

Travis Dodson
Hawi, HI 96719
12/21/11

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

Attn: EV21, MV-22/H-1 EIS Project Manager

Dear Project Manager:

I am writing to you regarding the proposed basing and operation of MV-22 Osprey tilt-rotor aircraft and H-1 helicopters in Hawaii and specifically the impacts related to the use of Upolu Airport located in the district of North Kohala in the county of Hawaii.

Thank you for hearing my concerns over the lack of clarity in your EIS.

They are as follows:

1. It makes no reference to the impact on whales, endangered monk seals, and Hawaiian green sea turtles in the waters surrounding Upolu.
2. The difference between "operation" and "events" is unclear.
3. The information the EIS is using is outdated.
4. The sounds produced by these aircraft have not been correctly judged and will affect the peace of our community especially at night when sounds travel further. How will night operations affect the surrounding residents? 022-2
5. The extremely important culture sights around Upolu are closer than reported in the EIS.

Thank you for hearing my concerns and the community's.

Aloha,

Travis Dodson

023

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: Kelly Nedved

ADDRESS: PO BOX 190612
HAWI HI 96719

PHONE/EMAIL: barefootchinesemedicine@gmail.com

COMMENTS: *(Please print legibly)*

023-1 - How does the U.S. Marine Corps plan to maintain the peace & the magic of Kohala?

023-2 - Will the residents of Hawaii have access to the land and beaches at Upolu Airport?

023-3 - What will security be like?

023-4 - What will the sound (decible levels of choppers/aircraft) impact be?

023-5 - Why wasn't this plan advertised to the small community of Kohala better than a tiny little ad in the paper?

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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024

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: MICHAL CARRILLO

ADDRESS: PO Box 263
Hawi, HI 96719

PHONE/EMAIL: (808) 987-4243

COMMENTS: *(Please print legibly)*

Our community does NOT want Upolu Airport to be utilized in any shape or Form For marine/naval air operations. The only exception would be an emergency situation. There are cultural impact issues that

024-1 are not listed in the EIS. Heiau's, The Birthplace of Kamehameha. It is a Sacred Hawaiian location & the community will NOT stand for the use of it. There is a Dairy Farm that will be

024-2 affected by the noise, the cattle get scared and the adrenaline can affect the milk of the cows. There are also many other Farms with livestock and The noise would greatly affect the farms. Also, the community is rural, quiet & the town shuts

024-3 down at 8pm. Night activity & lights would not be welcome at all. Our community will petition & fight this with great Fervor. Please stop now; take us off the Table. mahalo.

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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024

024-4 There absolutely has to be a community meeting in North Kohala the community which you are proposing this operation. Not 45 minutes away from the community.

fold here

Place First Class Postage Here

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

fold here

025

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: jamie Belmarez

ADDRESS: POB 1000 Kapa'au HI 96755

PHONE/EMAIL: jeversweet@gmail.com

COMMENTS: *(Please print legibly)* The residents of Kohala are not negotiating - we do not welcome or accept the proposed military activity at Upolu. We are

025-1 concerned about impact (negative) on our local dairy cows, whales and other animals and birds due to

025-2 noise. We are concerned about protecting cultural/historical sites and practices. This is where King Kamehameha was born. This kind of activity (landing/take off)

025-3 would greatly impact our small farming community in the most negative way, disrupting the peaceful atmosphere and quiet, slow way of life. Also, why

025-4 was the scoping conducted without the community being informed? and why was the EIS meeting held in Waimea and not in our community? These actions seem to convey a sense that our community's opinion is not regarded with respect. We demand further opportunity to voice our concerns before any decisions are made.

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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026

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: Theresa Perez

ADDRESS: P.O. Box 1426
Kamuela, Hi 96743

PHONE/EMAIL: live.aloha@hawaiiantel.net

COMMENTS: *(Please print legibly)*

026-1 I truely believe that this Community Meeting should be held in North Kohala as it has a great impact on residence in that area. Residence there are not all aware of Comm. Mtg. or cannot drive over to Waimea for this. And it should not be held in a outside community. I feel it is being hiden!

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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027

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: Micah Barclay

ADDRESS: P.O. Box 911 Kapaau H.I. 96755

PHONE/EMAIL: micahbarclay@yahoo.com

COMMENTS: *(Please print legibly)*

027-1 I request that a meeting be scheduled to take place in North Kohala with adequate notice given as well as thorough advertisment. Give my community a chance to give its true vice on this subject. Our community will be directly effected by these opperations at Upolu airport. Then you owe us a meeting in our town. Thankyou for reading my comment/concerns and hope they will be taken into consideration.

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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028

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft NOT in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: WILLIAM WOLF

ADDRESS: P.O. BOX 2167
KAMUELA, HI 96743

PHONE/EMAIL: [redacted]

COMMENTS: *(Please print legibly)*

AS A CITIZEN OF NORTH KOHALA, I AM AGAINST THE NAVAL

028-1 PLAN TO UTILIZE THE UPOLU AIRPORT AS A STAGING GROUND FOR MILITARY HELICOPTERS. I AM A LICENSED HEALTH CARE PROVIDER IN THE STATE OF HAWAII. NORTH KOHALA HAS BECOME A LOCATION WHERE MANY HEALTH PROVIDERS SUCH AS MYSELF LIVE AND WORK, WITH PATIENTS COMING TO OUR COMMUNITY FROM ALL OVER THE WORLD, SEEKING THE SOLITUDE, SOLACE & SERENITY OF OUR QUIET, PEACEFUL COUNTY. WE HAVE NUMEROUS CLINICS, HOSPICE CENTERS, AND RESIDENTIAL HEALING PROGRAMS WHOSE APPEAL, AND THUS THEIR ECONOMIC FOUNDATION, RESTS UPON

028-2 THE TRANQUILITY OF OUR COMUNITY. I THEREBY PROTEST THIS PROPOSED PLAN DUE TO THE NEGATIVE CONSEQUENCES IT WILL HAVE ON THE ECONOMIC, AND QUALITY OF LIFE ASPECTS THAT MAKE NORTH KOHALA THE RARE AND SPECIAL PLACE IT IS.

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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029

WRITTEN COMMENT FORM
Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: Forrest Arnold
ADDRESS: 54-247 Honopueo, PO Box 474
Hawi, HI 96719
PHONE/EMAIL: 808-987-2365

COMMENTS: *(Please print legibly)* EIS Question Pgs 569-572
Pg. 570 states that there is no impact on Upolu Airport as to noise or airspace. (Table 6-5 Pg 6-32)
Both noise + airspace impacts will have very negative impacts
029-1 One reason:
Ambient noise levels in Kohala are so Low that all aircraft noise is very noticeable.

Thanks but please Cancel the use of Upolu.

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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029

WRITTEN COMMENT FORM
Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: Forrest Arnold
ADDRESS: PO Box 474
Hawi, HI 96719
PHONE/EMAIL: 808-987-2365

COMMENTS: *(Please print legibly)*
The rural nature of the Kohala region would suffer
029-2 greatly - We rely on tourism for our Local economy and real estate values would be negatively impacted.
Why?
Nothing could be a greater mismatch to our community than a military training activity.

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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029

Aloha from North Kohala on the Big Island----

The attached letter is in response to the US Marines training proposal with MV-22 Osprey & H-1 helicopters at Upolu Airport on Big Island.

The Draft EIS for the proposal did not reflect the actual impacts that such training would have on this quiet rural community.

We were told that public comment on the Draft Environmental Impact statement would be accepted until December 26, 2011.

But the community has had virtually no notice of this proposal or opportunity to respond to its impact.

The attached letter includes my corrections to the EIS---and I join the community in it's unwillingness to host the military activity.

Les Forrest Arnold, Kohala resident for 24 years

029

Les Forrest Arnold

54-247 Honopueo Road PO Box 474, Hawi HI 96719
Tel 808-987-2365

RECEIVED
'11 DEC 22 A8 :13
NAVFAC Pacific

December 20, 2011

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

Comments on Draft EIS from Les Forrest Arnold
Resident of North Kohala for 24 years

Aloha and many thanks for the opportunity to offer comments on the Draft EIS for Basing of MV-22 & H-1 Aircraft in Hawaii and particularly regarding training proposal for Upolu Airport on Big Island.

First of all, as a Vietnam combat veteran myself (USS Robison DDG-12 Westpac 1972), I offer great support to our troops and to the need for effective training.

The EIS for the proposed training activity at Upolu Airport in North Kohala does not accurately reflect the many impacts that such training would have. I believe that revisions are needed to the document to match the reality of the Upolu Airport location.

I believe that some of the assumptions made in the Draft EIS (whatever the source) are outdated, incomplete and incorrect.

Airspace & Aesthetics
4.3.2.4 Page 4-19: States that previous training had occurred there.

029-3 **Comment:** If this training ever occurred, it is not in recent community memory and does not justify the new proposed training activity.

Table 4-6 States that annual operations at Upolu in 2009 was 800.

Comment: This figure may be grossly exaggerated (and based on what) & does not offer a valid baseline for the increased training proposed.

029-4 Page 4-29, Line 1: states that 242 new MV-22 operations constitute 23% increase and that airspace impacts would be minimal.

Comment: Table 4-20 The figures are misleading if the exaggerated baseline of 800 is used.

Noise (this may be the most critical community concern...it is mine)

On Pg 4-46, the EIS states:

4.5.2.4 Upolu Airport, Island of Hawaii
Aircraft operations are not in proximity to residential or other noise sensitive land uses to warrant noise modeling and analysis, i.e., noise impacts are not anticipated. Hence, no evaluation of existing conditions for aircraft noise was conducted at Upolu Airport.

029-5 **Comment:** Because the ambient noise levels are so low in this quiet rural community, any additional aircraft noise will have negative impact. Even small single-engine planes & tour helicopters are intrusive. Any assumptions made in the EIS based on other Hawaii locations will not apply here. At the Nov 30, 2011 information meeting there were many residents who stated that they would be directly impacted by additional air traffic and noise.

4-9-2-4 Cultural Impacts
Pg 4-150 It is notable and appreciated that this historical information is included.

029

Les Forrest Arnold

54-247 Honopueo Road PO Box 474, Hawi HI 96719
Tel 808-987-2365

4-9-2-4 Cultural Impacts (continued)

029-6 **Comment**: Regarding this portion of the EIS & Pg 4-170 Section 4.9.3.4 Archeological: Our Hawaiian neighbors describe Upolu Airport and the surrounding land as sacred to the Hawaiian people. So with the birthplace of Hawaii's unifying King Kamehameha and the historic Mo'okini heiau so close by, it is hard to assess the negative cultural impacts. Especially with growing interest in preserving cultural areas, airborne military training becomes an inappropriate use.

Section 4.11 Socioeconomics – The Draft EIS does not mention an impact at the Upolu location.

029-7 **Comment**: Although the Upolu location may seem convenient, the negative impacts of regular military flight missions clashes completely with the lifestyle of the Kohala community and our economic reliance on tourism attracted to our uniquely rural atmosphere. The proposed training schedule would directly affect housing values & negatively impact our already fragile tourist economy. In the last 10+ years, the Kohala community has become increasingly dependent on visitor spending and in no way does the proposed training add to that rural appeal.

Page 6-31 & 6-32 Summary of Impacts

029-8 **Comment**: Based on foregoing comments, The Summary of Impacts does not reflect actual impacts on:
Aesthetics/Visual Resources
Airspace
Noise
Cultural/Archeological
Socioeconomics

In conclusion:

We support our US Marines---but **not** this training plan in North Kohala.

We might support the use of Upolu as an emergency landing area for the US Marines...
but Kohala's peaceful rural setting is absolutely not suited in any way to airborne military training.

There is no benefit to this community from a military training activity---only loss and negative impacts. To risk the precious qualities of North Kohala in favor of a convenient landing area is completely unacceptable. Kohala may be the least warlike place in Hawaii...we must preserve this special place.

The EIS attempts to look at impacts on the environment...but offers a very incomplete view of the impacts on the people who live here in Kohala.

With true support to our Troops and full understanding that training is important, we must decline to host the training at Upolu Airport in North Kohala.

Respectfully,

LFArnold

Les Forrest Arnold
Tel 808-987-2365

030

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: STEFFANI BAKU

ADDRESS: P.O. Box 1061
Kapa'au HI 96755

PHONE/EMAIL:

COMMENTS: *(Please print legibly)*

030-1 First - why was this meeting in Waimea and not even offered to be in North Kohala/Hawi and/or Kapa'au.

030-2 Second - what effects on the marine life (eg. whales) does these aircraft impact? And why are the

030-3 environmental studies provided here completed by your sister in the military (The NAVY) and not an independent group not associated w/ military branches.

Lastly Mahalo for the Marines and other military branches for helping us stay FREE and safe. May the Goddess bless those who have given life & limb.

Aloha & Peace

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

030-4 Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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* Why are the print-outs stating results from 2004? Are you serious — think people, think.

031

comments on Draft Environmental Impact Statement
for the Basing of MV-22 and H-1 Aircraft in Support of III MEF Elements in Hawai'i
for public meeting 5:30-7:30 PM Thursday, December 1, 2011, Hilo Intermediate School cafeteria
by Cory Harden, PO Box 10265, Hilo, Occupied Hawai'i 96721 808-968-8965 mh@interpac.net

At last year's scoping meeting, a military official, name withheld, told me Congresspeople ask that the military people not pull projects out of Hawai'i, for fear the economy will crash.

031-1 But military buildup also brings us down—bringing more violent crime, assault, prostitution, and vehicle crashes; higher housing costs; toxins, explosives, and other hazards; and degradation of the environment. All are left out or glossed over by this EIS, like most.

031-2 For this action, fire risks could be high when combined with risks from the Army's enormous modernization project, which may bring to Pohakuloa the training that sparked repeated fires at Makua. The EIS says V-22 helicopters have started grass fires only occasionally and exhaust deflectors will prevent fires. But when the Navy tested the deflectors, in 10 minutes a flight deck reached 300 degrees. What happens when you add tall dry grass, high winds, and no fire hydrants?

031-3 Risks from downwash are not evaluate for people on the ground, for archeological resources and other objects, or for erosion.

031-4 For depleted uranium, the EIS says nothing about numbers of firing pistons and requirements in old training manuals that point to 2,000 spotting rounds at Pohakuloa—though the Army only found a few fragments.It also says nothing about air monitoring filters with pores that were ten times too large, according to a retired geologist.

031-5 Golden plovers and endangered Hawaiian hoary bats were confirmed at 12 of the 18 proposed landing zones. Palila critical habitat is near some of these zones. But other animals and plants may be undiscovered—data for Upolu Airport is 12 to 14 years old, and at Pohakuloa surveyors walked far apart and only went out once. For archeological resources, surveys are incomplete.

031-6 No public meetings are planned for Molokai, though the helicopters will go there.

031-7 No meetings on Kauai either, though it's near Kaula Island, which is about 25 miles off Ni'ihau. The Navy has been bombing it since the 1950s. The Navy "has denied requests by state and federal wildlife biologists to conduct surveys" though "the State of Hawaii included Kaula on the list of State Seabird Sanctuaries". The Navy claims to own the island, but a "legal determination" says it belongs the State. This is according to the multi-agency Offshore Islet Restoration Committee

031-8 The EIS uses a small Region of Influence that fails to consider that Hawaiian cultural sites sometimes link to other sites miles away, and even on other islands.

Despite inadequate analysis of impacts, the "Iron Arm" is reaching farther and farther off military bases and into civilian areas. Boats at Kawaihae, convoys on Saddle Road, jets roaring over Hilo for practice landings, Army helicopters on conservation land on our mountains, and now helicopters planned for tiny Upolu Airport.

For now, we need an honest accounting of the harm. For the future, we need fewer soldiers, and more statespeople.

031

QUESTIONS

031-9 *Will the move leave the I MEF in California short of resources?*

Exhaust deflection system & fire

031-10 *The V-22 "has not performed the full range of missions anticipated,and how well it can do so is in question" according to a 2009 General Accounting Office report.*

031-11 *Is a Marine base planned here (per Abercromibe)?*

031-12 *Describe transportation procedures from O'ahu for equipement and personnel.*

031-13 *What was the cause of the recent Marine helicopter crash?*

032

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: Haloa naka

ADDRESS:

PHONE/EMAIL:

COMMENTS: *(Please print legibly)*

Only people who take good care of the earth are allowed to inhabit our sacred Land. The military destroys the environment, and desecrates sacred land, trains soldiers for murder in imperialist wars. Like brings like, violence brings more violence. Build schools not bombs, Live Aloha. No US military in Hawaii, Free Hawaii

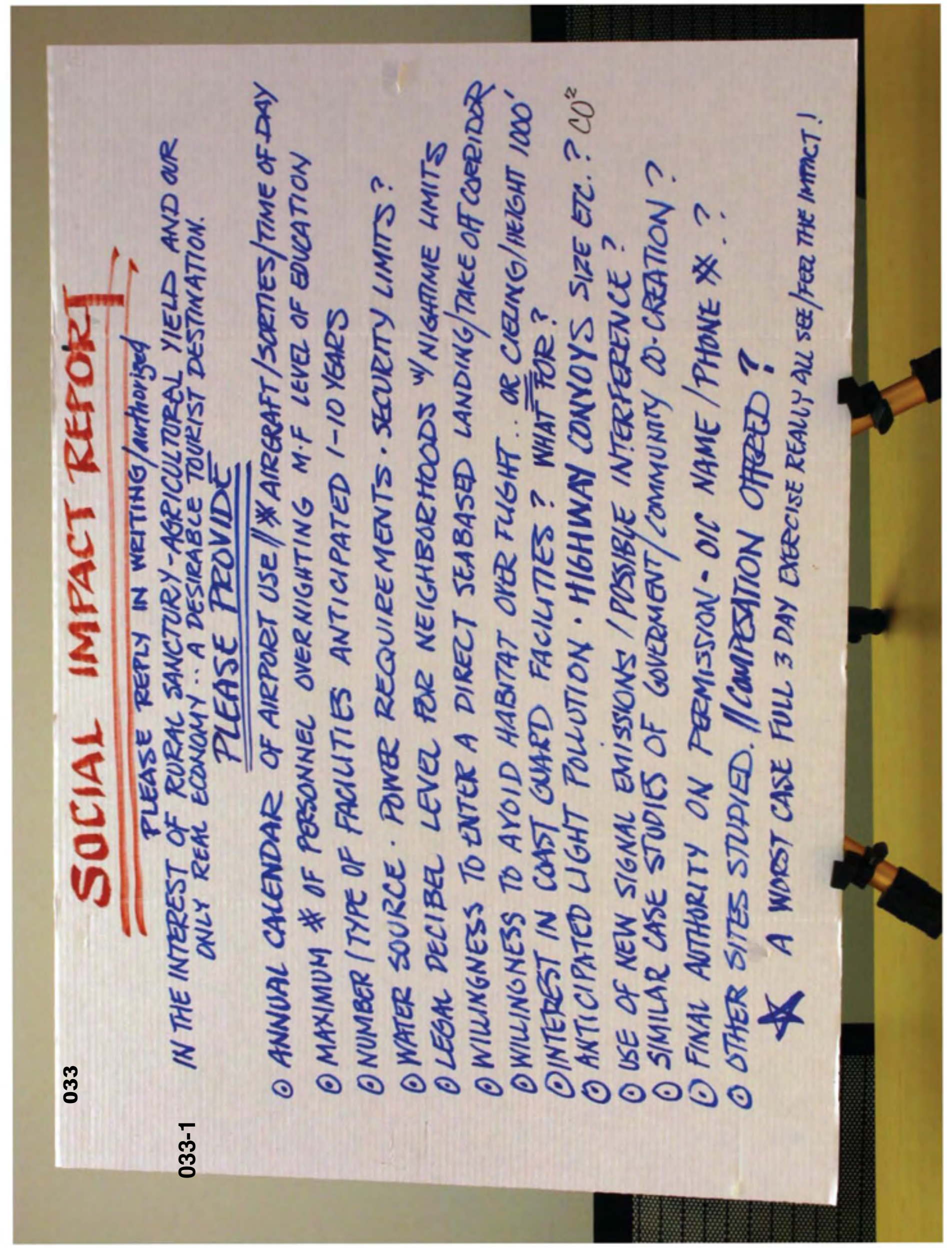
Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

This form may be used as a mailer if folded, taped or stapled, and stamped.

033

033-1



034

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: Robert Sumner-Mack

ADDRESS: 1600 Waianuenue Ave
Hilo, HI 96720

PHONE/EMAIL: 808-315-7031 RSM4e earthlink, NET

COMMENTS: *(Please print legibly)*

034-1 What assurance can the U.S. military give to the people of Hawaii that this expansion of the military presence will actually contribute to political stability in Asia? Although this is an existential question without answer, it needs to be asked because the entire military thrust of US foreign policy should be examined and not taken as an unquestioned assumption. Many Americans oppose our militaristic policies.

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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035

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: maka'ala Nakoa

ADDRESS: PO Bx 711498
Mt. View, HI. 96771

PHONE/EMAIL: —

COMMENTS: *(Please print legibly)*

035-1 (1) Concern for Depleted Uranium in Impact Zone (Live Fire Training) Wind Patterns bring D.U. (Dust) to Waikaloa Elementary — see also Flight Patterns to Avoid "Known" DU areas?

035-2 (2) Compliance to DLNR/BLNR original Lease (1965?) for protection of water & environment; including "Restoration" issues mandated by Lease —

035-3 (3) Non clean-up still pending. DU + fugitive dust

035-4 (4) Live Fire Training = Heavy Metals;

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

This form may be used as a mailer if folded, taped or stapled, and stamped.

036

Amy Kepilino

From: Renee wulzen [reneneg@gmail.com]
Sent: Thursday, December 08, 2011 10:37 PM
To: mv22h1eis
Subject: Upolu Airport

It is absolutely vital to prevent the United States Marine Corps from using our Upolu Airport for Military Operations. There is too much at stake! Hawi and Kapaau are quiet peaceful places for many people that come from all over the world to come and escape the loud and hectic fast pace city lives that most people are accustom to. Our little town is precious and unique. It is one of a kind. All of the buildings that hold all of the little businesses in our Kohala towns are historical. We do not need the sound pollution from Marine Corps
036-1 Aviation. The presence of Marine operations would destroy our tourism which brings our little community our only source of income. Our community would be crushed. Our wild life would be effected and most likely damaged. There are only two Dairy farms in the state Of Hawaii. One of them is Right next to Upolu airport. Not to mention the sacred birth place of our King Kamehameha the Great! This is a very fragile sacred
036-2 and ancient place that is right next to a Heiau in the area were the Upolu airport is located. The Temple was erected in 480 A.D. Mo,okini Luakini Heiau is one of the largest and oldest historical sights and is one of the most sacred Heiau's. This place needs to be protected. Natural weathering is already creating damage. I cant imagine what the Marine Aerial operations will do to all that we hold sacred in our community of north Kohala. Please Do not destroy everything that we have worked so hard to build. That our ancestors have worked so hard to built........ Aloha Renee.

1

037

Amy Kepilino

From: Leonard Rossoff [lrossoffmd@gmail.com]
Sent: Wednesday, December 14, 2011 7:07 PM
To: mv22h1eis
Subject: Comments - EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

Please be advised , that I attended the meeting on Dec 8th which was held in the area most directly affected by this EIS (Kaneohe Bay and Kailua) Many of my neighbors are also planning to respond to the EIS. However, the deadline for submission was less than 3 weeks after the meeting and falls during the holiday season. Many interested parties are away or unable to properly evaluate and prepare comments on this important issue. This is inopportune timing and does not allow for adequate public response. We feel this is unfair to the residents of the affected areas and request that the deadline be moved to mid to late January

Thank you

1

037

Amy Kepilino

From: Leonard Rossoff [lrossoffmd@gmail.com]
Sent: Monday, December 26, 2011 8:13 PM
To: mv22h1eis
Subject: Response to Draft EIS
Attachments: LJR Department of the Navy Dec 25, 2011.dotx.pdf

To Project Manager

Draft Environmental Impact Statement (DEIS) FOR THE BASING OF ADDITIONAL PERSONNEL AND MV-22 AND H-1 AIRCRAFT IIN SUPPORT OF THE THIRD MARINE EXPEDITIONARY FORCE (111 MEF) ELEMENTS IN HAWAII

Please see attached response the above DEIS

Please add my contact information to the listserv to receive any information on this issue

Thank you

Len Rossoff MD

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037

FIRST CLASS DEC 28 2011

317 Kaneohe Bay Drive
Kaneohe, Hi. 96744
December 25, 2011

Department of the Navy
Naval Facilities Engineering Command
Pacific Division
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive
Suite 100
Pearl Harbor, Hi 96860-3134
Emailed as well to mv22h1eis@beltcollins.com

SUBJECT: Draft Environmental Impact Statement (DEIS) FOR THE BASING OF ADDITIONAL PERSONNEL AND MV-22 AND H-1 AIRCRAFT IIN SUPPORT OF THE THIRD MARINE EXPEDITIONARY FORCE (111 MEF) ELEMENTS IN HAWAII

I am a resident of Kaneohe living on Kaneohe Bay Drive and a firm supporter of the Marine Corps and its mission in defense of our country. I further support the necessity for vigorous training with all assets that they require. I also believe that this training is not incompatible with the protection and maintenance of a current and future healthy and enjoyable environment. I believe that the Navy has not fulfilled its obligations under the National Environmental Policy Act ("NEPA"), 42 USC 4332, for the stationing of 1000 additional troops with new "next generation equipment" i.e. helicopters (CH-53Es) and MV-22 Osprey. This letter represents my strong opposition to the proposed changes at Marine Corps Base Hawaii (MCBH) and contests several assessments put forth in the above DEIS.

Failure to Analyze Alternatives Objectively

037-1 The DEIS falls short of satisfying NEPAs mandate to analyze the impact of stationing alternatives for both equipment and troops. The admission by the Navy that MCBH is the only infantry division that does not routinely train with rotary winged lift aircraft suggests a prior recognition of the facilities inadequacy to do so without adverse impact on the population living close by as well the environment. Part of this reluctance might be based on their recognition of previous local public's distress over the noise generated by Harrier jets in addition to that of helicopters. It does not adequately explore alternative troop placements (e.g. Guam, mainland).

Thus the DEIS falls far short of satisfying the Navy's obligation under NEPA to take a "hard look" at the environmental impacts associated with any of the proposed alternatives for the permanent stationing of additional troops and aircraft at MCBH at Kaneohe.

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Failure to Analyze Impacts Associated with the Military Training a MCBH

037-2 The DEIS fails to provide adequate analysis of the impact of stationing in Hawai'i additional permanently assigned troops and equipment.

The DEIS does not adequately discuss the Navy's proposal to significantly increase the frequency of training activities with newer proposed equipment. All the training alternatives currently under consideration would have significant impact on recreational activities, noise levels geology, and soils, biological resources, cultural resources, environmental justice especially as impacts avian and marine wildlife. The Navy has failed to provide the requisite information and analysis including quantification of impacts involving, among other things, soil erosion, water quality, cultural resource damage, traffic, economics, toxins, habitual and listed species loss, air quality and noise. Furthermore, they inadequately address expected increases in sewage that would be transferred to an already overburdened and non-EPA compliant City facility in Kaneohe operating sub optimally and under a consent decree.

Inaccurate Analysis of No Action Alternative

037-3 The DEIS does not adequately address reasonable alternatives including upgrading of equipment without increasing troop levels and flight activity at KMBH.

Failure to Assess all Cumulative Impacts

037-4 The DEIS does not provide adequate information regarding the time, type, place and the scale of this near future project included in the cumulative impact analysis. They fail to fully address the cumulative impact of the MV22 Osprey and new helicopters in addition to the P8's replacement of less noisy propeller craft.

037-5 The DEIS falls far short of satisfying NEPA's mandate to analyze the impact of stationing alternatives in the light of each alternative's interaction with the effects of past, current, and reasonably foreseeable future projects. Vague descriptions of the general impact of past and present activities, without identifying the environmental impacts from such projects on an individual basis, fails to satisfy NEPA. The DEIS illegally fails to quantify quantifiable cumulative impacts such as soil erosion, water quality, cultural resource damage, traffic, economics, toxins, habitat and listed species loss, air quality , noise, and so forth.

037-6 The DEIS fails to analyze the impact on subsistence activities (fishing, harvesting marine and freshwater species, gathering limu, etc.) as such practices are specifically protected by Hawaii's constitution.

037-7 The DEIS fails to consider potential human health impacts associated with contaminants transported by surface or groundwater contamination. The Marine Corps must investigate the potential for all training-related contaminants to impact groundwater and seawater.

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037-8 The DEIS fails to consider the potential negative impact of the increased frequency and intensity of noise on human health, quality of life and recreational activities and recreational based businesses in and around Kaneohe Bay. An increased frequency implies that the noise will be heard for more hours of the day and night than previous.

037-9 Kaneohe bay is recognized as one of the most visually beautiful sites in Hawai'i and is extensively used for recreation including motor and sail boating, paddle boarding, canoeing, kayaking, swimming, snorkeling, and so forth. It's recreational value is clearly recognized by the Marine Corps by virtue of maintaining an on base Marina facility available to active duty, civilian employees and retired personnel.

037-10 The DEIS having described the risk for potentially disastrous bird strikes does not provide sufficient data on the risk to inhabitants of the area on land and in the water, not to mention the crews, of aircraft crashes. The recent fatality of a crew member in a helicopter crash in an area very popular with recreational boaters should have made this analysis imperative. Furthermore increased aircraft activity with newer equipment would unfortunately make the possibility of such an occurrence more likely.

037-11 The DEIS did not present adequate data on the potential adverse effect of increased aircraft activity and noise on the public's enjoyment of recreational activities, tourism, and the economics of recreationally based businesses.

- The DEIS inaccurately describes the most affected area as low density misquoting Honolulu's City's General Plan (DGP 2002) as a "residential areas with limited future population growth." The plan clearly indicates that, on the contrary, "limited growth potential" is consequent to the fact that it is already fully populated.
- The DEIS states noise contours representing the proposed action would remain similar in size when compared to contours for the No Action Alternative. "Existing noise sensitive land uses in the surrounding civilian community currently exposed to aircraft noise levels greater than 65 DNL would continue to be exposed to similar noise levels." The DEIS did not apparently take into account the cumulative noise of the new helicopters and Ospreys superimposed on larger jets P8s replacing smaller and quieter propeller aircraft.
- The DEIS's computer noise model is not an actual measurement of the noise generated now or in the future. They failed to use actual sound measurements placed in the surrounding community to establish a baseline and measure the actual change in noise pollution when the newer aircraft come on line.
- Furthermore the computer modeling used by the DEIS appears to be fatally flawed demonstrating a number of immediate deficiencies , specifically:

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037-11

- The DEIS does not address the adverse impact of marked increased frequency of exposure to this noise.
- The DEIS analysis of baseline and projected noise is based on a computer model without any actual measurements from sites in the affected community.
- The model did not adequately address the event of peak noise when several aircraft take off simultaneously including jets combined with helicopters and hybrids.
- The model did not address the common practice of revving of the engines on the ground or prolonged hovering.
- Studies have indicated that noise pollution is not only a consequence of loudness alone. Helicopter noise appears to be more disruptive than equally loud noise generated by jets. No data was supplied as to whether the Osprey noise, especially on takeoff, was or will be analyzed in this way. Asked about this at the public outreach meeting at Castle High school (12/0801), a Marine representative said that Osprey would be taking off like fixed wing aircraft on the runway. The implication was that vertical takeoff was in fact very noisy. It is difficult to accept that training in vertical takeoffs will not take place.

In summary, this DEIS has not adequately addressed a wide variety of impacts including:

- **A more comprehensive look at cumulative impacts.**
- **Incomplete information on alternative locations.**
- **An incomplete assessment of environmental and wildlife impact.**
- **Incomplete quantitative and especially qualitative assessment of noise pollution.**
- **Incomplete assessment of effects on human health and the quality of life.**
- **Incomplete assessment of the expected impact of increased sewage.**

037-12 **Furthermore the actual manner of presentation of the DEIS did not allow for the community to be appropriately informed. It was presented for review during the holiday season when many local residents are traveling or otherwise occupied. This questionable timing shortened the window available to scrutinize a lengthy document and respond by the deadline. This suggests a strategy to limit public comment.**

It is incumbent on the Navy to revise and resubmit the DEIS and comply with Congress's mandate to allow for "decisions based on understanding of environmental consequences" and the objective evaluation of all reasonable alternatives.

Sincerely,
L.J. Rossoff, MD
Kaneohe Bay Drive

Rossoff

4

037

5

038

Amy Kepilino

From: mv22h1eis
Sent: Wednesday, November 30, 2011 1:26 PM
To: mv22h1eis
Cc: malaku@hotmail.com
Subject: Public Meeting Request on Molokai

038-1 Malia from the State Environmental Council for Molokai called asking for a public meeting to be held on Molokai before the comment period ends (in addition to those on Hawaii and Oahu). Her number is 808-336-0318.

Thank you.

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039

Internal government review comments.

040

Amy Kepilino

From: Forrest Arnold [forrest@forrestinhawaii.com]
Sent: Friday, December 09, 2011 1:16 PM
To: mv22h1eis
Cc: Sue Sakai
Subject: Aloha---public comments on the Draft EIS for Basing of MV-22 & H-1 Aircraft in Hawaii (From Forrest Arnold on Big Island)

Aloha-- We understand that you are the person collecting comments on the Draft EIS for Basing of MV-22 & H-1 Aircraft in Hawaii

(particularly regarding training proposal for Upolu Airport on Big Island)

Please confirm that you received these comments with an email reply...Many thanks

Comments on EIS from Les Forrest Arnold tel 808-987-2365
Resident of North Kohala for 24 years
P.O Box 474, Hawi, HI 96719

Many thanks for the opportunity to offer comments on the Draft EIS for Basing of MV-22 & H-1 Aircraft in Hawaii---and particularly regarding training proposal for Upolu Airport on Big Island.

First of all, as a Vietnam combat veteran myself (USS Robison DDG-12 Westpac 1972), I offer great support to our troops and to the need for effective training.

The EIS for the proposed training activity at Upolu Airport in North Kohala does not accurately reflect the many impacts that such training would have.

The Belt Collins staff Whatever the source of the assumption made in the EIS, I believe that some revisions to the document will help it to match the reality of the Upolu location.

Airspace & Aesthetics

4.3.2.4 Page 4-19: States that previous training had occurred there.

040-1 **Comment**: It this training ever occurred, it is not in recent community memory and does not justify the new proposed training activity.

Table 4-6 States that annual operations at Upolu in 2009 was 800.

Comment: We find this figure to be grossly exaggerated & does not offer a valid baseline for the increased training proposed.

040-2

Page 4-29, Line 1: states that 242 new MV-22 operations constitute 23% increase and that airspace impacts would be minimal.

Table 4-20 The figures are misleading if the exaggerated baseline of 800 is used.

→Noise (this may be the most critical community concern...it is mine)

On Pg 4-46, the EIS states:

4.5.2.4 Upolu Airport, Island of Hawaii
Aircraft operations are not in proximity to residential or other noise sensitive land uses to warrant noise modeling and analysis, i.e., noise impacts are not anticipated. Hence, no evaluation of existing conditions for aircraft noise was conducted at Upolu Airport.

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040-3 **Comment**: Because the ambient noise levels are so low in this quiet rural community, any additional aircraft noise will have negative impact. Even small single engine planes & tour helicopters are intrusive. Any assumptions made in the EIS based on other Hawaii locations will not apply here. At the Nov 30, 2011 information meeting there were many residents who would be directly impacted by additional air traffic.

4-9-2-4 **Cultural Impacts**

Pg 4-150 It is notable that this historical information is included.

Comment: For this portion of the EIS & Pg 4-170 Section 4.9.3.4 Archeological:

040-4 Our Hawaiian neighbors describe Upolu Airport and the surrounding land as sacred to the Hawaiian people. So with the birthplace of Hawaii's unifying King Kamehameha and the historic Mo'okini heiau so close by, it is hard to assess the negative cultural impacts. Especially with growing interest in preserving cultural areas, airborne military training becomes an inappropriate use.

Section 4.11 **Socioeconomics** – The Draft EIS does not mention an impact at the Upolu location.

040-5 **Comment**: Although the Upolu location may seem convenient, the negative impacts of regular military flight missions clashes completely with the lifestyle of the Kohala community and our economic reliance on tourism attracted to our uniquely rural atmosphere. The proposed training schedule would directly affect housing values & negatively impact our already fragile tourist economy. In the last 10+ years, the Kohala community has become increasingly dependent on visitor spending and in no way does the proposed training add to that rural appeal.

Page 6-31 & 6-32 **Summary of Impacts**

Comment: Based on the comments from above, The Summary of Impacts does reflect actual impacts on

Aesthetics/Visual Resources
Airspace
Noise
Cultural/Archeological
Socioeconomics

In conclusion:

We support our US Marines---but not this training plan in Kohala.

We might support the use of Upolu as an emergency landing area for the US Marines...
but Kohala's peaceful rural setting is absolutely not suited in any way to airborne military training.

There is no benefit to this community from a military training activity---only loss and negative impacts. To risk the precious qualities of North Kohala in favor of a convenient landing area is completely unacceptable. Kohala may be the least warlike place in Hawaii...we choose to protect this special place.

The EIS attempts to look at impacts on the environment...but offers a very incomplete view of the impacts on the people who live here in Kohala.

With true support to our Troops and full understanding that training is important, we must decline to host the training at Upolu Airport in North Kohala.

Please contact me with any questions about these comments--- Les Forrest Arnold 808-987-2365

Draft EIS for proposal: http://www.mcbh.usmc.mil/mv22h1eis/documents/Draft%20EIS/DEIS%20Vol%201.pdf

Descriptive page of proposal: http://www.mcbh.usmc.mil/MV22H1EIS

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Here's the contact info for folks to submit written comments on the Draft EIS, either via snail mail or email:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

Mv22h1eis@beltcollins.com

Comments are due no later than December 27, 2011.

Thanks for your interest.

Sue

Susan A. Sakai | Vice President/Director of Planning
Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
T: 808.521.5361 | F: 808.538.7819 | www.beltcollins.com

Forrest Forrest Arnold P(B) Certified EcoBroker Tel. 808-987-2365
Hawaii Green Realty, LLC email forrest@HawaiiGreenRealty.com

3

041

WRITTEN COMMENT FORM
Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements In Hawaii

NAME: FRANK K. PARRISH
ADDRESS: 44-211 MALAE PLACE

PHONE/EMAIL: 808 254-1953

COMMENTS: *(Please print legibly)*

041-1 Part of your poster-board presentation was material on sound levels of different aircraft. Core to this presentation was output from a computer model that showed average sound levels (DNL in contours. It was not clear if there was any validation of the model results. Archival acoustic recorders should be on the ground in neighborhoods to see if the model results reflect reality. It was also not clear how the average values were derived. How are loud single events of many take offs (That exceed acceptable levels) averaged with typical background noise → over

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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041

041-1 of aircraft in flight Tracks over head. Clarifying How the average is derived and weighted should be disclosed. Using acoustic recorders to validate The model is pretty straight forward and should be expected as part of the base air operations.

fold here

Place First Class Postage Here

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

fold here

042

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: S Fessler

ADDRESS: 707 Old Mokapu Rd
Kailua, HI 96734

PHONE/EMAIL:

COMMENTS: *(Please print legibly)*

There are two concerns related to noise:

042-1 (1) night noise from static aircraft engines interferes with sleep and vibrates the walls of single wall buildings

042-2 (2) flights over the residential area called Kaimalino

When I called the Provost Marshall's office to lodge a complaint, I was asked for my social security number — or I couldn't be helped!

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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043

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: JOHN FLECKLES

ADDRESS: 46-074 Puulena ST, # 1116
KANEOHE 96744

PHONE/EMAIL: 358-1116 jfleckles@yahoo.com

COMMENTS: *(Please print legibly)*

First, thanks for providing this opportunity to learn about the new plans and to make our comments.

043-1 My comments are very specific and have to do with the high noise made currently by flights of the C5 and AN124 cargo jets over the homes on THE EDGE of KANEOHE Bay. To reduce the noise level, please MOVE THE FLIGHT PATHS AWAY from the bay shore and MORE TOWARDS its center. If necessary, please relocate the guiding beacons to the bay from the land. There will still be noise, but less. As a good citizen I support your plans. I hope you too as a good citizen can carry out my suggestion. Sincerely, John Fleckles 12/8/11

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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044

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: Guy Ballou

ADDRESS: 46-491 Haiku Plantations Dr
Kaneohe, HI 96744

PHONE/EMAIL: 410.507.0010, guyballou@hawaii.rr.com

COMMENTS: *(Please print legibly)*

1st I filled out last time & never heard from anyone!! Concern is noise! ~~The model is not~~ Believe

044-1 The model is just to ensure noise is below 65dB The flights after 10pm is LOT more then what is in model! The mountains are NOT modeled!!! P8 is not going be acceptable!! 85dB at brake release is 8.9 AT 85dBs!!! Believe helicopters would work but the noise WITH P8 + C17 is unacceptable

G Ballou

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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044

From: guyballou [guyballou@hawaii.rr.com]
Sent: Monday, December 26, 2011 3:25 PM
To: mv22h1eis
Cc: Guy Ballou; Joan fleming
Subject: Extremely poor modeling of noise for EIS of Mv22 at Kaneohe

From Justin Ballou at 46-491 Haiku Plantations Dr, Kaneohe, HI 96744. Cell is 410.507.0010 and email is guyballou@hawaii.rr.com.

An email confirming you received this email would be nice.

044-2 **Main concern is the accumulative noise level of ALL aircraft at Kaneohe Marine Air Field. Believe the model is not correct in determining noise levels as the aircraft noise have been piecemealed . My questions are below:**

044-3 **What is the DNL dBs for the P8 at brake release ? At what distance behind the P8 will the 65/85dBs be heard? Believe it is /6585dBs at 8.9NM? Is that correct? What is your source for your numbers? What numbers did you use?**

044-4 **Was the Ko'olau Mountain range used in your model? Why not?**

044-5 **Flights between 10PM and 7am have an increase of 10dbs for each flight? The increase in flights at night will increase greatly as helicopter and Osprey train at night. How was the 10dbs increase of each night flight determined and how it affects the model? What is the number of increased night flights that was used in model and how did it affect the model dB rating?**

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044

044-6 **Kaneohe King Intermediate School is just south of the Coconut Island and within cone of noise of the runway. The noise levels are so loud that teaching has to stop each time an aircraft lands. King is downwind of the flight path. How are you measuring the noise and air pollution at the school now and in the future? If not --why not? What if it was your children at that school? The air pollution from all the aircraft landing has to increase. How are you going to monitor the increase in air and noise pollution?**

044-7 **Believe that the additional Marine aircraft would not be an issue but the addition of P8s and C17 is just not reasonable. Why not just move the P8s to the Navy/AF Hickam Airfield. Before the Navy didn't run Hickam but is now a joint base and the airport is use to 737 and C17 noise levels.**

044-8 **Where is the economic analysis for this EIS. The monies that the government is going to end up paying over noise is easy to determine. All one has to do is goggle airport noise and law suits and the monies go into the BILLONS!!! The noise levels are OVER 85dbs at the school. Again how did you do your measurements of noise levels????**

It will be interesting to see where the E22 hangers go, over by officer housing OR over by Kaneohe bay residents' homes. Humm! Extremely disappointing!!!

2

045

WRITTEN COMMENT FORM
Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: KAWIKA

ADDRESS:

PHONE/EMAIL:

COMMENTS: *(Please print legibly)*

NEED FLIGHT TRACK
045-1 TO STAY OUT 2-3 miles
AT SEA
APZ Zone Are Begin
045-2 VIOLATED

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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046

1893 Executive Agreements

As a result of the illegal overthrow of the Hawaiian Kingdom Government, by the United States on, January 17th 1893 there were two executive agreements entered into between President Grover Cleveland and Queen Liliu'okalani that brought about a peaceful settlement. This was admitted by President Bill Clinton of the United states , UNITED STATES PUBLIC LAW 103-150

103d Congress Joint Resolution 19

* The first agreement called the "*Liliu'okalani assignment*" binds the "U.S. President and his successors" to administer Hawaiian Kingdom Law

* The second agreement called the "*Restoration Agreement*" bind the "U.S. President and his successors" to restore the

Hawaiian Kingdom Government and the Monarch to grant a pardon

Obligatory Nature of Hawaiian Law

* The Laws are obligatory upon all persons, whether subjects of this Kingdom, or citizens or subjects of any foreign State , while within the Limits of the Kingdom, except so far as exception is made by the laws of nations in respect to Ambassadors or others. The property of all such persons, while such property is within the territorial jurisdiction of this Kingdom, is also subject to the Laws
"§6, Hawaiian Civil code"

Conveyance Barred since 1893

- To entitle any conveyance. to be recorded, it Shall be acknowledge by the party or parties executing the same, before the Registrar of

Conveyances, or his agent, or some judge of a court of record, or notary of the Kingdom, or Before some minister, commissioner or council of the Hawaiian Islands or some notary public or judge of a court in Any foreign country, "Hawaiian Civil Code No. 1255"

*If a conveyance, whether by deed or mortgage, was not properly acknowledge it was not entitled to be recorded, and though spread upon the record it must be treated as a nullity.

Lenehan v. Akana, §6 538, 541 (1884)

Supremacy of Federal over State

*Article VI, clause 2, U.S. Constitution: - This Constitution, and the Laws of the United States which shall be made in Pursuance

046

thereof: "and all Treaties made, or which shall be made, under the Authority of the United States, shall be the *supreme Law of the Land*"; and the Judges in every State shall be Bound thereby, any Thing in the Constitution or Laws of any State to the Contrary notwithstanding

- All State of Hawai'i laws and County ordinances are in direct violation of the "*Liliu'okalani assignment*" and therefore against the U.S. Constitution.

****** The 1893 executing agreement and the agreement to restore the government of the Hawaiian Kingdom are considered Treaties ******

047

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: Alice Hewett - Koolaupoko Hawaiian Civic Club

ADDRESS: P.O. Box 6664 Kaneohe, HI 96744

PHONE/EMAIL:

COMMENTS: *(Please print legibly)*

Pls. send us a hard copy of the EIS - it is too difficult to read 1,000 pages on the computer.

Mahalo

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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048

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: Jeanette Orihuela

ADDRESS: 608 Milokai St.
Kailua, Hi.

PHONE/EMAIL: 254-2285

COMMENTS: *(Please print legibly)*

048-1 God bless the U.S. Marines! Keep up the great work you do protecting our country! You have my full support as you heard in my prepared letter this evening. Thank you again + again!

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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049

Subj: **RE: Letter 2, Noise opinion**
Date: 12/2/2011 3:35:01 P.M. Hawaiian Standard Time
From: repthielen@Capitol.hawaii.gov
To: HAFANMANN@aol.com

Dear Harry,
Thanks for your compelling reasons why the Base should change its flight plan to let the residents live in peace. I hope you can attend Dec. 8.
Look forward to seeing you both again.
Aloha,

Cynthia

Representative Cynthia Thielen
Assistant Minority Leader
50th Representative District (Kailua – Kaneohe Bay)
Phone: (808) 586-6480
Fax: (808) 586-6481
repthielen@capitol.hawaii.gov
www.cynthiathielen.com

From: HAFANMANN@aol.com [mailto:HAFANMANN@aol.com]
Sent: Friday, December 02, 2011 3:13 PM
To: Rep. Cynthia Thielen
Subject: Letter 2, Noise opinion

Dear Rep. Thielan:
As stated in letter about trees we moved in over 50 years ago.
My wife and I taught at James B. Castle High School and we retired January 1988.
For years we endured the noise of jets at the nearby Marine Base. I need not explain the blasts that shook our windows, interrupted conversations and sleep, blasts that suddenly frightened us and visiting friends etc.
In 1988 upon retirement we decided to move to some property on the mainland and just after having the sewer system installed learned that the F-16's or whatever they were had left the base and canceled our moving plans and have enjoyed the relative quiet that now exists until recently. In other words the Base almost chased us away.
049-1 As a Korean War Veteran and a strong American Citizen I can appreciate the need for a strong defense. I spent a year on the war time flight line in Korea and under stand the system and how it works. However no matter how strong that feeling no matter how much I repeat its for the cause, noise can destroy regardless of the reasons. I am beginning to wonder how much more strain for freedom I can stand. Due to my defibrillator I am always searched at the airport and no matter how I try and rationalize I believe that the noise will destroy me. I do not have Alzheimer or dementia, excellent hearing, but the human system has its limits as to the strain one can take. We need to remain here, I need to die in my home, my wifes large caring family is here and I am wedded to Kaiser. I don't know what to do if the noise repeats itself once again except go crazy.
I will try to be at the Castle H. S. meeting.
aloha, Harry and Flo Fanning,
44-208 Malae Place
Kaneohe, Hawaii 96744
254-1121

Thursday, December 08, 2011 AOL: HAFANMANN

050

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: Joan + Paul Graham

ADDRESS: 46-043 Ipuka St
Kaneohe Hi 96744

PHONE/EMAIL: Ipukapaul@hawaii.rr.com

COMMENTS: *(Please print legibly)*

050-1 We are NOT WANTING increased aircraft Noise or flight patterns As it is Now the hours Are to extended ~~they~~ the pilots fly over our house STARTING As early as 5:00Am AND up until 11:00 pm or later, they are close enough At time to see the crew. Do Not say they are NOT familiar As they are supposed to be UNDER supervision by control tower for flight patterns Decreasing home Values AND home Enjoyment

Submit your comments at the meeting today, or ~~mail or email~~ no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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051

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: THOMAS M. MASTERSON

ADDRESS: 44-623 A KANEOHE BAY DRIVE
KANEOHE, HI 96744

PHONE/EMAIL: (808) 228-1049, TOMMASTERSON@HAWAII.RR.COM

COMMENTS: *(Please print legibly)*

051-1 (1) WHAT IS THE PRESENT DECIBLE LEVEL OF P33 ENGINE MAINTENANCE TESTING BETWEEN 9PM → 5AM CURRENTLY?

(2) IS IT NECESSARY TO TEST AT THESE TIMES? AT HIGH RPMS? NOW + IN THE FUTURE

(3) HOW WILL THE NEW PLANS CHANGE THIS NOISE LEVEL? AND TIMES?

(4) WHERE WILL THESE NIGHT TESTS BE DONE IN THE NEW PLAN? AT EXISTING SITES OR THE NEW MAINTENANCE HANGER?

051-2 (5) WHAT NOISE ABATE CONSTRUCTION PLANS ARE THERE? (I.E. A NOISE BARRIER WALL AROUND RESIDENT FACING SIDES OF THE TEST HANGARS)

(6) WHAT WILL BE THE NEW NIGHT TESTING NOISE LEVELS?

(7) WILL THESE EXCEED CIVILIAN EPA GUIDELINES?

(8) IF THEY DON'T TEST THE ENGINES, WHERE IS THE NOISE COMING FROM? WHERE WILL IT COME FROM?

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

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052

WRITTEN COMMENT FORM
Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: Reverend Richard Bermudez
KAHU-
ADDRESS: 1314 KUNA St

PHONE/EMAIL: 347-0838

COMMENTS: *(Please print legibly)* * BASELINE Flight Levels
052-1 are Incomplete and should include all OF KAILUA and Bellows.
* Noise levels are inconsistent with whats Really going on. (Flight Path) Route -
052-2 * Flight Path should be drawn outside - no one to two miles out.
* Flights should be above 1000 ft. and away From homes -.
* THERE IS NO OVERSIGHT on Flights —
052-3 - NO HELP from military —
- NOISE - RATTLING Home - Health & IT A MESS OVER HERE. Safety ISSUES not addressed

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

This form may be used as a mailer if folded, taped or stapled, and stamped.

NEW Flight PATHS need TO BE DEFINED TO THE PUBLIC! mission?

053

Amy Kepilino

From:	joshua frame [frajoshua@gmail.com]
Sent:	Tuesday, December 13, 2011 11:55 PM
To:	mv22h1eis
Subject:	upolu airport training

Many thanks for the opportunity to offer comments on the Draft EIS for Basing of MV-22 & H-1 Aircraft in Hawaii---and particularly regarding training proposal for Upolu Airport on Big Island.

First of all, as a Vietnam combat veteran myself (USS Robison DDG-12 Westpac 1972), I offer great support to our troops and to the need for effective training.

The EIS for the proposed training activity at Upolu Airport in North Kohala does not accurately reflect the many impacts that such training would have.

The Belt Collins staff Whatever the source of the assumption made in the EIS, I believe that some revisions to the document will help it to match the reality of the Upolu location.

Airspace & Aesthetics

4.3.2.4 Page 4-19: States that previous training had occurred there.

053-1 **Comment**: It this training ever occurred, it is not in recent community memory and does not justify the new proposed training activity.

Table 4-6 States that annual operations at Upolu in 2009 was 800.

053-2 **Comment**: We find this figure to be grossly exaggerated & does not offer a valid baseline for the increased training proposed.

Page 4-29, Line 1: states that 242 new MV-22 operations constitute 23% increase and that airspace impacts would be minimal.

053-3

Table 4-20 The figures are misleading if the exaggerated baseline of 800 is used.

→**Noise** (this may be the most critical community concern…it is mine)

1

053

On Pg 4-46, the EIS states:

4.5.2.4 Upolu Airport, Island of Hawaii

Aircraft operations are not in proximity to residential or other noise sensitive land uses to warrant noise modeling and analysis, i.e., noise impacts are not anticipated. Hence, no evaluation of existing conditions for aircraft noise was conducted at Upolu Airport.

053-4 **Comment**: Because the ambient noise levels are so low in this quiet rural community, any additional aircraft noise will have negative impact. Even small single engine planes & tour helicopters are intrusive. Any assumptions made in the EIS based on other Hawaii locations will not apply here. At the Nov 30, 2011 information meeting there were many residents who would be directly impacted by additional air traffic.

4-9-2-4 **Cultural Impacts**

Pg 4-150 It is notable that this historical information is included.

053-5 **Comment**: For this portion of the EIS & Pg 4-170 Section 4.9.3.4 Archeological:

Our Hawaiian neighbors describe Upolu Airport and the surrounding land as sacred to the Hawaiian people. So with the birthplace of Hawaii's unifying King Kamehameha and the historic Mo'okini heiau so close by, it is hard to assess the negative cultural impacts. Especially with growing interest in preserving cultural areas, airborne military training becomes an inappropriate use.

Section 4.11 **Socioeconomics** – The Draft EIS does not mention an impact at the Upolu location.

053-6 **Comment**: Although the Upolu location may seem convenient, the negative impacts of regular military flight missions clashes completely with the lifestyle of the Kohala community and our economic reliance on tourism attracted to our uniquely rural atmosphere. The proposed training schedule would directly affect housing values & negatively impact our already fragile tourist economy. In the last 10+ years, the Kohala community has become increasingly dependent on visitor spending and in no way does the proposed training add to that rural appeal.

Page 6-31 & 6-32 **Summary of Impacts**

Comment: Based on the comments from above, The Summary of Impacts does reflect actual impacts on

Aesthetics/Visual Resources

2

053

Airspace

Noise

Cultural/Archeological

Socioeconomics

In conclusion:

We support our US Marines---but not this training plan in Kohala.

We might support the use of Upolu as an emergency landing area for the US Marines…

but Kohala's peaceful rural setting is absolutely not suited in any way to airborne military training.

There is no benefit to this community from a military training activity---only loss and negative impacts. To risk the precious qualities of North Kohala in favor of a convenient landing area is completely unacceptable. Kohala may be the least warlike place in Hawaii…we choose to protect this special place.

The EIS attempts to look at impacts on the environment…but offers a very incomplete view of the impacts on the people who live here in Kohala.

With true support to our Troops and full understanding that training is important, we must decline to host the training at Upolu Airport in North Kohala.

Please contact me with any questions about these comments--- frajoshua@gmail.com (808)896-5792

3

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Pacific Southwest Region
333 Bush Street, Suite 515
San Francisco, CA 94104

IN REPLY REFER TO:
ER# 11/1056

Electronically Filed

27 December 2011

ATTN: EV21, MV-22/H-1 EIS Project Manager
Department of the Navy Naval Facilities Engineering Command
Pacific 258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

Subject: Review of the Draft Environmental Impact Statement (DEIS) for Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements, Hawaii

Dear Project Manager:

The Department of the Interior has received and reviewed the subject document and has the following comments to offer.

Our primary concerns lie specifically with the potential for impacts from activities adjacent to Mauna Loa Volcano within the boundaries of Hawai'i Volcanoes National Park (HVNP) or resources that may be shared by HVNP and Pohakuloa Training Area (PTA). We are especially concerned with noise that could potentially travel to parklands and could impact park resources and values including visitor experience, cultural resources including cultural landscapes, Congressional designated wilderness and threatened and endangered wildlife.

054-1 Section 4.5.2.3 (pg. 4-45) discounts any noise impacts due to aircraft operations 'not in proximity to residential or noise sensitive land uses.' However, PTA is adjoined by HVNP, which lies only 4 miles from the southern edge of PTA. The document needs to consider, model, and analyze the potential noise impacts to cultural resources, recreational users and wildlife, as they are important 'noise sensitive receptors' from a conservation perspective.

054-2 The National Park Service manages park soundscapes or "natural quiet" as a park resource, which is based on public law and is defined in NPS policy. In 2007, park studies revealed nearly two-thirds of surveyed visitors rank the ability to hear natural sounds as important to their enjoyment and appreciation of the park and three-quarters of these visitors equate annoyance and negative feelings with human-caused sounds including aircraft and vehicle noise (2007 Social

054-2 Science Research to Inform Soundscape Management, Steve Lawson, Department of Forestry, Virginia Polytechnic Institute and State University).

054-3 We encourage you to address soundscapes in your analysis, or at a minimum, consider the impacts of noise on recreational users, wildlife and cultural resources not only within PTA but in the surrounding areas. We also request advance notice of aerial gunnery and live fire activities so that we may post information at trailheads and alert our backcountry office to better inform our wilderness users.

054-4 Mauna Loa Volcano is part of the park's 123,100 acres of congressionally legislated Wilderness. Known as the Mauna Loa Unit, this designation provides special protection to this area of Mauna Loa that is demarcated by the park boundary on the north and east sides of the park. We appreciate your selection of alternatives that avoid any impacts to designated park wilderness.

Our concerns also include the potential impacts of noise generated from ground activities and low flying aircraft that may be adjacent to or in close proximity to the park's designated wilderness. The primary wilderness trail for visitors to access the Mauna Loa Summit and associated backcountry cabins run parallel to the boundary of PTA. The associated noise is unexpected for park visitors and would potentially limit opportunities for solitude that are protected under the Wilderness Act.

The island's large expanses of lava produce landscapes that offer little sound shielding, creating long "time audibles" for human or mechanized sounds. Our own noise modeling in this type of lava terrain indicates that noise travels great distances (2007 NPS Natural Sounds Program Draft Acoustic Report). In these areas, noise has the potential for creating an acoustic impact on wilderness users.

054-5 The NPS mission to conserve park resources and values unimpaired requires a different standard than *significance* as defined by the Federal Aviation Agency (FAA) and other agencies. For example, FAA Order 1050.1E, Environmental Impacts: Policies and Procedures, notes that special consideration needs to be given to the evaluation of the significance of noise impacts on noise sensitive areas within national parks.

In order for the NPS to assess potential impacts to park resources, values and visitor experience, we request that the environmental impact analysis include audibility based, or "time above," metrics in order to express the time that sound levels are above ambient. This takes into account the duration of aircraft noise events, the number of aircraft noise events, and the absolute sound level of events.

Time above metrics correlates better with flight operations than day-night average metrics (DNL), which may obscure the dynamic range of acoustic events (www.fican.org/pdf/HanscomNoise.pdf). We believe these supplemental metrics would also better satisfy the requirements under the National Environmental Policy Act to characterize impacts to the environment in terms of intensity, context and duration (40 CFR 1508.27).

054

NPS is aware that typically the Department of Defense uses the day-night average sound level (DNL) metric in their environmental impact assessments. DNL is an energy-based noise averaging metric widely used by the Federal Aviation Administration (FAA) and the Department of Defense as the primary means for determining the cumulative noise energy exposure of individuals to noise resulting from aviation activities. Hence, thresholds of significance that have been established by the FAA are based on community response.

054-6 FAA Order 1050.1E notes that special consideration needs to be given to the evaluation of the significance of noise impacts on noise sensitive areas within national parks. Since assumptions regarding DNL levels are community-based in relation to airports, this metric and the 65 DNL threshold is not adequate to assess impacts of noise to park resources, values and visitor experience. Supplemental noise metrics that have been useful to supplement DNL analyses for both military and civilian aircraft noise exposure around noise sensitive areas include the following:

- Maximum A-weighted Sound Levels (Lmax);
- Sound Exposure Level (SEL);
- Equivalent Sound Level (Leq);
- Time Above a Specified Sound Level (TA);
- Number-of-events Above a Specified Sound Level (NA);

Source: Improving Aviation Noise Planning, Analysis and Public Communication with Supplemental Metrics, Guide to Using Supplemental Metrics, Department of Defense Noise Working Group, December 2009. Hawaii Volcanoes National Park can provide location points for modeling noise impacts at noise sensitive locations of concerns in the park.

054-7 The DEIS only addresses the use of the actual landing zones/drop zones (LZs) at PTA. However, the training activity that will occur with the MV-22 and H-1 includes terrain flight (TERF) and low altitude training (LAT) (pg 2-31). Both of these are low altitudes flights that are presumably occurring more than just over the LZs that were addressed in the document.

The impacts of the overflights and associated ground training activities (including live fire training) on wildlife, recreational users, wilderness values and cultural landscapes need to be considered as part of the environmental analysis, not just the hovering, landing and take-off. The impacts of increased noise and activity related to this training needs to be clearly analyzed (e.g. number of personnel, numbers of days/hours for aerial gunnery, type of live fire to be used, noise levels generated, noise contours, etc.

The document states that there will be an increase in annual operations of aircraft by 14,697 at PTA. How will this annual increase be implemented per each actual training day? Will it be concentrated over a specific period of time or spread out over the year? The cumulative impact of the recent PTA Modernization DEIS should be considered in the cumulative impact analysis. In addition, the travel route of MV-22 and H-1 between Oahu, other training sites, Upolu Airport, and PTA needs to be similarly analyzed. The document currently only addresses impacts to residential areas.

054

054-8 The DEIS states there are only five T&E species at PTA (pg. 6-28) which is contrary to previous PTA military planning documents (e.g. 2011 PTA Modernization DEIS). The DEIS needs to be clear regarding whether it is referring to PTA in general or the project area, or if it is referring to plants, animals, or both. Appendix F does list all T&E species consistent with previous documents. On page 4-139 the wrong scientific name is listed for the Hawaiian goose.

The T&E surveys were conducted at one point in time and don't account for seasonal variations that may occur in species' use of areas, or the ephemeral nature of some T&E plants. The DEIS should not discount that species may use these areas in other times of year and hence be impacted by the proposed project. There are also species that traverse the area and may be impacted by the proposed operations (e.g. Hawaiian petrels).

054-9 The federally endangered Hawaiian Petrel (‘Ua‘u) and proposed endangered (and presently state listed endangered) Band-rumped Storm Petrel (‘Ake ‘ake) are nocturnal long distance flyers whose nesting activities and aerial displays occur within the park primarily from 5,000'-10,000' elevation on Mauna Loa.

Recent documented calling birds in the Kohala Mountains at 3,000'-3,200' suggest the federally endangered Hawaiian petrels may still use lower elevations on Hawaii Island where conditions permit. There is potential for these birds to occur within the region of influence, particularly when in transit. The noise, vibrations and visual intrusions generated by ground activities and low flying aircraft, particularly any night activities during the breeding season, could potentially alter bird behavior and result in negative impacts to birds.

054-10 We have additional concerns about the potential impacts to the federally endangered Hawaiian goose (Nēnē) that is known to utilize several areas in the Saddle region including PTA and the neighboring Kipuka Ainahou Nene Sanctuary. The majority of birds found in the Saddle region actually originate from other populations across the island.

Nene are known to move seasonally between multiple areas, including to and from Hawaii Volcanoes National Park, and flight routes and stops around Mauna Loa and in and through the Saddle area are still not well understood and not necessarily consistent. Because endangered Nene do indeed utilize as well as traverse the project area, it is not possible to rule out the potential for impacts due to increased noise, vibrations and visual intrusions generated by ground activities, low flying aircraft or potential wildfire which could alter bird behavior on the ground and result in negative impacts to birds.

We appreciate that you indicate that you will consult with USFWS as consultation with subject experts familiar with bird use in the impact area are recommended to effectively evaluate potential impacts to birds by the proposed expansion and increase in use, and mitigation measures identified as needed.

054-11 On page ES-15 the DEIS states that no unmitigable impacts have been identified. However, since consultation with USFWS and SHPO has not been completed, this is undetermined at this point in time.

054

Although your project does not propose flights above the park, please note Kīlauea Volcano
continues to experience an ongoing summit eruption at Halemaumau Crater. The FAA has issued
a Temporary Flight Restriction, (TFR) for aircraft safety for explosive eruptions and presence of
ejected volcanic particulates at Kīlauea Summit (NOTAM: Hilo Vortac (ITO) 209 degree radial
054-12 at 24.6 miles (Latitude 19°24” 20” N, Longitude 155° 17”26”W) for a current radius of 3
nautical miles. This is from the surface up to and including 4000’agl.) Eruptive activities are
continuing to produce a hazardous ash cloud which may cause aircraft engine damage/failure and
abrasion damage due to airframe and windshield surfaces. Plume size fluctuates. Explosive
events with large amounts of ash can appear with no warning.

Visitors come to their national parks to experience the natural quiet and solitude. Park managers are charged with protecting critically endangered species, designated wilderness and park soundscapes as well as limiting activities that cause unnecessary noise or threaten the natural quiet. Both agencies are jointly engaged in protecting our country and its resources. We anticipate working with you to build a cooperative relationship and resolve our concerns as the planning progresses.

For further information or clarification on these comments, please contact Danielle Foster, Environmental Protection Specialist, at (808) 985-6073.

Sincerely,

Patricia Sanderson Port
Regional Environmental Officer

Cc:
Director, OEPC
Loretta Sutton, OEPC staff contact
Environmental Protection Specialist, NPS

055

Internal government review comments.

056

From: Kimberly Kalama [fourhoofing@gmail.com]
Sent: Monday, December 26, 2011 9:50 PM
To: mv22h1eis
Subject: EIS Comments

Naval Facilities Engineering Command, Pacific
December 26, 2011

Attn: EV21, MV-22/H-1 EIS Project Manager

258 Makalapa Drive Suite 100

Pearl Harbor, HI 96860-3134

mv22h1eis@beltcollins.com

Thank you for giving me the opportunity to make comments on the Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in support of the Third Marine Expeditionary Force (lll MEF) Elements in Hawaii.

056-1 I am in complete opposition to this EIS. This EIS targets a number of communities which fall under EO 12898. This order was put in place to protect our communities from potential health and environmental effects. This includes traffic, sewer, ozone and particulate levels. This EIS also targets population areas meaning places mostly of Hawaiian Ancestry, children, elderly and low income. I do not believe the community had enough adequate notice. I feel the community was misled and underhandedly meant to not have the time to make comment. For example, the notice of intent was held in August of 2010. The marines show up at the Waimanalo neighbor hood board meetings every month and say nothing of this notice. Then the marines have an open house on this subject and again say nothing of the open house. And to justify themselves they tell us it was mentioned in the federal registry. Again, the federal registry is used for this EIS. I know no one in our community that reads the federal registry on a daily basis. The marines also knowingly holds the comment period of this EIS during the month of December when there is no neighborhood board meeting. This is the reason for distrust. This is why I feel the way I feel which I believe we are being targeted and just a process of elimination. At this said I ask that this comment period be extended until one month after the community neighborhood board meeting so it can be brought to public attention? 056-2 In March of this year, 2011, a helicopter crashed and killed one on board and injuring three others. This is what our communities will be facing on a daily basis. The risk of a helicopter crashing into our schools, health center, emergency ambulance, fire station, church, stores and homes. The helicopter went down by means of catastrophic failure due to old age. The EIS words this catastrophic failure mishap of equipment with a fancy couple of words. “Legacy Equipment.” Given the amount of air crafts that will be flying on a daily basis the percentage rate of an incident happening has just increased a hundred percent. I don’t think our communities deserves risking the future of our children, families and friends lives by being used as guinea pigs while the military risks the lives of their own using “legacy equipment” and learning how to use advanced equipment at our communities expense. This EIS is a huge project which opens the door to the largest task force the military has. We deserve the opportunity to question and have answers on a public level. Again, I do not believe the communities had enough public notice. This

1

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056-3 whole EIS seems to be a secretive process? Another wording in this EIS ”legally mandated” this seems threatening to me, as if it’s a done deal, that we are just part of the elimination process. That the military is checking us off their wish list like for example: the community right to know act √ that’s done. They will say well we let the community know but we going to do it anyway because we can. Endangered birds and mammals √ no big deal, migratory birds √ no big deal, wet lands protection √ no big deal, recreational fishing √ no big deal, coral reef protection √ no big deal, Environmental Justice to minority and low-income population √ no big deal, Protection of our children from environmental health and safety risks √ no big deal. All these “no big deals” fall under the protection of executive orders. Why have any rules or regulations set in place when the military can just exempt themselves from executive orders? We should not be subject to the expendable or collateral damage category. As a community if we say nothing we get nothing at least give us the opportunity to voice our opinions. At least let the communities know? Contact our representative let our representative make a public meeting for all to hear? Give us a chance to play your game on the same playing level?This next part of the EIS is quite crafty one area that needs community participation since it is our tax dollars that pays for maintenance and it lays on ceded lands. It needs to be more clear.

056-4 Now this is sneaky! Under Public Access, let’s make the city responsible for this action. Although most weekends and holidays we have access to the beach fronting the marine area once this EIS passes through an agreement between the city and marines they will close the beach due to safety and to accommodate training procedures. We will lose public access to Bellows under this agreed-upon notice procedure. 056-5 As for cultural .resources there is no compromise. Kalaupapa absolutely not. No access to military uses what so ever. The people there have suffered enough that whole area is a sanctuary, a preserve. The communities cannot keep on competing with military abuse and Environmental Injustice of its lands and its people. Training needs to be done at a more appropriate site. Not Paradise! Our islands are all we have, our land is sacred and we cannot afford to give any more. Our land capacity, water, air and sea have all been breached well over capacity by human means. We need to stop! We are almost pushed to the point where we no longer can even be Hawaiian. We need to think of our future as far as just existing. We have learned from past experiences and say enough!

This whole process leads me to believe it was done underhandedly. The intentions were to never really let the community comment or stop the process of procedures from going forward. Under purpose and need the only reason the No Action alternative is there is basically to make us happy and shut us down. This action does not meet the military purpose and need there fore it’s a done deal. This EIS will lead to permanent fixtures and all the efforts the communities have gone through to keep military use to a minimal will be a major let down morally and psychologically. This EIS will be a detrimental factor to our health and well-being here in Hawaii. The point is there is just not enough “wasted” space for this squadron to play their games and learn how to use advanced equipment while using legacy equipment at our communities’ expense. They should really be training in an area and environment more suitable to conditions they will be fighting in.Not in Paradise!

Sincerely, Kimberly A.M. Kalama

41-1016 Waikupanaha Street

Waimanalo,HI 96795

(808) 853-0772

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November 30, 2011

Department of the Navy
Naval Facilities Engineering Command
Pacific Division
Attn: EV 21, MV 22
H 1 EIS Project Manager
258 Makalapa Drive
Pearl Harbor, HI

Dear Project Manager,

As a citizen of Kaimalino, a neighborhood next to MCBH, I am asking you to consider the following in your EIS:

1. Consider moving the flight path north towards Eagle or Boondocker when the rotary wing aircrafts are
flying over Nuupia Pond to minimize the noise and safety for the Kaimalino neighborhood and Nuupia Pond.

057-1 2. Include the Kaimalino Neighborhood in the EIS

3. Have the pilots fly at 500 feet when flying over the Kaimalino neighborhood to minimize the noise level.

4. Have a monitoring system to inspect the flight paths of the pilots for consistency.

5. Consider Aikahi School in you EIS since it is closer then the high school to MCBH

Sincerely,

James N. Turner
695 Mil0kai St
Kailua, HI
96734

turnerj004@hawaii.rr.com
Phone- 254-5477

cc: Cynthia Thielen
House of Representatives
State Capitol, Rm # 443
Honolulu, HI 96813

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specific comments on November 2011 Draft Environmental Impact Statement
for the Basing of MV-22 and H-1 Aircraft in Support of III MEF Elements in Hawai'i
by Cory Harden, PO Box 10265, Hilo, Occupied Hawai'i 96721 808-968-8965 mh@interpac.net

Notice of Public Meetings
"The public comment meetings will be held on the dates and at the times and locations indicated below…
Waimea Elementary School Cafeteria…Kamuela…
Hilo Intermediate School Cafeteria…Hilo…
Mililani Middle School Cafeteria…Mililani…
Waimanalo Elementary & Intermediate School Cafeteria…Waimanalo…
Caste High School Cafeteria…Kaneohe…" *[Notice of Public Meetings for the Draft Environmental Impact Statement for Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 11-4-11]*
058-1 *Meetings should also be held on Molokai, since actions are planned there, and Kauai, since actions are planned for Kaula. See comments on 1.4 and Table 2-5.*

"Under either Alternative A or B, the VMM and HMLA squadrons would conduct training operations at…PTA and Upolu Airport…" *[Notice of Public Meetings for the Draft Environmental Impact Statement for Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 11-4-11]*
058-2 *Why was Upolu Airport not mentioned in the 2010 EIS fact sheet or 8-6-10 Federal Register notice? What laws and military policies address expansion of military actions beyond base boundaries? This is also occurred with HAMET.*

Fact Sheet
[there are] "…only three possibilities: locate the needed assets in Hawai'i…move the entire MAGTF to another location, or the no action alternative of continuing to fill the missing capability from other sources…80 percent of the MAGTF's capacity is already located in Hawai'i." *[Fact Sheet, Environmental Impact Statement for Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 2010]*
058-3 *The alternative of moving the entire MAGTF to another location, such as Okinawa or Guam, should be more thoroughly evaluated.*

EXECUTIVE SUMMARY
" The proposed introduction of these aircraft is part of the Marine Corps' plan to restructure and rebase its forces in the Pacific over the next ten years…" *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, ES-1]*
058-4 *The EIS should evaluate cumulative impacts of the 10-year plan, not just this limited action.*

ES.2 PROPOSED ACTION AND ALTERNATIVES
ES.2.1 ALTERNATIVE A
Evaluate impacts of helicopters travelling to Pohakuloa, not only impacts after they arrive.

"In addition, the squadrons are expected to use State of Hawaii airports and other DoD airfields and helipads that are routinely used by existing Marine Corps squadrons for refueling and related activities. Tactical training would generally not be conducted at these facilities; their use would be considered administrative, for example, transporting personnel and emergency evacuation." *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, ES-9]*
058-5 *Impacts on facilities and nearby residents, including those in Keaukaha, should be evaluated.*

CHAPTER 1 Purpose and Need
1.1 INTRODUCTION
"The proposed action addressed in this EIS results from the vision and initiatives identified in the *Fiscal Year (FY) 2011 Marine Aviation Plan*…To achieve this [plan] vision, the Marine Corps must restructure and rebase its forces in the Pacific over the next 10 years, and Marine Aviation must better integrate its

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assets with ground and command elements in the Marine Forces Pacific (MARFORPAC) region of operation. The proposed action…accomplishes a portion of these goals." *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 1-1]*

058-6 *See comment on ES-1.*

Aviation Training
"Other airfields in Hawaii available for aviation use would include those operated by the State of Hawaii Department of Transportation, Airports Division, and other Department of Defense (DoD) airfields on Oahu." *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 1-2]*

058-7 *See comment on ES-9.*

1.2 BACKGROUND INFORMATION
1.2.1 MARINE CORPS ORGANIZATION
"Although the III MEF is headquartered in Okinawa, Japan, a smaller MAGTF that is part of the III MEF is based at MCB Hawaii Kaneohe Bay. " *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 1-4]*

058-8 *Will the move leave IMEF in California short of resources?*

1.3 PURPOSE AND NEED

058-9 *Why do the Marines say they can get high-altitude training anywhere, while the Army says it cannot?*

> "A marine official told BIW [Big Island Weekly] that the proposed Army high altitude sites were not included on the map [at the 12-1-11 Hilo EIS meeting] because, 'That is not what we need at this point'; the marine pilot we spoke to said such training would be useful, but 'We can get that type of training anywhere', and there was 'too much scheduling hassle for us to use those (proposed Army landing) areas.' " *[Send in the Choppers? Big Island Weekly, 12-7-11]*
>
> "To conduct HAMET [High Altitude Mountainous Environment Training] at a CONUS [continental U.S.] location, the 25th CAB [Combat Aviation Brigade] aircrews wil spend up to an additional 45 days away from Families prior to the upcoming deployment; and helicopters and maintenance crews will spend additional time on the mainland …increased costs would accrue from the aircrews, helicopters, and equipment staying on the mainland longer. Furthermore, while the offsite HAMET would be occurring, the CAB's ability to perform other mandatory pre-deployment training would be severely limited." *[Draft Environmental Assessment, Army High-Altitude Mountainous Environment Training [at Pohakuloa], July 2011, p. 1-3]*

1.4 PUBLIC INVOLVEMENT
[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 1-13]

058-10 *Re. the scoping meeting August 24, 2010, conspicuously absent is any mention that no public testimony was planned, but about ten people (myself included), feeling that testimony is a vital part of the process, spoke using a sound system brought by citizen Jim Albertini.*

However re. the EIS meeting December 1, 2011, the format was commendable. There was time to look at displays and speak with representatives individually. There was also time to ask questions publicly, with a setup that encouraged a productive exchange (though a microphone would have been helpful—commenters used Jim's again.)

058-11 *See comments on Molokai and Kauai meetings under "Public Notice".*

CHAPTER 2 Proposed Action and Alternatives
2.2 PROPOSED ACTION
"Other airfields in Hawaii proposed for VMM and HMLA aviation use would include those operated by the State of Hawaii (State) Department of Transportation, Airports Division. These civilian airfields are routinely used by existing Marine Corps aviation squadrons for refueling and similar activities, coordinating with civilian airport authorities in accordance with Federal Aviation Administration (FAA) procedures, and would be similarly used by the proposed VMM and HMLA squadrons. State airports include: Lihue and Port Allen Airports on the island of Kauai; Lanai Airport on the island of Lanai; Hana, Kahului, and Kapalua Airports on the island of Maui; Molokai Airport on the island of Molokai; Hilo International, Kona International and Waimea-Kohala Airports on the island of Hawaii; and Honolulu International and Kalaeloa Airports on the island of Oahu. In addition, aviation facilities on the island of Oahu at Wheeler Army Airfield, operated by the U.S. Army, and Joint Base Pearl Harbor-Hickam, operated by the U.S. Navy and Air Force, are available for VMM and HMLA use. As these airfields would be used for routine transits and not for tactical training, their use is not analyzed in this document." *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 2-2]*

058-12 *See comments on ES-9.*

2.3.1 SCREENING CRITERIA

058-13 *At the August 2010 scoping meeting, a military official, who shall remain nameless, told me Congresspeople ask that military projects not be taken out of Hawai'i, for fear the economy will crash. Analyze how much of the decision to base aircraft and personnel in Hawai'i is due to military need, and how much is due to a wish to contribute to Hawai'i's economy.*

Selection Criterion 2: Local Training Area Proximity and Airfield Requirements
Training Area Proximity Requirements
"…fueling capabilities of loaded but unarmed aircraft are being further evaluated at MTSF on Molokai and the HIARNG Facility on Maui, as well as selected FARP sites at PTA." *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 2-2]*

058-14 *The EIS should evaluate impacts of transporting and storing fuel, and risks such as fire, explosion, and leaks.*

2.4 PROPOSED ALTERNATIVES
See comment on Fact Sheet.

058-15 *Evaluate the suitability of the Osprey in light of the following:*

> **V-22 Osprey Aircraft: Assessments Needed to Address Operational and Cost Concerns to Define Future Investments** *[GAO-09-692T, 6-23-09, http://www.gao.gov/products/GAO-09-692T]*
>
> **Summary**
> Since the 1980s, the V-22, developed to transport combat troops, supplies, and equipment for the U.S. Marine Corps and to support other services' operations, has experienced several fatal crashes, demonstrated various deficiencies, and faced virtual cancellation--much of which it has overcome. Although recently deployed in Iraq and regarded favorably, it has not performed the full range of missions anticipated, and how well it can do so is in question. Given concerns about the V-22 program, GAO recently reviewed and on May 11, 2009, reported on MV-22 operations in Iraq; strengths and deficiencies in terms of the capabilities expected of the V-22; and past, current, and future costs. In that report, GAO recommended that the Secretary of Defense require (1) a new alternatives analysis of the V-22 and (2) that the Marine Corps develop a prioritized strategy to improve system suitability, reduce operational costs, and align future budget requests. The Department of Defense (DOD) concurred with the second recommendation, but not the first. GAO believes both recommendations remain valid. This testimony highlights GAO's findings from that report. In speaking of the V-22, we are actually speaking of two variants of the same aircraft. The MV-22 is used by the Marine Corps; and the CV-22 by the Air Force to support special operations. This statement largely focuses on the MV-22, but also refers to

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the V-22 and CV-22.
As of January 2009, the 12MV-22s in Iraq successfully completed all missions assigned in a low-threat theater of operations--using their enhanced speed and range to deliver personnel and internal cargo faster and farther than the legacy helicopters being replaced. However, challenges to operational effectiveness were noted that raise questions about whether the MV-22 is best suited to accomplish the full repertoire of missions of the helicopters it is intended to replace. Additionally, suitability challenges, such as unreliable component parts and supply chain weaknesses, led to low aircraft availability rates. Additional challenges have been identified with the MV-22's ability to operate in high-threat environments, carry the required number of combat troops and transport external cargo, operate from Navy ships, and conduct missions in more extreme environments throughout the world. While efforts are underway to address these challenges, it is uncertain how successful they will be as some of them arise from the inherent design of the V-22. The V-22's original program cost estimates have changed significantly. From 1986 through 2007, the program's Research, Development, Test, and Evaluation cost increased over 200 percent--from $4.2 to 12.7 billion--while the cost of procurement increased 24 percent from $34.4 to $42.6 billion. This increase coincided with significant reductions in the number of aircraft being procured--from nearly 1,000 to less than 500--resulting in a 148 percent increase in cost for each V-22. Operations and support costs are expected to rise. An indication is the current cost per flying hour, which is over $11,000--more than double the target estimate for the MV-22. After more than 20 years in development, the MV-22 experience in Iraq demonstrated that the Osprey can complete missions assigned in low-threat environments. Its speed and range were enhancements. However, challenges may limit its ability to accomplish the full repertoire of missions of the legacy helicopters it is replacing. If so, those tasks will need to be fulfilled by some other alternative. Additionally, the suitability challenges that lower aircraft availability and affect operations and support costs need to be addressed. The V-22 program has already received or requested over $29 billion in development and procurement funds. The estimated funding required to complete development and procure additional V-22s is almost $25 billion (then-year dollars). In addition, the program continues to face a future of high operations and support cost funding needs, currently estimated at $75.4 billion for the life cycle of the program. Before committing to the full costs of completing production and supporting the V-22, the uses, cost, and performance of the V-22 need to be clarified and alternatives should be re-considered.

2.4.2 ALTERNATIVE A
2.4.2.2 Aviation Training
"…various non-military sites would continue to be used and consist mainly of State airports routinely used by existing Marine Corps squadrons for refueling and related activities. The proposed MV-22 and UH-1/AH-1 aircraft would use these sites in accordance with FAA procedures. Impacts of their use are not addressed in this EIS, since the State Department of Transportation (DOT), Airports Division, conducts analyses in separate environmental documents." *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 2-21]*
058-16 *See comments on ES-9.*

Figure 2-10. Training Areas on Hawaii Island—PTA and Upolu Airport *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 2-27]*
Where are impacts evaluated for helicopter landing zones in Keamuku?
How will the proposed action affect these areas marked on the map: Kona and Waimea-Kohala Airports;
058-17 *Waikii; Mauna Kea State Park; Puu Anahulu, Kaohe, and PTA Cooperative Game Management Areas?*

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058-17 *Are the red-dot areas landing zones and FARPs [Forward Arming and Refueling Points]? Will there be increased use and/or alteration of these?*

"Aviation training events would be geared toward supporting the ground forces with cargo and equipment transport, assault support, and close air support." *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 2-30]*
058-18 *Compare impacts to impacts from existing activities, at times when troops are in Hawai'i, not deployed.*

2.4.2.3 Aviation Training Activities
"Additional details regarding flight operations at the LZs are in Appendix C-1."
058-19 *See comment on 2-30.*

"Table 2-5 provides a summary of training activities expected to occur at the various areas…
Table 2-5. Aviation Training Locations and Activities…
Hawaii
PTA All training except FCLP. [field carrier landing practice] Live fire is also conducted at PTA.
Upolu Airport CAL [confined area landing]"
Kauai
PMRF MAGTF operations, CAL, NVD, inert target range on Kaula island. Live fire would also be conducted within PMRF's water training range. Additional training events could include electronic/ counterelectronic warfare training.
Molokai
Kalaupapa Airport CAL, NVD MTSF Refueling (aircraft may land either at MTSF or at the nearby Molokai Airport)
Maui
Hawaii Army National Guard (HIARNG) Facility Facility to serve as an expeditionary training site for a squadron detachment. Training at the HIARNG facility would coincide with training at PTA."
[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 2-32to 33]
See comments on Molokai and Kauai meetings under "Public Notice".
058-20 *Describe confined area landing and risk mitigation for this activity.*

2.6 MANAGEMENT MEASURES
2.6.1 CONSTRUCTION ACTIVITIES
2.6.1.8 Minimizing Construction Impacts to Cultural Resources
"Archaeological monitoring of ground disturbing activities is implemented at MCB Hawaii installations whenever there is a potential for such activities to encounter subsurface archaeological resources and/or human skeletal remains." *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 2-49]*
058-21 *Who decides when monitoring will be done? Will it be done at Pohakuloa?*

2.7 SCREENING OF ISSUES AND RESOURCES
Table 2-8. Screening of Issues and Resources
[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 2-52]
These should be FA (further analysis)--
058-22 *Upolu Airport--public access*
PTA and Uplou Airport--Bird Air Strike Hazard, invasive species, wildland fires

CHAPTER 3 MCB HAWAII KANEOHE BAY AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES
3.11 SOCIOECONOMICS
Include and analyze this information from "The U.S. Employment Effects of Military and Domestic
058-23 *Spending Priorities: An Updated Analysis" by Robert Pollin and Heidi Garrett-Peltier, Department of Economics and Political Economy Research Institute (PERI), University of Massachusetts-Amherst, October 2009.*

"This study focuses on the employment effects of military spending versus alternative domestic spending priorities, in particular investments in clean energy, health care and education. We first present some simple alternative spending scenarios, namely devoting $1 billion to the military versus the same amount of money spent on clean energy, health care, and education, as well as for tax cuts which produce increased levels of personal consumption;. Our conclusion in assessing such relative employment impacts is straightforward: $1 billion spent on each of the domestic spending priorities will create substantially more jobs within the U.S. economy than would the same $1 billion spent on the military. We then examine the pay level of jobs created through these alternative spending priorities and assess the overall welfare impacts of the alternative employment outcomes. We show that investments in clean energy, health care and education create a much larger number of jobs across all pay ranges, including mid-range jobs (paying between $32,000 and $64,000) and high-paying jobs (paying over $64,000). Channeling funds into clean energy, health care and education in an effective way will therefore create significantly greater opportunities for decent employment throughout the U.S. economy than spending the same amount of funds with the military."
*[**http://www.peri.umass.edu/fileadmin/pdf/published_study/spending_priorities_PERI.**pdf]*

Public Safety and Health Services
Police
3.11.3 ENVIRONMENTAL CONSEQUENCES
Public Safety and Health Services
Police

058-24 *The DEIS says nothing about possible increases in rape, domestic abuse, drug use, prostitution, and other crime--contrary to assurances that crime was analyzed, from a military official (I think Major Alan Crouch) during the public question-and-answer session at the Hilo DEIS meeting December 1, 2011.*

Include and analyze the following:

Rape

"Rape within the US military has become so widespread that it is estimated that a female soldier in Iraq is more likely to be attacked by a fellow soldier than killed by enemy fire. So great is the issue that a group of veterans are suing the Pentagon to force reform. The lawsuit, which includes three men and 25 women (the suit initially involved 17 plaintiffs but grew to 28) who claim to have been subjected to sexual assaults while serving in the armed forces, blames former defence secretaries Donald Rumsfeld and Robert Gates for a culture of punishment against the women and men who report sex crimes and a failure to prosecute the offenders.
Since the lawsuit became public in February, 400 more have come forward, contacting attorney Susan Burke who is leading the case. These are likely to be future lawsuits. Right now they are anxiously awaiting a court ruling to find out if the lawsuit will go to trial. The defence team for the department of defence has filed a motion to dismiss the case, citing a court ruling, dating back to 1950, which states that the government is not liable for injury sustained by active duty personnel. To date, military personnel have been unable to sue their employer.
Whether or not the case goes to trial, it is still set to blow the lid on what has come to be regarded as the American military's dirty little secret. Last year 3,158 sexual crimes were reported within the US military. Of those cases, only 529 reached a court room, and only 104 convictions were made, according to a 2010 report from SAPRO (sexual assault prevention and response office, a division of the department of defence). But these figures are only a fraction of the reality. Sexual assaults are notoriously under-reported. The same report estimated that there were a further 19,000 unreported cases of sexual assault last year. The department of veterans affairs, meanwhile, released an independent study estimating that one in three women had experience of military sexual trauma while on active service. That is double the rate for civilians, which is one in six, according to the US department of justice." *[Rape in the US military: America's dirty little secret, The Guardian, 12-9-11,* http://www.guardian.co.uk/society/2011/dec/09/rape-us-military?newsfeed=true]

Domestic Abuse

"On June 28, 2010, MHA-Hawai`i presented a Brown Bag Mental Health Seminar called "Understanding the Effects of War."
Judge Michael Broderick, Lead Judge of the Special Division of the Family Court, which includes domestic abuse cases, explained that the most common theme among military families experiencing domestic violence is, "Where has he gone?" They are wondering why the soldier they love has come back, seemingly a different person.
"I do not hear this about any other category of person in my court." He quoted:
* "He was one type of man before he was deployed, and he is another type of man after he has returned."
* "I don't recognize my husband."
* "He never acted that way before he went to war."
* "Ever since he came back from Iraq, he has not been himself."
* "I want my husband back."
* "He is an angry, depressed, suicidal person; he was never any of those things before he went to war."
It is the Judge's observation that war has significantly damaged the vast majority of men who appear on his domestic abuse calendar.
He explained that 5% -10% of the domestic abuse cases in his court involve soldiers; that equals to 15 a week, or about 720 a year on Oahu alone.
His is a civil, not a criminal calendar, which means the cases involve physical abuse, malicious property damage or extreme psychological abuse. These range from relatively mild ("shoved me in the shoulder") to very severe ("threw me down the stairs, kicked me in the ribs, put a knife to my throat, and said, 'If you ever leave me I will kill you.'")
"Unfortunately," said Judge Broderick, "most of the allegations involving soldiers are on the severe end of the spectrum."
These severe cases involve choking, punching, threatening to kill the spouse/girlfriend, breaking down a locked bedroom door, calling 50 times a day, and sending 100 text messages over 48 hours. Many involve romantic jealousy – the accurate, or inaccurate, belief by the man that his wife/girlfriend is involved with someone else – and this often involves the period while the soldier was at war.
Children are often part of the restraining orders Judge Broderick issues, because, he said, "It has become crystal clear that children who are exposed to domestic violence, who hear it or see it, are damaged."
Timing of when the military domestic violence cases come to his court is important. "These cases," continued Judge Broderick, "come to court almost always within days or weeks of the soldier returning from the war."
"And the more deployments, the more severe the abuse," he reported.
One piece of good news: the Judiciary has recently convened a committee to look into the development of a Veterans Court, which would divert soldiers who are accused of certain crimes into treatment rather than sending them to jail." *[e-mail news from Mental Health America of Hawai'i, about 6-28-11]*

Drug Use

"The military, U.S. Drug Enforcement Administration, Congress and state lawmakers are scrambling to get a handle on drug compounds that are easily obtained, can easily be modified to keep them legal and are readily available in stores and on the Internet.
"The number of incidents of designer drug usage is rising at an alarming rate in our Navy," Adm. John C. Harvey, commander of U.S. Fleet Forces Command, said in January.
In the four months before his statement, 72 Pacific Fleet sailors had been accused of using or possessing the drugs. The Navy said in February that it was discharging 16 sailors on the Norfolk, Va.-based amphibious assault ship Bataan for using or dealing in Spice.[...]
The Air Force said there have been six Spice cases at Joint Base Pearl Harbor-Hickam resulting in nonjudicial punishment and/or administrative discharge since January, compared with two Spice cases in 2010. Hickam did not have any Spice cases before 2010, officials said.
The military is a big customer for Spice and Bath Salts.

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Hawaii's Natural High shop owner Greg Azus said he doesn't sell synthetic drugs, but he gets one or two military members a day stopping by his Waikiki store asking for them.
"It's consistent," Azus said. "It's like I know what they are going to ask." He added that "you can pretty much tell" the individuals are in the military because of their short hair and appearance.
He said that he probably gets as many requests these days for Bath Salts as for Spice.
These drugs have been linked to a number of bizarre crimes and violent acts:
Schofield Barracks soldier Spc. Bryan Roudebush smoked the designer drug "Spice" and then beat his girlfriend and tried to throw her off an 11th-floor balcony in Waikiki.
He said in court he didn't remember what happened that night in April 2010.[...]
The high that individuals are seeking from the drugs also can bring a raft of serious side effects, including anxiety attacks, rapid heart rate, vomiting, disorientation, hallucinations, paranoia and suicidal thoughts, and some alarming behavior has followed.
In one case a man in Mississippi got high on Bath Salts, hallucinated and repeatedly sliced his face and stomach with a skinning knife.
David Rozga, 18, of Iowa killed himself after using K2 purchased at a mall." *["Spice" traps troops, Honolulu Star-Advertiser, about 4-25-11, quoted on http://www.dmzhawaii.org/?p=8708]*

Prostitution
" The Pro Bowl, military exercises and the Asian Development Bank meeting in 2001 all drew more prostitutes to Waikiki, said Bob Finley, who has been a Waikiki resident since the 1970s and is chairman of the Waikiki Neighborhood Board……sex workers remain an unresolved concern year-round for Waikiki, said Kaleo Keolanui, president of the Hawaii Hotel & Visitor Industry Security Association, whose members include hotel, condo and shopping center security. 'We have travelers from all over the world mixed with our military population, which makes for an ideal prey for the prostitutes,' Keolanui said. 'Why?? Because they have money, and they're here for a very short period of time. It's a huge concern.' "
[http://www.staradvertiser.com/news/hawaiinews/20110510_prostitution_expected_to_surge__for_APEC.html]

3.8 BIOLOGICAL RESOURCES
3.8.3 ENVIRONMENTAL CONSEQUENCES
"See Appendix B-2, NAVAIR System Safety Risk Assessment Matrix." *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 3-58]*
Readers cannot review the Matrix unless they discover it is actually in Appendix J, last page.

"As of July 22, 2011, after approximately 110,000 MV-22 and CV-22 flight hours combined and operations to numerous unprepared (unpaved) LZs, the rate for reported grass fires ignited by MV-22 exhaust is 'Occasional'." *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 3-58]*
How many of the flight hours were MV-22s and how many CV-22s?
The rate is not for MV-22s,, but for MV-22s and CV-22s combined.
058-25 *"Occasional" is about one to ten incidents per 100,000 flight hours, based on the Matrix. That could mean up to one incident per 10,000 flight hours. How many hours per year will MV-22s fly at Pohakuloa and how many potential incidents does that entail?*

CHAPTER 4 Other Training Areas/ Affected Environment and Environmental Consequences
058-26 *One official at the Hilo DEIS meeting December 1, 2011 said the EIS is not for the range, just for the landing zones. But since the new aircraft will be taking part in actions off the landing zones, the impacts of those actions must also be evaluated.*

4.1 INTRODUCTION
"Table 4-1. Summary of Proposed Training Areas and Construction
Molokai
MTSF Vacant Clearing, grubbing, grading,paving, and installation of fencing 2,220 SY"

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[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 4-2]
058-27 *See comments on Molokai and Kauai meetings under "Public Notice".*

4.2 LAND USE
058-28 *Evaluate this information about Kaula Island--*
From the Offshore Islet Restoration Committee—

"Regulations The Navy forbids landing on Kaula without a special permit. They currently use Kaula as a target range for non-explosive ordnance. However, past target practice used live ordnance so there is a risk that unexploded ordnance remains on the islet and in surrounding waters. Kaula is subject to Hawaii regulations protecting State Seabird Sanctuaries. Federal law also protects seabirds, shorebirds, and threatened or endangered species.

Birds Kaula has historically been renowned for the number of its nesting seabirds and is still possibly the largest and most diverse seabird colony in the main Hawaiian Islands. The Tanager Expedition sailed around Kaula in July 1932 but did not land. The first on-island survey of birds and plants was conducted by Edward Caum in August 1932. Neither of these early surveys made estimates of bird numbers but both reported dense bird populations. DOFAW and U.S. Fish and Wildlife Service conducted fairly regular wildlife surveys from 1971 to 1984. The most recent surveys were done in 1993 and 1998. Unfortunately, the last survey conducted close to peak nesting season was in 1993 so the current condition of the colony is unknown. Past surveys at peak nesting season estimated over 100,000 seabirds of 18 different species on Kaula, placing it on a par with the Northwestern Hawaiian Islands. Sooty terns (Sterna fuscata), Brown noddies (Anous stolidus), Booby (Sula) species, and Wedge-tailed shearwaters (Puffinus pacificus) have historically been the most numerous birds. Black-footed albatross (Phoebastria nigripes) and Laysan albatross (Phoebastria immutabilis) both nest on Kaula. Updated surveys are urgently needed.

Plants…Thorough botanical surveys were conducted in the early 1930s and in the 1970s but not since then. These early surveys found 31 species of plants, about half of which were native, including two rare endemic species. The current condition of the vegetation is unknown and new surveys are needed.

Insects Limited insect collections were made in 1932 and 1971. Because these collecting efforts were minimal and the last one was over 30 years ago, Kaula's insect fauna is virtually unknown. A thorough survey is much needed.

Marine Organisms State biologists conducted limited intertidal and nearshore fish surveys in 1971 and 1976, concentrating on the long wave-cut terrace on the east side of the island. Bishop Museum, NOAA and the State of Hawaii conducted a joint marine survey in July 2006. Survey results are not yet available…

Human Uses The frequent mention of Kaula in Hawaiian oral traditions shows that they were well aware of its existence. Visitors in the 1920s reported finding stone structures that may have been heiau. Niihau fishermen reportedly honored the shark god Kuhaimoana at heiau located above the seacave on the northwest end of the island. Although there is no evidence of any permanent settlements, Hawaiians likely visited to fish and to harvest seabirds, feathers and eggs. Stories tell that Kaula was also the source of a certain type of stone highly valued for making octopus lures. A lighthouse was completed on Kaula in 1932 and functioned until 1947. The Navy has used Kaula as a target range since at least 1952. The public has periodically protested this use but the Navy continues target practice using inert ordnance. Despite objections by the Navy, the State of Hawaii included Kaula on the list of State Seabird Sanctuaries in 1978 after making a legal determination that the islet belonged to the state. The ultimate determination of land ownership may require a court decision.

Threats Ongoing Navy use of Kaula for target practice poses unquantified threats to seabirds, terrestrial species, and nearshore marine species. The lack of baseline (pre-bombing) biological survey data makes it impossible to quantify the level of disturbance and mortality that has occurred since target practice first started some time during or shortly after World War II. In recent years, the Navy has denied requests by state and federal wildlife biologists to conduct surveys so the current condition of the resources is also unknown.
Introduced rodents, probably Polynesian rats (Rattus exulans), have been seen on Kaula since

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the 1930s. Rodents were most recently observed in 1998, the last time that biologists were on Kaula. Based on the severe impacts rats have had on island ecosystems in Hawaii and worldwide, they are a serious threat to multiple species on Kaula and should be eradicated. Introduced Barn owls (Tyto alba) are also present and pose a threat to nesting seabirds by eating chicks and adults." *[http://www.hawaiioirc.org/OIRC-ISLETS-Niihau/OIRC-ISLETS-Niihau-Kaula.htm]*

"The **Offshore Islet Restoration Committee (OIRC)**, formed in September 2002, is a multi-agency group dedicated to conducting biological surveys and restoration on selected offshore islets in Hawaii. OIRC members include the Hawaii Department of Land and Natural Resources' Division of Forestry and Wildlife and Division of Aquatic Resources, U.S. Fish and Wildlife Service Pacific Islands Office, U.S. Coast Guard, U.S. Geological Survey's Biological Resources Division, U.S. Department of Agriculture's Wildlife Services and Natural Resources Conservation Service, National Park Service, Nature Conservancy of Hawaii, Bishop Museum, National Oceanic and Atmospheric Administration (NOAA) Fisheries, Pelea Pacifica, two Oahu kayak rental and ecotourism companies, and the University of Hawaii." *[http://www.hawaiioirc.org/OIRC-ABOUTUS.htm]*

058-29 *Will the proposed action comply with monk seal critical habitat requirements for Kaula Island?*

"The National Marine Fisheries Service is holding one of six public hearings for the proposed rule to revise critical habitat for the Hawaiian monk seal in Hilo on Monday evening, August 15th, at the Mokupapapa Discovery Center in the Downtown area.

According to the background provided in the supplementary information of the public hearing notice:

'…we propose to revise the current critical habitat for the Hawaiian monk seal (Monachus schauinslandi) by extending the current designation in the Northwestern Hawaiian Islands (NWHI) out to the 500-meter (m) depth contour and including Sand Island at Midway Islands; and by designating six new areas in the main Hawaiian Islands (MHI), pursuant to section 4 of the Endangered Species Act (ESA). Specific areas proposed for the MHI include terrestrial and marine habitat from 5 m inland from the shoreline extending seaward to the 500-m depth contour around: Kaula Island…' "[http://www.bigislandvideonews.com/2011/08/14/monk-seal-critical-habitat-hearing-in-hilo-aug-15/]

4.2.1 INTRODUCTION

"Land use compatibility with respect to noise was not evaluated for…PTA on the island of Hawaii… These areas are not in proximity to noise sensitive receptors to warrant further noise analysis (noise modeling) for the Environmental Impact Statement (EIS), i.e., noise impacts are not anticipated for these areas." *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 4-3]*

058-30 *With about 9,000 more flights a year, concentrated on training days, more thorough analysis is needed. How will construction and helicopter noise affect palila in critical habitat close to the proposed helipads? How will noise affect people seeking cultural, spiritual, and wilderness experiences near Pohakuloa?*

"Aviation operations at PTA would increase by about 9,000 flights annually…" [*New aircraft considered for Hawaii, Hawai'i Tribune-Herald, 11-11-11]*

4.2.3 ENVIRONMENTAL CONSEQUENCES

Operational Impacts

"A preliminary review of the 18 other training areas [including Pohakuloa] indicated that aircraft noise would not be an issue given their distance from noise sensitive receptors." *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 4-13]*

058-31 *See comments on 4.2.1.*

Aesthetics/Visual Resources

"During operations, aircraft in transit or during training may be visible from various viewpoints…As these are existing training areas, the visual impact would be similar to existing conditions…No mitigation would be required for any of the alternatives." *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 4-14]*

058-32 *See comments on 4.2.1. How will the sight of numerous additional aircraft affect people seeking cultural, spiritual, and wilderness experiences near Pohakuloa?*

4.2.2.3 Pohakuloa Training Area (PTA), Island of Hawaii

"For the analysis of land use impacts associated with proposed activities at PTA, the ROI comprises the 131,805-ac (53,339.6-ha) PTA property and surrounding lands…" *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 4-3]*

058-33 *The ROI should be larger since Hawaiian cultural sites sometimes link to other sites miles away and even on other islands, and since helicopters travelling to Pohakuloa will overfly residents already subjected to excessive noise and vibration from numerous military and commercial helicopters.*

4.2.2.4 Upolu Airport, Island of Hawaii

"For the analysis of land use, the ROI for Upolu Airport is the 88.699-acre airport site and surrounding properties. Unless otherwise indicated, the following information is summarized from the Upolu Airport Final Environmental Assessment prepared for the State Department of Transportation (DOT), Airports Division (DOT 1999)." *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 4-8]*

058-34 *See comment on 4.2.2.3.*
The DOT information is 12 years old---seriously outdated.

4.4 AIR QUALITY

4.4.3 ENVIRONMENTAL CONSEQUENCES

Operational Impacts

"Emissions of fugitive dust from rotary wing downwash would occur at unpaved landing zones.
Based on meteorological and soil conditions, fugitive dust is primarily a concern at PTA. Fugitive dust emissions at these locations are expected to remain within the training areas, as the relatively large particle size of fugitive dust (compared to smaller particles resulting from combustion) tend to fall out of the atmosphere quickly. However, should visible fugitive dust become an issue, the Marine Corps would modify use of landing areas and/or identify improvements at these landing areas to minimize fugitive dust. The smaller particulates that are of concern for effects on human health, e.g., PM10, have been shown to remain within National and State AAQS during training of the 2/25th SBCT (Army HQ 2008b). Such training included both maneuver and live fire training (small arms training and mortars)." *[[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 4-39]*

058-35 *Include and analyze this photo, one of three sent by a friend who e-mailed:*

"Here are three photographs of the River of Dust blown down from PTA by strong winds. It was just south of the junction with the Waikoloa Village Road and the upper Mamalahoa Highway heading to Kailua town. November 19, 2003 is on the date stamp."

Downwash
058-35 *What is the potential area of effect for the likely scenario where take-off or landing is not completely vertical?*
Mitigation seems insufficient for the potential impacts of raising dust, causing erosion, and disturbing archeological sites.

Potential impacts
"Downwash impacts are possible at KTA, KLOA, SBER, and PTA, where there is potential for encountering surface and subsurface features where archaeological surveys have not been completed." *[ES-17]*

"Emissions of fugitive dust from rotary wing downwash would occur at unpaved landing zones." *[4-39]*

"Potential impacts on archaeological sites would be due primarily to ground-disturbing activity related to such construction activities and from rotor downwash during aviation training." *[4-165]*

"…there is a potential for encountering additional surface features at LZs Kahuku Split Rock and X-Strip, as well as subsurface features at all four LZs. The extent of impacts due to MV-22 downwash would depend on the location and depth of such features." *[4-166]*

"…given the possibility that archaeological resources may exist at the LZs, there is a potential for impacts due to MV-22 downwash." *[4-167]*

"…subsurface features may be present. The potential for MV-22 downwash impacts would depend on the location and depth of such features." *[4-169]*

"…impacts are possible from MV-22 downwash within the APE, depending on the location and depth of cultural resources, if any are present." *[4-171]*

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"Erosion related impacts may occur during operations due to aircraft downwash." *[5-24]*

"With increased frequency of aviation training by all users, cumulative erosion impacts due to aircraft downwash are possible at unpaved LZs at the Army's Oahu training areas…" *[5-24]*

"MV-22 rotor downwash could affect buried cultural deposits in the dune area. Impact would be avoided by restricting aircraft from flying over the dunes." *[6-37]*

Mitigation
"The MV-22 aircraft's proprotors generate downwash during vertical take-offs and landings (see Appendix F-2). The potential area of MV-22 downwash effect is within a 350-ft (107-m) radial area measured from the aircraft's landing point. As such, the potential area of MV-22 downwash effect could extend 350 ft (107 m) beyond the landing zone boundary. At paved landing zones, no soil erosion effects are expected, and no mitigation is required. At unpaved landing zones, there is a potential for soil erosion due to aircraft downwash. Unpaved landing zones are located at the Army's Oahu training areas and at PTA. Erosion due to MV-22 downwash is less likely at PTA, where soils are mainly rocky and poorly developed. Erosion from downwash is more likely at SBER and certain parts of KLOA, where soils have relatively high erosion potential. Any erosion would be localized within the 350-ft (107-m) radial area at the LZ. In conjunction with the range manager, the operators would monitor conditions at selected LZs with the highest risk of soil erosion. Should field observations verify that erosion is occurring, the Marine Corps would work with the range manager to implement appropriate repairs or other maintenance actions (e.g., use of other LZs with less erosion potential and/or improvements to LZs to minimize erosion)." *[4-60]*

4.6 GEOLOGY, SOILS, AND TOPOGRAPHY
4.6.3 ENVIRONMENTAL CONSEQUENCES
058-36 *See comments on 4.4.3.*

4.7 DRAINAGE, HYDROLOGY, AND WATER QUALITY
4.7.2 AFFECTED ENVIRONMENT
4.7.2.3 Pohakuloa Training Area (PTA), Island of Hawai'i
"Groundwater has not been found at levels less than 1,000 ft…below ground level. Groundwater occurrence on the Island of Hawaii is not well studied…" *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 4-66]*
4.7.3 ENVIRONMENTAL CONSEQUENCES
Construction Impacts
"Water quality would not be significantly affected." *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 4-66]*
Operational Impacts
"…no change to drainage, hydrology, or water quality would occur." *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 4-6]*

058-37 *Include the following information and state why it does, or does not, change DEIS conclusions:*
"Hydrology Although the primary purpose of the borehole was to document the geochemical evolution of an oceanic volcano, a significant finding was the unexpected hydrology. The traditional view of ocean island subsurface hydrology is one of a freshwater lens (fed by rainfall recharge) "floating" atop saltwater-saturated rocks that extend to the island's base. Circulation of seawater within the basement rocks is presumed to occur to the extent made possible by permeability and thermal conditions. The HSDP boreholes showed that the hydrology of the island of Hawaii is considerably more complicated and interesting. Whereas it has been assumed that the youth of the island of Hawaii meant that artesian aquifers, such as those arising from the buried cap rocks on Oahu, would be absent, the borehole encountered multiple artesian aquifers (Fig. 2). Estimated groundwater flow through the first of these, at a depth of only 300 m, may represent as much as a third of the rainfall recharge to the windward mid-level slopes of Mauna Kea. The deeper artesian aquifers have equally unexpected implications. Some of the

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groundwater produced by the deep aquifers was hypersaline, with chloride concentrations about 20% higher than seawater. These aquifers must be isolated from ocean water, and they may have lost 25% of their water to hydration reactions with basalt glass. Other fluids produced by the borehole had salinities less than half those of seawater, indicating that a connection exists between these deep confined pillow aquifers and the basal fresh groundwater system. Evidence for freshwater in the formation fluids was found in the borehole to as deep as 3000 mbsl, implying that the volume of freshwater within Mauna Kea may be ten times greater than previously estimated." *[Edward M. Stolper, Donald J. DePaolo, and Donald M. Thomas. Deep Drilling into a Mantle Plume Volcano: The Hawaii Scientific Drilling Project, Scientific Drilling, No. 7, March 2009, pp. 4-14, http://www.iodp.org/iodp_journals/1_Deep_Drilling_into_Mantle_SD7.pdf]*

"An unexpected result of the HSDP2 drilling was the discovery of significant artesian groundwater. The shallowest artesian flow was from a fresh water aquifer at 100–600 mbsl (in the region of the Mauna Loa to Mauna Kea transition), which produced _7300 L/min. This aquifer may indicate that there are additional sources of fresh, artesian groundwater elsewhere in Hawai'i near the interfaces between volcanoes. Artesian saltwater aquifers were discovered below _2000 mbsl within the sequence dominated by pillow lavas. These aquifers strongly influence temperatures in the drill hole. Temperatures in the shallow portion of the HSDP2 hole decrease with depth to _8_C near 600 mbsl (Figure 2). A similar decrease in HSDP1 was related to seawater infiltration [Thomas et al.,1996]. In the shallow submarine HSDP2 section, temperatures are nearly isothermal (Figure 2), probably due to seawater circulation through the highly permeable, poorly consolidated hyaloclastite units." *[Michael O. Garcia, Eric H. Haskins, Edward M. Stolper and Michael Baker, Stratigraphy of the Hawai'i Scientific Drilling Project core (HSDP2): Anatomy of a Hawaiian shield volcano, http://authors.library.caltech.edu/7703/1/GARggg07.pdf, 2-28-07, p. 3]*

"Buried about 1,000 feet below Mauna Kea's surface on the often drought-stricken Big Island is a thick layer of fresh water. That was among discoveries during a test hole drilled in the volcano in 1993 to show a deeper hole would be feasible and scientifically useful. "It could have some very, very striking implications for water development on the island of Hawaii," said Donald Thomas, University of Hawaii geochemist who coordinated the Hawaii Pilot Hole Project. He said researchers intended to drill about 1,900 feet, but they hit that depth earlier than they expected. Since they still had time and money, they continued drilling to about 3,500 feet, he said. Don DePaolo, a co-investigator for the drill projects at the University of California-Berkeley, said another surprise was "really cold salt water" below the fresh water layer. "Most people think it should be hot down there. This water was 7 degrees centigrade, not a whole lot warmer than inside a refrigerator. It's cold sea water, and it's flowing through cracks in rocks at a pretty substantial rate. "There are some ideas of using this cold water for refrigeration or air conditioning," DePaolo added. The scientists expect to learn a lot more about the potential resource from the deeper hole, down to about 14,500 feet. Thomas said a process appears to be going on in which high- level rainfall, about 6,000 feet above sea level, falls on Mauna Kea, seeps down into the volcano and becomes trapped under the soil and ash. As rainfall piles up, it forces the rain water below sea level, and it moves beneath the layer of soil until it reaches the ocean, he said. There, it's discharged as submarine springs about 1,000 feet deep offshore, he said. More research is needed to see if other environments have a similar situation, he said." *[Scientists discover water under volcano, Honolulu Star-Bulletin, month and day unavailable, 1997]*

4.8 BIOLOGICAL RESOURCES
4.8.1 INTRODUCTION
"The ROI for proposed aviation activities is the area potentially affected by downwash associated with MV-22 aircraft…" *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 4-68]*
058-38 *The ROI should be larger to evaluate impacts to animals from the sight and sound of helicopters.*

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4.8.2 AFFFECTED ENVIRONMENT
4.8.2.3 Pohakuloa Training Area (PTA), Island of Hawaii
"Surveys for Hawaiian hoary bats were conducted at each of the 18 LZs between May 3–19, 2011. See Appendix F-3 for a copy of the natural resource survey report…" *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 4-84]*
058-39 *Surveys appear inadequate.*

Military surveys had slightly over one day at each LZ. By contrast, another survey "visited each point on at least six separate occasions over a 14-week period from mid-April to late July" [http://manoa.hawaii.edu/hpicesu/techr/140/03.pdf]

"Survey methods to count or estimate populations of solitary roosting bats have not been developed." *[Hawaii's Comprehensive Wildlife Conservation Strategy, October 1, 2005, http://www.state.hi.us/dlnr/dofaw/cwcs/files/NAAT%20final%20CWCS/Chapters/Terrestrial%20Fact%20Sheets/hawaiian%20hoary%20bat%20NAAT%20final%20!.pdf]*

"Bats in forests switch roosts every 2-3 days and alter the timing and location of their foraging activities on a nightly basis in response to weather conditions and availability of insects… Accurately assessing patterns of bat activity or species presence is challenging because of uncertainties in the system (e.g., spatio-temporal variability in activity patterns and their relation to environmental variables) and the methods (e.g., mist nets, acoustic surveys) used to achieve these objectives…" *[Developing Quantitative Methods for Assessment of Bat Populations, U.S. Forest Service, http://www.fs.fed.us/psw/topics/wildlife/bat/batpop.shtml]*

"Acceptable accuracy often was not attained until at least 15 sites or 15 visits were used to estimate detection probability and occupancy." *[Gorresen, Miles, Todd, Baonaccorso, and Weller, Assessing Bat Detectabiilty with Mulitople Authomated Echolocation Detectors,Journal of Mammalogy, 89(1):11–17, 2008, http://ddr.nal.usda.gov/bitstream/10113/35205/1/IND44279157.pdf]*

Terrestrial Flora
058-40 "PTA has been under severe drought conditions for several years, leaving much of the vegetation (and potential habitat) either dead or severely stressed." *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 4-85]*
How did this affect plant surveys?

Terrestrial Fauna
"MBTA-listed species were recorded at each of the 18 LZs." *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 4-85]*
"Based on limited available information, Hawaiian hoary bats are present in low numbers throughout PTA year-round…The year-round presence of bats and availability of suitable roosting habitat indicate that bats are likely breeding, foraging, and possibly roosting at PTA, although limited survey data cannot confirm whether bats roost there. Based on observation of long-distance flights, Jacobs (1993, 1994) concluded that bats likely commuted to forage at PTA from roosting areas outside the installation (USFWS 2003). During the 2011 survey at PTA conducted in support of this EIS, the presence of Hawaiian hoary bats was confirmed at 12 of the 18 surveyed LZs. Bat calls were detected at LZs Emu, Noble, and Tango, but no bat passes were recorded at these three LZs. Three other LZs (LZs Rob, Turkey and XRay) did not have detections of either bat calls or bat passes. Based on the proximity of the LZs to one another, it can be generally inferred that bats frequent the entire area. Although there was a surprisingly high level of bat activity at DZ Mikilua, the short sampling period (minimum of three nights) tends to artificially magnify bat activity values. Appendix F-3 shows a map of bat activity observed at PTA during the study period." *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 4-86]*
058-41 *Evaluate impacts combined with those from the Army Stryker and Modernization actions.*

Existing Management Measures
Wildland Fires
058-42 *Evaluate combined impacts from the proposed action plus Army Modernization, using information below from that EIS and comments I made for Sierra Club.*

3.15.3 PTA Range Area
3.15.3.1 General Range Area
Fire Fighting Infrastructure
Figure 3.15-1. Fire Management Facilities *[Draft PEIS, Modernization of Training Infrastructure and Construction and Operation of an Infantry Platoon Battle Area (IPBA) at Pōhakuloa Training Area (PTA), Hawai'i, p. 3-157]*
Why are there few fire dip tanks outside the north portion of PTA?
How did water supplies hold up during fire tornado in 2010?

"As of June 2006, approximately 27 km (17 mi) of access roads exist in the northwest portion of PTA with an additional 24 km (15 mi) requiring construction…Firebreaks/fuelbreaks at PTA are currently in the planning and development stage…Several firebreaks/fuelbreaks are planned for construction in the near future." *[Draft PEIS, Modernization of Training Infrastructure and Construction and Operation of an Infantry Platoon Battle Area (IPBA) at Pōhakuloa Training Area (PTA), Hawai'i, p. 3-158]*
When will work be completed on the 15 miles of fire access roads in need of improvement?
The DEIS should have included more specifics on firebreaks and fuelbreaks for public comment.

Figure 3.15-2. Fire Access Road System for KMA *[Draft PEIS, Modernization of Training Infrastructure and Construction and Operation of an Infantry Platoon Battle Area (IPBA) at Pōhakuloa Training Area (PTA), Hawai'i, p. 3-158]*
It appears two-thirds of the roads need improvement, contrary to text on p. 158. When will this be done?

4.15 WILDFIRES
See comments on 3.4.

4.15.5 PTA Range Area
[Draft PEIS, Modernization of Training Infrastructure and Construction and Operation of an Infantry Platoon Battle Area (IPBA) at Pōhakuloa Training Area (PTA), Hawai'i, p.4-93]

What training proposed in this DEIS is the same as in past Makua training, and in the August 2008 Makua DEIS?

> *"An Infantry Platoon Battle Area…could…replace past live-fire training at Makua Valley…" [Upgrade in sight, Star-Advertiser, 1-22-11]*
>
> *"…the Army said…[it] no longer will use the heavy firepower in Makua that started multiple fires…and fueled a number of lawsuits….Just over a year ago, Lt. Gen. Benjamin R. "Randy" Mixon, head of the U.S. Army in the Pacific, said the army would shift artillery and other heavy weapons training from Makua…to…Pohakuloa…over the next five to 10 years…Mixon…said this week…live-fire training will be conducted at Schofield, Pohakuloa and on the mainland…[and] 'The key piece…to replace the loss of live-fire capability at Makua, is the platoon and company live-fire area (at Pohakuloa)…' " [Army ends live-fire training at Makua, Star-Advertiser, 1-13-11]*

What fire risks and fire prevention measures discussed in this DEIS are the same as in past Makua training, and in the August 2008 Makua DEIS?

> *"Between 1970 and 1998, 276 fires occurred at MMR, with approximately 20 fires (each burning over 100 acres…causing most of the damage to natural resources…Ten of these fires escaped the firebreak during September. Nine, eight, and seven fires escaped during November, July, and March respectively." [Draft EIS for Military Training Activities at Makua Military Reservation, 8-08, p. 3-366]*

Fires at Makua consumed 800 acres thirteen years ago (burning outside firebreak roads), 2,100 acres eight years ago (when a controlled burn became uncontrolled), 300 acres six years ago, and 100 acres one month ago (during ordnance cleanup).

- *"1998 Army suspends training after several fires burn outside firebreak roads [at Makua]…a Marine Corps mortar caused an 800-acre fire…" [Army ends live-fire training at Makua, Star-Advertiser, 1-13-11]*
- *"2003 A fire intentionally set by the Army to manage grasses gets out of control and burns half the valley…" [Army ends live-fire training at Makua, Star-Advertiser, 1-13-11]*

  "Preparation and execution of the [July 2003] prescribed burn was performed according to the burn plan prepared by the Army…The Army coordinated the prescribed burn with the USFWS; US Forest Service; HDOH; Clean Air Branch; State DLNR, Division of Forestry and Wildlife; Federal Fire Department; Honolulu Fire Department; Hickam Fire Department; and the National Weather Service…the fire burned uncontrolled for three days and burned 2,100 acres…all of the precautionary steps…as outlined in the prescribed burn plan, were carried out…" [Draft EIS for Military Training Activities at Makua Military Reservation, 8-08, p. 3-368]
- *[2005] "Makua Valley activists are disputing claims by the Army that none of the 41 cultural or historical sites in the Leeward Oahu military training area was damaged by last week's brush fire…the Army said it has yet to pinpoint the cause of the fire…" [Group says Makua fire damaged cultural sites, Honolulu Star-Bulletin,8-29-05]*
- *[2011] "A fire burned about 100 acres of the Army's Makua Valley training range…after it was started by workers who had detonated unexploded ordnance." [Army says Makua wildfire started during ordnance cleanup, Star-Advertiser, 9-28-11]*

"…tracers…accounted for 49 percent of historical wildfire ignition sources. Live-fire training would occur during the daytime and nighttime, and it is more difficult to extinguish a fire at night at MMR…missile or rocket propellant or illumination munitions may not be fully consumed before reaching the ground, creating the potential for igniting a wildfire…[the proposed action] would increase the amount and intensity of use of…weapons that have the potential for igniting a wildfire…Because the 2.75-caliber rocket is fired from a helicopter rather than from a fixed position, this weapon has an increased risk of misfiring…Anticipated impacts [at PTA] would be similar to those [at Makua--"Significant and unmitigable wildfire impacts" ES-34]
[Draft EIS for Military Training Activities at Makua Military Reservation, 8-08, p ES-33 to 35]

"The most common cause of wildfires on MMR has historically been the use of tracer ammunition…percentages of historical fires at MMR by source…:
- *Tracer ammunition, 49 percent;*
- *Anti-tank missiles…12 percent;*
- *Demolition explosives and mines, 6 percent…*
- *…unknown or unrecorded, 6 to 12 percent. White phosphorus…could be the source…it can be buried and then could be ignited if uncovered; and*

Other ignition sources totaling 16 to 22 percent…These sources include UXO detonation, indirect fire (including mortars and artillery), rockets, fire restart/escape, muzzle flash, and pyrotechnics…." [Draft EIS for Military Training Activities at Makua Military Reservation, 8-08, p. 3-366 to 368]

Makua fire management plans were written, but not fully used. What would prevent this occurring at Pohakuloa?

> *"…the IWFMP [Integrated Wildfire Management Plan] has been relied on only to a limited extent in the past to manage wildfire ignition, and this did not include training scenarios with the use of tracers…" [Draft EIS for Military Training Activities at Makua Military Reservation, 8-08, p ES-34]*

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Is there a fire manager at Pohakuloa, or plans for one?

> *"According to the Analysis of fire Management concerns at Makua Military Reservation, one of the most frequently cited reasons for the decrease in fire prevention and suppression success in the 1990s has been the lack of a well-trained, devoted fire manager on-site at MMR, who could be relied on to implement the IWFMP." [Draft EIS for Military Training Activities at Makua Military Reservation, 8-08, p. 4-234]*

How secure is funding for fire prevention?

> *"Critical must-fund projects or contracts (such as firebreak construction or dip pond/tank construction)…compete with other critical must-fund projects based on priority and available funds for that year, and are subject to the approval of the Garrison Commander…" [Draft EIS for Military Training Activities at Makua Military Reservation, 8-08, p. 3-368]*

How are fire history files kept now?

> *"Most fire history files for MMR and PTA are incomplete and were primarily retained as manual records, which were destroyed after five years, following disposition of records, in accordance with the Modern Army Recordkeeping System…As a result, limited historical wildfire records are still available and complete to compare wildfire incidences from previous training to proposed training." [Draft EIS for Military Training Activities at Makua Military Reservation, 8-08, p. 4-231]*

Is this still correct?

> *"…the western and the northern sections of PTA potentially face the greatest threat of wildfire." [Draft EIS for Military Training Activities at Makua Military Reservation, 8-08, p. 3-368]*

4.8.2.4 Upolu Airport, Island of Hawaii
"Information about natural resources at Upolu Airport is derived from the *Upolu Airport Final Environmental Assessment* prepared for DOT Airports Division (DOT 1999).
Terrestrial Flora
A botanical survey was conducted in January 1998 to inventory resources in the area and to determine the presence of ESA-listed endangered or threatened plant species…
Terrestrial Fauna
Three faunal surveys were conducted in April, July, and October 1997. No ESA-listed species were recorded during these surveys. Two evenings were devoted to looking for the Hawaiian hoary bat (*Lasiurus cinereus semotus*); none were observed.
The following MBTA-listed species were recorded during the July (summer) survey: white tailed tropicbird (*Phaethon lepturus*), Pacific golden plover or kolea (*Pluvialis fulva),* and ruddy turnstone (*Aernaria interpres*). During the April (spring) and October (fall) surveys, three MBTA-listed species were recorded: white-tailed tropicbird, short-eared owl or pueo (*Asio flammeus sandwichensis*), ruddy turnstone, and Pacific golden plover.
The airport is apparently an important roosting site for plover wintering in North Kohala. An average of 40 plover were tallied on each of the two survey days in July, and daytime counts in the April and October surveys averaged 23 birds within the airport fence line. At dusk, large numbers of plover flew in from nearby grasslands to roost on the runway. On one evening during the October survey, approximately 250 plover were recorded at the airport.
Invasive Species
No invasive species have been identified on land within the boundaries of Upolu Airport,which consists of paved airfield and mowed grass. Invasive species have been identified on adjacent lands." *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 4-90]*
See comment on 4.2.2.4.
058-43 *What year were surveys done for bats, birds, invasive species, and habitat?*
Since 1997, what species were added and dropped from ESA and MBTA lists? If current lists were used for the 1999 study, would the results be the same?

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4.8.3 ENVIRONMENTAL CONSEQUENCES
4.8.3.3 Pohakuloa Training Area (PTA), Island of Hawaii
Operational Impacts
"…exhaust deflectors on MV-22 aircraft would reduce the risk of fire at unprepared LZs. Additional operational measures to further minimize the already remote risk of fire include avoiding bushes or brush directly beneath the aircraft and limiting time the aircraft is on deck at unpaved LZs." *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 4-105]*
058-44 *See comments on 4.8.2 AFFFECTED ENVIRONMENT, 4.8.2.3 Pohakuloa Training Area (PTA), Island of Hawaii, Existing Management Measures, Wildland Fires.*

4.8.3.4 Upolu Airport
Operational Impacts
'With resumption of Marine Corps aviation training at Upolu Airport, there is the potential for increased BASH risk due to the presence of fairly large numbers of Pacific golden plover…This risk would be managed through compliance with Marine Corps aviation safety procedures and State DOT Airports' BASH control measures. No mitigation is required." *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 4-107]*
058-45 *There should be additional mitigation measures.*

4.9 CULTURAL RESOURCES
058-46 *Address this concern:* "…Native Hawaiians have long complained that most of the PTA firing range has never been surveyed." *[Send in the Choppers? Big Island Weekly, 12-7-11]*

4.9.2 AFFECTED ENVIRONMENT
058-47 *The description is totally inadequate for the significance of the Mauna Kea-Mauna Loa-Pohakuloa area. Descriptions in the Stryker and Modernization EISs provide better examples.*

4.9.3 ENVIRONMENTAL CONSEQUENCES
4.9.3.3 Pohakuloa Training Area (PTA), Island of Hawaii
058-48 *See comments on 4.4.3.*

4.9.2.3 Pohakuloa Training Area (PTA), Island of Hawaii
Areas of Potential Effect
PTA, Main Area
"The APE for BAAF is defined as the runway and aprons, as well as the 25 area encompassing proposed improvements to the Bravo helipad. The APE for the 26 landing/drop zones and FARPs is defined as the area delineated by perimeter points, plus a 27 350-ft (107-m) buffer measured from the perimeter." *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 4-138]*
058-49 *See comments on 4.2.2.3.*

PTA, Keamuku
"Proposed activities in the Keamuku area of PTA include aviation operations at 18 landing zones, all of which are presently cleared level areas in open settings…[footnote—"The Army's proposals for use of these landing zones include placement of gravel to level out the ground surfaces."] The APE is defined as the area delineated by landing zone perimeter points, plus a 350-ft (107-m) buffer 4 measured from the perimeter." *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 4-139]*
058-50 *See comments on Figure 2-10 and 4.2.2.3.*

Archaeological and Cultural Surveys
PTA, Keamuku. 'Since the expansion of Army training into the Keamuku area in the mid-2000s, three major archaeological surveys have been undertaken (Roberts, Robins, et al. 2004; Escott 2004; Robins, Desilets, et al. 2007). The initial survey involved a Phase I reconnaissance survey of the entire Keamuku area that identified 94 possible archaeological sites, of which 72 sites were recommended for Phase II

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work to collect additional data to determine eligibility to the NRHP (Roberts, Robins, et al. 2004). Subsequently, Phase II work was carried out at the location of the Keamuku Sheep and Cattle Station (Sites 23499, 23515- 23517 and 23539) (Escott 2004) and at the other 67 Phase II sites (Robins, Desilets, et al. 2007). In addition to surveys carried out by contractors, PTA cultural resources staff has conducted surveys, primarily to examine specific proposed improvements for training purposes at PTA Keamuku (e.g., Head 2009)." *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 4-144 to 145]*
058-51 *These surveys should have been done for the Stryker DEIS so the public could review them.*

"In addition to surveys carried out by contractors, PTA cultural resources staff has conducted surveys, primarily to examine specific proposed improvements for training purposes at PTA Keamuku (e.g., Head 2009). As a result, all landing zones considered in the present EIS have been fully surveyed; survey areas encompassed landing points plus a 1,640-foot (500-meter) buffer around the landing points. These surveys are documented in memoranda to the file, reposited in the PTA Cultural Resources office." *[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 4-145]*
058-52 *These should be in appendixes for public review.*

Table 4-54. Cultural Resources Characteristics of the APEs at Pohakuloa Training Area, Main Area
[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 4-146 to 147]
058-53
Surveys appear inadequate.
Fewer than half of the APEs have "complete" surveys.
Survey completeness is "unknown" for four APEs, apparently because the survey and the Army had different locations for the landing zones.
Survey completeness is "partial" for three APEs and "aerial survey only" for one.
More than half (7 out of 13) sites have "Probability for Addl [additional] Arch [archeological] Sites".

Table 4-55. Cultural Resources Characteristics of the APEs at Pohakuloa Training Area, Keamuku Area
[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 4-147 to 148]
058-54 *Almost half (8 out of 18) APEs have "Probability for Addl [additional] Arch [archeological] Sites".*

4.10 SAFETY AND ENVIRONMENTAL HEALTH
4.10.2 AFFECTED ENVIRONMENT
4.10.2.3 Pohakuloa Training Area (PTA), Island of Hawaii
Hazardous Materials and Waste
Depleted uranium
058-55
"Marine Major Alan F. Crouch stated that the DU issue 'was outside the scope of this EIS…' " [at the 12-1-11 Hilo EIS meeting] *[Send in the Choppers, Big Island Weekly, 12-7-11]*
Is this the official Marine position? If so, please justify it.

"A Baseline Human Health Risk Assessment (BHHRA) was completed to evaluate potential health impacts to persons from exposure to DU resulting from the presence of Davy Crockett spotter round bodies (SRB) found at PTA (Cabrera 2010). According to the assessment, the migration of DU off the military installation is highly unlikely. Studies have shown that DU transport is limited and that it is unlikely to migrate from the impact area under most conditions. Studies have also shown that the small DU fragment size and the environmental conditions at the range serve to prevent migration, including by air. Studies conducted by numerous non-military agencies, including the World Health Organization and the Department of Health and Human Services, have not found credible evidence linking DU to radiation-induced illnesses (Army HQ 2008b).
The risk assessment findings demonstrate that the presence of DU in soil at PTA results in radiological risk that falls well below the U.S. Environmental Protection Agency (EPA) limits for what is considered safe. Therefore, no adverse human health impacts are likely to occur as a result of exposure to uranium present in the soil at PTA (Cabrera 2010)."

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[Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, 4-178 to 179]
058-56 *Evaluate information below, from comments I made for Sierra Club on the Army Modernization EIS.*

3.12.3 Army Use of DU
The EIS should analyze use of DU at Pohakuloa by the Navy, Marines, National Guard, foreign forces, and all other services that train there.

"In August 2005…at Schofield Barracks, an Army contractor discovered 15 tail assemblies from the M101 spotting round…After confirming the presence of DU, the Army disclosed that information to the public." *[Draft PEIS, Modernization of Training Infrastructure and Construction and Operation of an Infantry Platoon Battle Area (IPBA) at Pōhakuloa Training Area (PTA), Hawai'i, p. 3-128]*
Include and analyze information below from my October 30, 2009 filing with the Nuclear Regulatory Commission. Attachments available on request.

<u>Summary</u>
It's unclear whether the Army didn't know, or didn't tell, that it used DU in Hawai'i. But it is clear that military information about military hazards in Hawai'i is unreliable.

<u>Denial</u>
The Army repeatedly denied use of DU in Hawai'i.

> "A memorandum from the Deputy Chief of Staff, Logistics, Munitions…determined that these types [DU] of munitions were never a part of the Army's inventory in Hawai'i and that the Army did not and does not have any plans to introduce depleted uranium to the State of Hawai'i." *[Stryker Final Environmental Impact Statement, May 2004, p. 3-83, attached]*
>
> "..we substantiate that the Army has not used, and does not plan to use, these [depleted] uranium rounds in Hawai'i." *[8-12-05 letter from Colonel James Boisselle, Army Chief of Staff, Schofield, to U.S. Senator Inouye of Hawai'i, attached]*
>
> [the Army has been] "repeatedly denying depleted uranium use here, most recently in the March 2005 draft environmental impact statement for Makua and at a public hearing for the Stryker brigade EIS in 2004." *[Schofield uranium find prompts calls for probe, Honolulu Advertiser, January 6, 2006]*
>
> "The Army has no information which would indicate that…depleted uranium munitions have ever been used in the Pohakuloa Training Area." [*10-4-06 letter from Army Lt. Col. Michael Webb to U.S. Representative Case of Hawai'i, attached]*

<u>DU Discovery</u>
Then an Army contractor found DU in 2005.

> "We have found much that we did not expect, including recent find of depleted uranium…" *[9-19-05 e-mail from Plyler McManus, Army Engineering and Support Center, to Ron Borne, Army Transformation, attached]*

Citizens found out from documents received by Earthjustice during litigation on a different issue. *[10-27-09 e-mail from David Henkin to Cory Harden, attached]*

Citizens, not the Army, first announced the find to the public. The Army says they were "confirming" the find. They don't say why confirmation only became ready for public announcement a few hours after the citizen announcement, and four months after the find.

> "Depleted uranium (DU) was found recently in the Wahiawa area, contrary to the Army's repeated denial of its use in Hawai'i." *[1-5-06 public statement by DMZ-Hawai'i/ Aloha Aina, attached]*
>
> "Schofield Barracks, Hawaii--In August 2005, 15 tail assemblies from spotting rounds made of D-38 uranium alloy, also called depleted uranium (DU), were recovered…"

[1-5-06 media release by U.S. Army Hawai'i, attached]

"The Army statement was issued several hours after a DMZ Hawai'i/Aloha 'Aina news conference announcing the e-mail findings…" *[Schofield uranium find prompts calls for probe, Honolulu Advertiser, 1-6-06, attached]*

"Gardin [Stefanie Gardin, spokeswoman for the U.S. Army Garrison in Hawaii] said the Army wasn't intentionally withholding information about the use of depleted uranium. Training with the Davy Crockett system ended in 1968, and the classified nature of tests meant that a "minimal" number of people knew the system was being used in Hawaii." *[Depleted uranium confirmed, West Hawai'i Today, 8-22-07]*

"After confirming the presence of DU, the Army disclosed that information to the public." *[Information Booklet, Depleted Uranium (DU) in Hawaii , by Army Installation Management Command-Pacific, issued about 11-07]*

3.12.3.1 Use at PTA
Surveys and Studies
When looking for depleted uranium (DU) the Army cites difficult terrain and the danger of unexploded ordnance. But for new construction, there seems to be no problem. Why?

Re. new construction—
"The proposed IPBA would be sited within the impact area at PTA where no ranges currently exist." *[Draft PEIS, Modernization of Training Infrastructure and Construction and Operation of an Infantry Platoon Battle Area (IPBA) at Pōhakuloa Training Area (PTA), Hawai'i, p. 2-3]*

"Each proposed IPBA live-fire alternative location under consideration is either in or directly adjacent to the existing impact area at PTA." *[Federal Register /Vol. 75, No. 246 /Thursday, December 23, 2010 /Notices]*

"will check for DU as do new construction" *[my notes from February 3, 2009 presentation by Army Col. Killian to Hawai'i County Council]*

Re. looking for DU--
"…the vegetation was very dense, and the *[Makua Valley]* aerial survey was limited to ravines and stream beds….Physical entry to range areas was precluded by safety concerns, including the likely presence of Unexploded Ordnance…and Improved Conventional Munitions…"
[Final Technical Memorandum, Depleted Uranium Scoping Investigations, Makua Military Reservation, Pohakuloa Training Area, Schofield Barracks Impact Area, Islands of Oahu and Hawaii, prepared for Army by Cabrera Services, April 2008, p. 4-1]

"Where terrain, vegetation, and safety concerns allowed access, radiological surveys…were performed." *[Final Technical Memorandum, Depleted Uranium Scoping Investigations, Makua Military Reservation, Pohakuloa Training Area, Schofield Barracks Impact Area, Islands of Oahu and Hawaii, prepared for Army by Cabrera Services, April 2008, p. 3-2]*

"The rough terrain limited accessibility to the suspected *[Pohakuloa DU]* impact areas."
[Final Technical Memorandum, Depleted Uranium Scoping Investigations, Makua Military Reservation, Pohakuloa Training Area, Schofield Barracks Impact Area, Islands of Oahu and Hawaii, prepared for Army by Cabrera Services, April 2008, p. 4-3]

"The results of the MMR *[Makua]* scoping survey were limited by accessibility issues. The aerial visual observations were obscured by vegetation and no radiological measurements wre performed in the impact area. Entry to the impact area was not allowed for safety reasons…CABRERA recommends the Army should…further investigate the potential for DU at the MMR if the area

becomes more accessible in the future….CABRERA recommends completing the characterization of these *[potentially contaminated]* areas *[at Schofield]* while they are currently accessible…"
[Final Technical Memorandum, Depleted Uranium Scoping Investigations, Makua Military Reservation, Pohakuloa Training Area, Schofield Barracks Impact Area, Islands of Oahu and Hawaii, prepared for Army by Cabrera Services, April 2008, p. 5-1]

"Due to the steep slopes and safety considerations, a GWS was not performed of the ravines."
[Final Characterization Report, Schofiled Barracks Davy Crockett Impact Area, prepared for Army by Cabrera Services, April 2008, p. 3-5]

"UXO avoidance was practiced in other GWS *[Gamma Walkover Survey]* areas *[at Pohakuloa]* and coverage was dependent on the ability to enter an area."
[Final Technical Memorandum for Pohakuloa Training Area Aerial Surveys, prepared for Army by Cabrera Services, July 24, 2009, p. 4-5]

"…due to both the nature of the UXO, and the extremely rugged terrain of some of the firing ranges, it is impractical to perform ground based surveys either efficiently or safely to gather data about the nature and extent of DU contamination in the impact areas of PTA or Makua."
[Final Technical Memorandum for Pohakuloa Training Area Aerial Surveys, prepared for Army by Cabrera Services, July 24, 2009, p. 4-29]

"The area containing residual DU *[depleted uranium; area referred to is inside PTA impact area]*…contains unexploded ordnance and is not safe for Soldier or vehicle access."
[February 1, 2010 letter from Col. Matthew Margotta, Commander, US Army Garrison-Hawai'i, to State Representative Faye Hanohano]

"MR. KLUKAN *[Nuclear Regulatory Commission]*…the sense I'm getting is the aerial surveys and
13 such were done in support of backs *[BAX—Battle Area Complex]* construction.
14 MR. KOMP *[Army]*: Yes. And, specifically, the
15 aerial surveys were done for Pohakuloa. Pohakuloa,
16 it's a primarily lava field. You've got the two types
17 of lava out there…
18 the A'a, which is the cinder-type
19 lava, you can't walk on without falling and cutting
20 yourself. The other type of lava is a pahoehoe, which
21 is basaltic, and it has all kinds of lava tubes, so
22 that is also unsafe to walk. So, we could not do the
23 ground survey that we did at Schofield. So, what we
24 did, we knew where the DU area is, so we flew it to
25 get us a baseline, and make sure the system would
1 work, and then we took that system over Pohakuloa.
2 That was the only way we could even come up with a
3 method for finding any DU."
[Nuclear Regulatory Commission Meeting with U.S. Army IMCOM Re: Licensing of DU from Spent "Davy Crockett" Test Rounds, November 16, 2010, transcript, pp. 109-110]

Airborne DU
"The Army, in response to public concern, conducted a study of airborne DU that began in February 2009 and ended in March 2010…The sum of these reports shows that DU is not migrating off the installation via airborne pathways near any levels that would pose a human health risk." *[Draft PEIS, Modernization of Training Infrastructure and Construction and Operation of an Infantry Platoon Battle Area (IPBA) at Pōhakuloa Training Area (PTA), Hawai'i, p. 3-130 to 131]*

Have air sampling plans changed since NRC found them deficient?

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"…we have concluded that the [air sampling] Plan will provide inconclusive results… as to the potential impact of the dispersl of…DU…while the Pohakuloa Training Area is being utilized for aerial bombardment or other training exercises…the number of samples is insufficient…multiple distances should be covered…Offsite and onsite sampling should occur…The selection of optimum monitoring locations needs to be established…Continous monitoring should be performed during the testing and also prior to and following testing to determine background conditions…" *[letter from Rebecca Tadesse of NRC to Amry Lt. Gen Rick Lynch, 3-9-10]*

Concerns were raised by Mike Reimer, retired geologist, in 2009 about ongoing testing, and in 2010 about planned air testing. His resume is attached.

"…they are going to use filters with a pore size of 5 micrometers (microns)…I would suggest a filter with a pore diameter maybe 10 times smaller…" *[e-mail from Mike Reimer to Cory Harden, 3-26-10]*

"I would also look for Mo [molybdenum] and Ti [titanium], two elements used in the alloying of DU." *[e-mail from Mike Reimer to Cory Harden, 5-11-10]*

"Right now, my criticism of the Army air monitoring program is that it is not looking for DU and it is unknown how much uranium they obtain through collection is DU. They feel comfortable indicating that the total uranium is so low it does not matter whether it is DU or natural U. In fact, they don't want to even determine health risks for the Big Island. Their program is based on protocols...I happen to think I can justify they are the wrong protocols....
we do know the World Health Organization model applied to airborne uranium is probably not the one to guide the determination [of health risk]. Did it ever catch your attention that the [Army] reports on airborne U concentration state they follow the WHO guidelines on soluble uranium? DU and DU oxides are not soluble (have a low solubility). I think WHO groups the two anyhow. Also, ASTDR (agency for toxic substances and disease registry) looks at chronic exposures and uses soluble uranium as a guide. When entrained in your body, the soluble U has a more rapid clearance time and is considered less of a health risk. The DU alloy and oxide form is ignored.
And what about the form of the uranium? It is an alloy and a study by the U.S. Air Force revealed that various DU alloys, not quite the same as claimed to have been used at Pohakuloa, are 100 percent effective in producing tumors I mice that then metatasize the lungs. Solid (or alloyed) U as a respirable adsorbed particle in your lung will produce a radiation dose much greater than the same size particle of oceanic basaltic rock containing 0.5 part per million uranium. Granted it is less than you might get from plutonium, but it does not necessarily conform to ALARA.
The most probable exposure vector for the residents of the Big Island is the inhalation of respirable (a size determination) aerosols. As long as the bombs drop and the winds blow in the spotting round test area, there will be the aerosol production and transport of DU. The aerosols may form and drop nearby but they can become remobilized with constant bombing.
…I must note that I had asked for *[illegible]* changes in sampling protocols and few were made. For example, I asked that the sampling cover a longer period or the pumping rate be increased. That was done for the July 2009 sampling by the [Army] contractor, Dr. James Morrow. It was increased by a factor of 3 and still did not get uranium isotopes 2234 and 235 reporting values into measurable ranges. A factor of 10 to 100 fold increase in sample might, or alpha spectrometry might see the difference…." *[9-25-09 e-mail from Mike Reimer to Cory Harden]*

"Right now the Army air sampling is not getting enough sample to detect DU from the natural U. Part of that is the sample size is too small." *[10-12-09 e-mail from Mike Reimer to Cory Harden]*

"…NRC has to know the sampling is inadequate… I have given further though *[sic]* to what should be done for sampling and I feel a group of people getting together and discussing what could be included is a good way. Another is in the RFP process - ask the proposers what they would do in their monitoring programs rather than specify what is to be done… I felt that the contractor for the Army, Jim Morrow, was extremely knowledgeable about DU and sampling methods. He is limited by the specifications of the contract… It is claimed that the DU used here was molybdenum alloy. I have not seen studies with that as an alloy component. Jim Morrow suggested to me that the found munition

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rounds should be analyzed to determine the actual metal alloy content. That is easily done." *[10-27-09 5:05 PM e-mail from Mike Reimer to Cory Harden]*

Health Risk Assessment

The study assumes only 714 spotting rounds statewide, but there are two lines of evidence for over 2,000 spotting rounds at Pohakuloa alone.

Firing pistons

"An environmental consultant [Peter Strauss, hired by Sierra Club] estimated there may be as many as 2,000 depleted uranium rounds at Pohakuloa Training Area…The consultant's analysis was based on an Army report estimating that between 120 and 400 firing pistons are scattered around impact ranges at PTA…Each piston would have fired up to five of the DU rounds, for a total of between 600 and 2,000 rounds fired, Strauss said."
[Sierra Club consultant disputes Army's DU tally, Hawai'i Tribune-Herald, 8-26-08]

Training requirements

"U.S. Army Colonel Killian…said the types of exercises conducted at PTA (Pohakuloa Training Area) would require the firing of at least 2,050...spotting rounds." *[Depleted Uranium at Pohakuloa, West Hawai'i Today, 2-4-09]*
"The 2,050 figure was based on old training manuals, which specify how many rounds soldiers had to shoot to be qualified on the weapon system." *[from my notes--re. Col. Killian's presentation to Hawai'i County Council 2-3-09 and conversations with him that day]*

There is other evidence for more than 714 spotting rounds.

"Greg Komp…said 1600 was the maximum he estimates of Davey Crockett…spotting rounds fired in Hawai'i—Oahu and PTA together." *[e-mail from Jim Albertini to Cory Harden, about 9-1-10, after attending a briefing on the HHRA]*

"Total rounds verified shipped from Oahu from Lake City Ordnance Plant were 714 rounds on 27 April 1962. Notice this date coincides with the first weapons arriving at Oahu in the spring of 1962. It is highly probable that additional stocks of the Cartridge, 20 mm Spotting M101 were order [sic] from one of the Ordnance Depts (Letterkenny or Pueblo) during the six active years of the Davy Crockett Weapon System in Hawaii. *[Archive Search Report on the Use of Cartridge, 20mm Spotting M101 for Davy Crockett Light Weapon M28, Schofield Barracks and Associated Training Areas, Islands of Oahu and Hawai'i, Army Corps of Engineers, May 2007, p. 41]*

"A shipping list showed that at least 714 of the spotting rounds…were sent to Hawaii by 1962, but it is 'highly probable' that more rounds were fired here, the Army said." *[Radiation Levels Safe at Pohakuloa, Star-Advertiser, 9-1-10]*

It's unclear where the spotting rounds were fired.

"Greg Komp, an Army radiation safety officer…said the Army doesn't have any records here on where and how many of those 715 rounds were fired." *[Army to study radiation risk, Honolulu Star-Bulletin, 4-23-08]*

"…the appropriate information regarding the number of DU projectiles fired at the range and/or the exact footprint of the area of affected soil could not be reliably ascertained…" *[Final Pohakuloa Training Area Firing Range Baseline Human Health Risk Assessment for Residual Depleted Uranium, June 2010, p. 1-2]*

Surveys didn't cover the entire base.

"The depleted uranium surveys didn't cover the entire base, but just the area the Army used for live fire training, said Greg Komp of the Army's safety office." *[Army: Depleted uranium not harmful to isle, Hawai'i Tribune-Herald, 9-1-10]*

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There are contradictory statements about whether the spotting rounds exploded, which could have generated and dispersed the hazardous oxidized form of DU.

> "The Davy Crockett M101 spotter round…did not reach high temperatures nor **explode** upon impact." *[2-1-10 letter from Col. Matthew Margotta of the Army to Hawai'i State Rep. Faye Hanohano, bold added]*
>
> "The projectile body of the XM101 spotting round was made from a D-38 uranium alloy and filled with 90 grains of incendiary mix LCOP-1 and 25 grains of PETN. It contained an electric, point detonating fuse (M538) to **detonate** the projectile and produce the white smoke puff on impact (USACE, 2005)." *[Final Pohakuloa Training Area Firing Range Baseline Human Health Risk Assessment for Residual Depleted Uranium, Cabrera Services, June 2010, p. 1-2, bold added]*

There should have been a search for DU from sources other than Davy Crocketts.

> " 'Today, (Depleted Uranium) is not used in military training, but in the 50 and 60s it was used anytime you needed a heavy weight,' said Greg Komp, senior health physicist, Office of the Director of Army Safety, Washington D.C." *[Army Reaffirms Commitment to Hawaii on Depleted Uranium, www.army.mil, http://www.army.mil/article/4671/, 8-30-07]*

Concerns were raised by Marshall Blann, consultant to Los Alamos National Laboratory 1996-2001. His lengthy resume is available on request.

> Re. Final Pohakuloa Training Area Firing Range Baseline Human Health Risk Assessment for Residual Depleted Uranium, Cabrera Services, June 2010
>
> "…if the DU is not picked up while it is in discrete pieces, the cost to do so will be prohibitive once it oxidizes and spreads." *[9-2-10 e-mail from Marshall Blann to Cory Harden]*
>
> "…if the DU comes from reprocessing spent fuel, yes, it could have higher actinides…
> Over the 53 years I have been a radiation worker, the official government standard of safe levels showed a steady decline/ revision every few years. I believe this may have gotten embarrassing after the n'th revision downward, so a new standard was introduced…ALARA…'As Little as Reasonabily Achievable.' This is a bit contrary to stating that levels at the camp [PTA] are within limits…that would come after a cleanup. And next year's limits would be lower…
> A few years back…there was atmospheric testing of nuclear weapons. If you took the total Pu [plutonium] to Am [americium] isotopes in the fallout, and divided by the earth's area, the dose must have been well within acceptable limits…[but] folk with detectors found 'hot spots', tiny particles of extremely high decay rates, which if ingested could pose serious health risks. An international treaty [footnote—Comprehensive Test Ban to ban all atmospheric testing of nuclear weapons] was signed in a time when it was really difficult to reach agreement ("cold war") because the serious hazard of the alpha emitters to present and future generations was recognized. Indeed the area of the training camp [PTA] can be divided into the number of rounds, and a not-too-high rate of radiation found; but a worker sitting next to a buried shell has unknowingly found a 'hot spot', and all bets are off." *[9-3-10 e-mail from Marshal Blann to Cory Harden]*
>
> "…in the past, the published 'safe' doses were adjusted downward by huge factors (e.g. to 1/3 last values), and it was finally realized that there is no 'safe' level. Each bit of exposure increases risk of biological damage. And workers on the range (and possibly citizens outside) are subject not to average levels, but fluctuations along their daily path.
> Because all labs in which I worked would immediately clean up any 'spill'—i.e. uncontained spread of radioactive sources, the recommendation to 'leave in place' the contamination at the range comes as a surprise. It will not be practical to recover it all, but an action in between, coupled with procedures to mitigate spreading outside the range seems prudent…the present…report [Human Health Risk Assessment] to me has weaknesses as stated." *[9-26-10 e-mail from Marshall Blann to Cory Harden]*

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Re. Final Technical Memorandum for Pohakuloa Training Area (PTA) Aerial Surveys, Cabrera Services, 7-24-09

"This report primarily summarizes on an air mapping of the Pahakuloa Training Area to search for DU, and oxides of Uranium which may have resulted from DU on the range. I would like to analyze the sensitivity/adequacy of the methods used. Before getting to those calculations, I would make comments on the technique used, and on the data for alpha spectrometry presented in the report.

Data collection:
A set of 4 NaI detectors were used under a helicopter flying at 3-4 meters altitude.It was noted on p 4-15 of the report that flight restrictions were required " due to the presence of lightweight debris (plywood, aluminum scrap, aluminum target, and munitions debris) which could become airborne due to helicopter rotor wash. Volcanic dust limited the minimum altitude in places throughout the range". It seems reasonable to assume that the Uranium oxide dust, a contaminant critical to measure, would likewise be blown away by the same rotor wash before it could be measured. Thus the technique used in search of uranium oxide begins by potentially blowing it away. Not finding significant levels may be a self fulfilled, predetermined result due to methodology.

Alpha spectrometric results:
Table 4-1 gives results for soil sample analyses by alpha spectrometry, on p. 4-1 " by a NELAP accredited laboratory using method ATSM-D3972."
I assume that this meant to be "ASTM-D3972", which is a protocol for testing water samples for U. Water samples differ from soil samples, especially if trace alpha emitters are the focus. The protocol cited is not valid. How was a weightless sample obtained for the alpha spectroscopy? The soil sample would have to be completely dissolved. Before running through an anion exchange column to get the U fraction, how was the bulk of silicon etc. removed? If by precipitation, then likely trace radioactivities were co-precipitated and lost to the sample. My point is, that there is a lot of chemistry to be done before being able to do meaningful alpha spectrometry on a soil sample; citing an inapplicable protocol leaves me with no confidence in the table presented. "Trust me" is not an acceptable basis for a scientific report.
Results of aerial survey:
Is the methodology appropriate to the task? In flyover radiation counting, 4- 4 liter volume Tl activated NaI detectors were used to gather gamma spectra, looking for 766 and 1001 keV photons emitted by 234mPa decay.To evaluate sensitivity, we need to know the branching ratios for the gammas observed, the photopeak efficiencies of the crystals for those gamma energies, and the detector solid angle. Tthe 1001 keV gamma has a branching ratio (abundance per decay) of just 0.8% (0.008)[NIM in PhysicsResearch, A424(1999)425-443], and the 766.36 keV gamma has a branch of 0.294, with a transition at 781.37 (0.00778 branch) which would be non- resolvable from the 766 using the NaI crystals of this measurement. I do note a discrepancy in branching ratio for the 1001. KeV photon with a branch of 0.837 in the Nuclear Data Table result, vs. the 0.0083 of the published research paper. The latter result seems accepted in other works- but this point needs further scrutiny. If the published paper cited is correct, Cabrera was seeking a phantom.

Solid angles: The altitudes cited were of 3-4 meters height. NaI detectors are usually right circular cylinders with PM tube mounted at the top of the cylinder with suitable reflector/light pipe. Resolution is poor for these detectors (e.g. vs. (HP)Ge), and the photoefficiency for the 2 gammas of interest is not cited- a guess might be around 0.4 (40%). Lacking the data on detector geometry, we might generously assume a cubic 4 liter crystal, so that one face would be 252cm**2. At 3 meters height, the area of a sphere would be 1.13x10**6 cm**2 (1.13 million square centimeters), so the solid angle of one NaI detector would be 2.2*10**(-4) . At 4 meters altitude the solid angle would be reduced to 1.25*10**(-4).

Count rates required for detection: The report states that the detector system travelled at 2-3 m/sec, with countsbeing taken at 1 second intervals. My own guess is that a minimum of 50 counts of either gamma would be required to resolve the appearance of a possible peak rising above the Compton scatter plus cosmic ray background. Trying to concentrate analyses of these gammas on just' regions of interest', without a proper unfolding of photo/Compton responses, beginning at the highest energies and working down, or by simultaneous least square fitting, is to my opinion asking for questionable results.

If the solid angle is 2.2*10**(-4), the BR(branching ratio) is 0.294, and the photopeak efficiency of the detector is 0.4, the number of dps necessary averaged over the 2-3 meters travelled, will be (50 counts detected)/[(0.4 photopeak efficiency)*(0.00022solid angle)*(BR=0.26 or 0.008)= 1.7*10**6 or 5.5*10**7 Pa234 dps. Since there is transient equilibrium with 238U, 234Th and 234Pa- and 234U, the actual dps implied will be triple these numbers. If the altitude during sampling were 4 m, these numbers would all be approximately doubled due to reduced solid angle. I have not divided by 4 due to use of 4 detectors, because I believe that each will require the 50 counts to be able to separate peak from background. If better detail had been given in the report, this point could be based more on fact than experience. From this exercise I deduce that the gamma ray measurements would only yield positive detector response if the average ground radiation levels were 4.5 milliCuries for the 1001 keV gamma, or nearer 0.15 milliCuries for the 766 keV gamma.

These levels are the noise levels below which I believe definite, reliable 'signals' would not be received by the apparatus used. The gear apparently had no anti-coincidence shielding, nor was discussion given of any attenuation between 'sample' and detector. I do not feel that this lower level of radiation gives confidence in the safety of the facility for personnel working there, nor does it address the question of possible migration of oxides offsite over the past 40 years. A more sensitive assay of ground radiation should be undertaken." *[e-mail dated about 7-24-09 from Marshall Blann to Cory Harden]*

Concerns were raised by Lorrin Pang, head of the Maui Department of Health but speaking as an individual.

"They mention oxides but did not enter their factors of insolubility into the risk equation. They need to be weighted regarding their slow (50 fold) clearance from the body due to aqueous insolubility." *[9-4-10 e-mail from Lorrin Pang to Cory Harden]*

Concerns were raised by Mike Reimer.

Re. Final Pohakuloa Training Area Firing Range Baseline Human Health Risk Assessment for Residual Depleted Uranium, Cabrera Services, June 2010

"…the recently released Baseline Human Health Risk Assessment from depleted uranium on the Big Island is, at best, an estimate using scant empirical isotopic data to substantiate its conclusions… The risk assessment is the conclusion of a single model approach and there are numerous models that could have been used in determining risk. I take issue with the…claim that DU has 40 percent less radioactivity than natural uranium…It is misleading and technically wrong…. I challenge anyone to tell me in good conscience that the DU remaining at PTA from the Davy Crockett tests in the 1960s has 40 percent the radioactivity of natural uranium. I further challenge someone to prove there are no other transuranic radio elements in the DU alloy, such as neptunium, plutonium, or for that matter even other isotopes of uranium… consideration of alternate expression of risk should be discussed and included… I am truly
unimpressed at the care in some sample monitoring at Schofield…when the wind was too strong to collect the filters for aerosol determination, some brushings from the soil were used instead for analysis… [the BHHRA]ignores U.S. Environmental Protection Agency's pronouncement that any exposure to ionizing radiation linearly increases risk. It ignores the emerging science that DU and its alloys or oxides in lesser quantities than natural uranium may indeed elevate risk from exposure. It ignores the fact that 40-plus years of bombing may have created aerosols capable of rebound or resuspension and be transported many miles anytime there is renewed disturbance of the surface." *[9-4-10 Commentary by Michael Reimer in West Hawai'i Today]*

"The Cabrerra report of the Schofield burn states they use the yellow color of the soil to show the presence of DU…there was no definition of yellow or how extensive it was…" *[9-4-10 e-mail from Mike Reimer to Cory Harden]*

"I met Jim Morrow about 2 years ago to specifically talk about DU…He is of course restricted in what he can do because of his Army Contract [to do air testing]…He felt frustrated that the Army would not analyze one of the DU fragments to see if it contained transuranics and what the DU ratios were." *[9-3-10 e-mail from Mike Reimer to Cory Harden]*

"…they do add a section of chemical exposure, also minimized by ignoring the form of Uranium as an oxide…[Morrow] is measuring total uranium, not DU…It may be the alloy that is the hazard as the newer alloys with titanium have shown to be highly toxic…One thing that really riles me when someone says DU has 40 percent less radioactivity that [sic] natural U…" *[9-1-10 e-mail from Mike Reimer to Cory Harden]*

Re. Final Technical Memorandum for Pohakuloa Training Area (PTA) Aerial Surveys, Cabrera Services, 7-24-09

"The report makes a comment that from the soil sampling done at PTA, there is no evidence that DU is present. This is based upon isotopic analysis of uranium and that the signature is not consistent with that of DU.

Insufficient information is provided to state that conclusion and the data provided do, in fact support the alternative conclusion. The results of a 2007 soil analysis is presented in Table 2-1 and the location of the nine samples are referenced to Table 2-3. There is no table 2-3 but the locations do appear on Figure 2-2. Table 2-1 lists the activity for uranium isotopes. The soil samples were collected in areas where sediment had or may have collected from past runoff or erosion. That seems to indicate it could be a time integrated sample with several or multiple sources along the lines of flow contributing to the sediment accumulation. The text on page 2-3 states "None of the results indicate uranium depletion, where the 234-U activity concentration is significantly lower than the238-U activity concentration."

Although it might be useful to define "significantly lower," the amount as presented by the IAEA in a question and answer information sheet should suffice to indicate this magnitude.

http://www.iaea.org/NewsCenter/Features/DU/du_qaa.shtml

The activity ratio of natural uranium 234/238 is 1, suggesting secular equilibrium. The activity ratio of depleted uranium 234/238 is 1:5.5, a lower value, and up to the reader to determine degree of significance.

Of the 9 samples listed in Table 4-1, three have activities of 234-U below that of 238-U. Sample 4011 is 25 percent lower. A reasonable challenge to the "no DU" statement can be made based on the analytical results and the method of sample collecting. As the sample could be integrated over time and derived from several locations, it is very likely a mixture of natural and DU contaminated soils. Thus, DU is not only present but it is mobile!

One additional point can be made. The report states (page 2-3) "The visual and scanning surveys identified no distinct surface areas with yellow, oxidized DU metal fragments." Yet the figure Photo 4-1 (page 4-7) clearly shows a partial metal DU fragment of a spotting round with yellow coloration on its surface. Later (page 4-8), the report states that only very minor oxidation is present, but again the subjective characterization is open to interpretation. Regardless, there is oxidation present and the oxidized form is readily converted to aerosols and thus available for migration.

Finally, a conclusion is suggested in this report that is totally without merit. That conclusion is that because there is so little DU found at PTA, it has already been removed.

On page 5-2 there is the statement:

"The number of DU spotter round bodies, aluminum fin assemblies and DU fragments are much fewer than would be expected given the total number of pistons which were identified. This fact, and in comparison to the number of DU fragments and portions of the Davy Crockett spotter rounds found at Schofield Barracks, suggests that some type of range clearance may have occurred at PTA." *[10-27-09 e-mail from Mike Reimer to Cory Harden]*

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3.12.3.2 Army/NRC License

"...the Army does not close operational ranges for cleanup, but...determine[s] whether there is a substantial threat of release of munitions constituents from an operational range." *[Draft PEIS, Modernization of Training Infrastructure and Construction and Operation of an Infantry Platoon Battle Area (IPBA) at Pōhakuloa Training Area (PTA), Hawai'i, p. 3-130 to 131]*
See comments on 3.4.7.

"The Army has applied to the NRC for a source material license to possess Davy Crockett M101 spotting round DU on ranges at PTA. Once issued, this license would not permit "clean-up" of this DU, only possession. If and when the Army decides to "clean- up" this DU, the Army would apply to the NRC for an amendment to the license to allow for this activity (personal communication with the IMCOM Radiation Health Safety Officer, February 2011)." *[Draft PEIS, Modernization of Training Infrastructure and Construction and Operation of an Infantry Platoon Battle Area (IPBA) at Pōhakuloa Training Area (PTA), Hawai'i, p. 3-133]*
The EIS should include the information that the Army asked the Nuclear Regulatory Commission to approve a Radiation Safety Plan for Hawai'i before the license is issued so they can continue actions in DU areas. The Army says suspending actions during the lengthy licensing process would create "possible significant adverse impact on Army readiness, national defense, and security." [e-mail from Bob Cherry, Army Radiation Safety Officer, to Nick Orlando, Nuclear Regulatory Commission, 8-31-11, http://wba.nrc.gov:8080/ves/ ML1124908]

Other radioactivity

058-57 *Stronium-90 was released on State land after the Marine helicopter crash in Kaneohe March 28, 2011, but first responders, the State, and the Nuclear Regulatory Commission were not notified. Do the proposed aircraft contain any radioactive materials? If so, what safety procedures will be followed in event of a crash? And who will be notified about radioactive substances?*

"A sweep of the Kaneohe sandbar Friday by six members of the state's Indoor and Radiological Health Branch turned up no evidence of radiological contamination from a helicopter crash five months ago.
'We got mainly background radiation," said Jeff Eckerd, IRHB's program manager. "We did not get any hits or spikes.'
The testing was ordered Thursday after environmental activist Carroll Cox received information that the CH-53D Sea Stallion helicopter that crashed onto the sandbar March 29, killing one marine and injuring three others, contained an In-flight Blade Inspection System. Within the device are six half inch pellets that contain 500 microcuries of strontium-90, a radioactive substance known to be harmful if ingested.
'It's a bone seeker,' explained Eckerd. 'It can get in and possibly cause bone cancer in high quantities.'
The six member team held Geiger counters above two feet of water that covered the sandbar at low tide. They ended up near the site of the helicopter crash and reported back to State Land Director William Aila.
'We're asking for more information from Marine Corps Base Hawaii in terms of the levels of contamination that they found immediately after (the crash) and all of the reports regarding the recovery of materials,' Aila told Khon2.
Marine Corpse [sic] Base Hawaii spokesman Maj. Alan Crouch stressed that the amount of strontium-90 released into the environment as crews removed the helicopter off the sandbar was not a 'reportable quantity.' He said some military personnel were exposed, but at minimal levels.
'All personnel involved in the recovery exposed to low level contamination were interviewed and appropriately evaluated,' Crouch wrote in an email. 'Given the small amount of potential contamination, if anyone exposed were contaminated, it would be very minimal, roughly similar to the radiation from two chest X-rays.'
However Aila expressed concern DLNR was not immediately notified about the presence of strontium-90 on the downed helicopter, even if it posed no risk to first responders or state conservation officers.

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'This is state land, it's not Marine Corps base land,' said Aila. 'We certainly registered some strong feelings about not being kept in the loop. We are in some very stern discussions with the Marine Corps base right now and working to ensure that situation doesn't occur in the future.'
Due to rigorous standards, officials at Marine Corps Base Hawaii carved out asphalt that came into contact with strontium-90 after a raft used to collect the helicopter's IBIS system was placed on what's known as the waterfront ops area.
'As a part of the mitigation, approximately 65 square feet of asphalt was removed from an area where contaminated components were temporarily located and isolated,' said Crouch. 'Thorough inspections were done at all aircraft component locations - both during and after recovery and salvage operations - to confirm there was no remaining contamination.'
First responders who rushed to the scene of the crash included personnel from Marine Corps Base, Hawaii, the U.S. Coast Guard and Honolulu Fire Department.
HFD spokesman Capt. Terry Seelig believes fire fighters were never in any danger. 'The material that was present, even in its entirety if it was all out of the capsules, wasn't that much to cause a concern'" he said.
Cox however is still not satisfied with the military's response to the release of strontium-90 and is demanding further testing.
'Create an effort to go and address this problem because people can be sickened," said Cox. "People can die from this neglect of duty.'
The state Health Department is checking whether the Marine Corps was required to report the release of strontium-90 to the U.S. Nuclear Regulatory Commission, which monitors the use of radiological substances.
'That is what we're checking with the NRC," said Eckerd, "to see if an actual notification was submitted to them.' "
[Kaneohe sandbar deemed safe after radiological testing, KHON 2, 9-3-11, http://www.khon2.com/news/local/story/Kaneohe-sandbar-deemed-safe-after-radiological/hWB71NHZkkqBJqVGe5ZI3w.cspx]

Aviation Safety

058-58 *The EIS should address concerns about downwash affecting people and objects on the ground as raised in my August 24, 2010 comments on scoping.*

4.11 SOCIOECONOMICS

058-59 *See comments on 3.11.*

CHAPTER 5 CUMULATIVE IMPACTS

5.2 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE PROJECTS CONSIDERED IN THE CUMULATIVE ANALYSIS

058-60 *See comments on 4.8 BIOLOGICAL RESOURCES, 4.8.2 AFFFECTED ENVIRONMENT 4.8.2.3 Pohakuloa Training Area (PTA), Island of Hawaii, Existing Management Measures, Wildland Fires.*

058-61 *Is military housing and/or a military exchange planned for Hawai'i Island?*

"Abercrombie floated the possibility of building public-private housing in West Hawaii for military families who will relocate from Okinawa when the Marine base there moves sometime in the next few years. That base was scheduled to relocate in 2014 but it has been delayed….Another possibility could be off-base housing for troops preparing for deployment at the increasingly strategic Pohakuloa Training Area.
"PTA will be the center for training in the Pacific in the 21st century," Abercrombie said.
"It's an interesting concept," said Lt. Col. Rolland Niles, the Pohakuloa Training Area Garrison Commander. Niles said an off-base area with a military exchange and other amenities would be welcome. 'It could be a tremendous opportunity,' he said." [Governor talks business in Kona, Hawai'i Tribune-Herald, 6-25-11]

058-62 *All old military sites should be cleaned up before new projects go forward.The EIS should include cleanup status for the old sites below, and all 50-plus old sites on Hawai'i Island, to inform the public about cumulative effects of military actions.*

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OLD ORDNANCE & MILITARY SITES ON HAWAII ISLAND

partial list July 2003 by Cory Harden

DISTRICT	UNEXPLODED ORDNANCE	FORMER MILITARY SITES
HAMAKUA	Pepeekeo 1956 **FATALITY**	Jungle Training Area, North Shore Jungle Training Area near Waipio Bay Ninoole Radar Station Waipio Bombing Targets
HILO	Hilo Breakwater 2000 Richardson's Beach 2002?	Army Impact Range, Waiakea Big Island Bombing Targets--Leleiwi Camp Furneaux General Lyman Field Hilo Prisoner of War Camp Hilo Storage Site Kalanianaole Camp Kaneolehua Camp Kaumana Camp Panaewa Tract 1 Jungle Warfare Area LST Landing Beach Piihonua Ordnance Storage Waiakea Storage Area Waianuenue Camp
KA'U		Ka La'e Military Reservation Kahuku Ranch Radar Station Ka'u Bombing Range Missile Tracking Station Morse Field Pahala Hospital
KOHALA	Hapuna Beach 1998,1997,1995	Pakini Bombing Range Big Island Bombing Targets-- Mahukona Range Navy Rocket Range, Hawi Upolu Point
KONA		Big Island Bombing Targets— Mano Point Makolea Point Kona & Huehue Station
PUNA	Ola'a 1955	Big Island Bombing Targets— Cape Kumukahi Kaloli Point Kea'au Wahine Maka Nui Combat Training near Mt View Firing Range near Mt View Hilo Research Site (near Kurtistown) Jungle Warfare & Maneuver (Kea'au) Kapoho Target Area Pololu Olaa Mill Camp Waiakea Forest Reserve

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DISTRICT	UNEXPLODED ORDNANCE	FORMER MILITARY SITES
VOLCANO		Kilauea Crater maneuver/impact area Kilauea Military Camp
WAIMEA/ WAIKOLOA	Waimea Middle School 2002 Waikoloa fire 1998 Anekona Estates 1998 Waimea country 1998 Chock Inn 1998 Pheasant Ridge 1997 Waikoloa Elem. School 1994 O'uli Parcel about 1993 Pu'u Pa 1983 **INJURY** Parker Ranch 1954 **2 FATALITIES** Mamalahoa Hwy 1945 **FATALITY**	Anti-tank, artillery, impact range Big Island Bombing Targets--Puako Camp Kilohana Camp Pokahuloa— anti-tank, artillery, impact range Kamuela Camp #4 Kamuela Reservoir Lalamilo Firing Range Mauna Loa Training Area Nansay Hawaii-- Ouli Puako Navy bombing range, Kawaihae Navy rocket range, Hawi Waikoloa Maneuver Area

5.3 ANALYSIS OF CUMULATIVE IMPACTS

058-63 *What is the carrying capacity of each island (land, ocean, airspace), and the islands as a whole, for military use? On O'ahu one acre of land out of every five is put to military use.*

APPENDIX F

F-1 Memorandum: Risk of Fire from V-22 Exhaust

"Testing to measure the effectiveness of the coanda exhaust deflection was performed in 1997. The maximum ground temperature achieved during this testing was 422 deg F…To quantify the flight deck heating characteristics of V-22 exhaust, with the exhaust deflection system operating, testing was conducted aboard USS Wasp in 2005…with exhaust deflectors operating…the flight deck temperature reached 300 deg F approximately 10 minutes after engine start, attained a maximum temperature of 380 deg F 30 minutes after engine start, and remained at 380 deg F for as long as 90 minutes after engine start." *But it's safe….*

[7-21-08 letter from Navy Col Mulhern in Maryland to Marine Corps headquarters in Washington D.C., appendix F-1 Memorandum Risk of Fire from V-22 Exhaust]

058-64 *It's been six years since this testing. What changes have been made to the V-22 and exhaust deflectors since then?*

"An applied wind generally reduced the time required for ignition, with reduction being greater for the higher velocity."

[Pitts, William, Ignition of Cellulosic Fuels by Heated and Radiative Surfaces, NIST Technical Note 1481, March 2007, appendix F-1 Memorandum Risk of Fire from V-22 Exhaust]

058-65 *How does DEIS analysis of fire risk take into account wind generated by exhaust and natural winds? Winds can reach high velocities at Pohakuloa and Keamuku.*

APPENDIX F-2 DOWNWASH

"Data collected in 1998 on the V-22…is plotted in detail in the 98-88 report…The V-22 contours were traced from figures in the 98-88 report." *[Hover Outwash Profile Comparison of V-22, CH-46A, CH-53E, Bell Boeing, the Tiltrotor Team, Interoffice memo, 12-9-08]*

058-66 *Are there any design changes since 1998 that would change downwash?*

APPENDIX F-3 SWCA Survey Report

"Pacific golden plover were observed at most of the LZs (12 of 18 surveyed). Several groups were observed, and based on the timing of this survey it is likely that they utilize the flat, open expanses of these LZs as staging areas for their annual migration to Alaska…

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The presence of bats was confirmed at twelve LZs at PTA…(i.e those LZs with activity rates greater than zero/passes/ night), with the highest level of activity recorded at DZ Mikiliua. Based on the proximity of the LZs to one another, it can generally be inferred that bats frequent the entire area.” *[Natural Resource Surveys in Support of the MV-22/ H-1 EIS, SWCA Environmental Consultants, 11 July 2011, p. 2]*
058-67 *See comments on 4.8 BIOLOGICAL RESOURCES.*

“In order to meet the schedule allotted for the field work, some latitude was allowed depending upon the density of vegetation in the specific survey areas. For example, in areas supporting little or no vegetation, SWCA biologists walked transects at or greater than 40-meter intervals. In areas supporting moderate vegetative coverage, the biologists walked transects at 20 meter intervals. In areas supporting dense vegetative cover, the biologists walked transects at or less than 10 meter intervals. This approach allowed the biologists to adjust survey intensity based on an area’s potential to support ESA-listed plant species and ground visibility. Unavoidable limitations to this approach include the possibility of missing some vegetation across transects at 40-meter intervals and during this single point-in-time survey. To the extent possible within the Scope of Work, this issue was addressed through a careful review of existing literature from previous studies.” .”*[Natural Resource Surveys in Support of the MV-22/ H-1 EIS, SWCA Environmental Consultants, 11 July 2011, p. 5]*
A former University of Hawai’i professor (with a master’s in horticultural science and training in botany and genetics) commented, “in an area where the T&E [threatened and endangered] species could are fairly
058-68 *obscure, the potential for missing individuals is much higher. The sad fact is that most deadlines are far too short to provide complete data.”*

APPENDIX G CULTURAL RESOURCES
058-69 *This should include information on areas outside of O’ahu.*

058

059

Amy Kepilino

From: lewpa@comcast.net
Sent: Sunday, December 18, 2011 5:22 PM
To: mv22h1eis
Subject: noise in Kaneohe Bay

Dear Sirs,

059-1 As a neighbor of the Marine Corp Air Station, first of all let me say I appreciate the important role of the military and am grateful for their activity on our behalf. That being said, it is difficult as a neighbor, to support increased activity and noise from the air base. On a recent evening sitting on our deck with friends, it was difficult to carry on conversation due to the noise which was being generated over 2 miles away. This lasted virtually all evening. Lately it seems there has been an increase in activity, and noise is an issue several days of the week. A lot of the noise seems to come from aircraft sitting on the ground for some time(both fixed and rotary wing aircraft). I think your neighbors want to be supportive of the military, but the aircraft are so noisy. Efforts to reduce the number of aircraft, reduce the noise they generate, or minimize activity in the evening hours would be greatly appreciated.

Paul Lewis
44-315 Knaeohe Bay Drive

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060

From: MintBar@aol.com
Sent: Sunday, December 18, 2011 1:56 PM
To: mv22h1eis
Subject: RE:DRAFT ENVIRONMENTAL IMPACT STATEMENT

Dear Sirs:

060-1 Why does the aircraft traffic have to be increased 49% over baseline activity around Kaneohe Bay? That is too much for all of the residents to cope with who live in the area. Why can't the increased activity be divided between Hickam and K MCBH ?

060-2 Besides the noise increase which is a huge factor (my blood pressure goes up just thinking about it), not too much has been talked about the safety factor. I remember the two planes a number of years ago that tipped each other and one had to forcefully land in the Kainalu Elementary School grounds. It first went through a home that had a Coast Guard family living in it. Their son was killed as he slept, and his sister was lucky that she was doing her homework in another part of the house. The mother who was in the kitchen was so over-wrought that she was found almost a mile away in a confused state.

And we mustn't forget the more recent crash landing of the helicopter that went down on the sandbar in Kaneohe Bay. It was just lucky that there were no people on boats out there.

060-3 The property values around here have already been affected due to the economy, and with all the added air activity will only exacerbate the property values downward trend.

Sincerely,
Barbara Minton
44-027A Aina Moi Place
Kaneohe, Hawaii 96744
Phone: 254-2601

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061

From:	HAFANMANN@aol.com
Sent:	Sunday, December 18, 2011 2:14 PM
To:	mv22h1eis
Cc:	inharmony@hawaii.rr.com
Subject:	Draft Environmental Impact Statement DEIS:

December 18,2011

Department of the Navy
Naval Facilities Engineering Command Pacific Division
Att'n: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, Hi 96860-3134

Attn: EV21, MV-22/H-1 EIS Project Manager:

We attended the recent gathering by you folks at Castle High School on December 8, 2011.
061-1 Although there were charts showing noise level, there were no visual/noise presentations made on screen.
We understand that the Osprey have a combined noise of a helicopter and a high pitched turbine aircraft.
I have lived in my home close to the Marine Base since August 1961 or more than 50 years.
We have experienced the loud whine of jets and engine testing until the late 1980's when the jets were moved. We attended community meetings regarding this matter at the same place in the cafeteria at Castle High School. At that time the Marine Corp. explained that they were installing noise monitors in homes in the local community that were affected by noise. Nevertheless, the noise continued.
At my home we couldn't listen to the TV or radio, all conversation stopped, the large glass windows vibrated, and I could not wait to retire from my State job and leave. Since the cost of homes in Hawaii are at a premium we thought it best to leave the islands and we purchased property in Tucson, Arizona far away from Davis Monthan Air Force Base and had expensive sewer system installed. However, the jets left and so we did not leave our beloved home here on Malae Place. During the times of jet noise we were working and so left the immediate area of disturbance during the day, I was a Korean Veteran in the Air Force and lived in Korea on the flight line where up to 72 jets would leave the runway at one time in a row with JATO assist during the Korean War. However, even with that background the jet planes wore me down and we counted the years until retirement.
At the meeting one lady gave a patriotic speech regarding bearing the noise. However, even though the Marine Base property was transferred to the government during World War One and the jets were here before some of us were born we are here for various reasons. I remain here due to the fact on my retirement the jets left. My wife remembers Pearl Harbor and remembers the Japanese attack on the Marine Base. We are here, we are patriotic and maybe we made a mistake in being a member of the Kaneohe community, but nevertheless we are here, all of us. People with all kinds of background, work hours, multiple jobs, sleep habits, financial resources, marriage and financial challenges, mental capacities, cultural background, views on war, being born here, Hawaiians who have always lived here some of whose property was confiscated and not returned and a thousand other scenarios that challenge the patriotic lady whose logic may be sound but does not address "what is" today.
No one can address the future challenge to the Kaneohe and Kailua community. Regardless of our reasons for living here and our patriotism noise can destroy mental equilibrium and balance and make us act irrationally in degrees depending upon the individual. The sounds of song birds make us happy and feel soft and caring, the noise of screaming jet engines depend upon the individual capacity to handle it and what that person is doing at the particular moment. I recall my guests being startled by the sudden blast of the jet engine. My father turning white the evening during dinner his first evening here.
We are stuck here due to age and being "wedded" to Kaiser Permanente and my wifes huge family. At age 80 now it is too late to move and we can't afford Aloha Care nursing facility at $9,000 a month which is cheap here in Hawaii.
I suspect we will be meeting again at Castle High School and the noise and blasts will come and we will suffer.
Thank you for letting us respond.
aloha, Harold A. Fanning
44-208 Kaneohe, Hawaii
254-1221
PS: I don't mind being wrong on the noise!

1

062

From:	Stephen Cameron [camerons@homelandsecurityinc.com]
Sent:	Sunday, December 18, 2011 5:11 PM
To:	kbresidentsinitiative@gmail.com
Cc:	mv22h1eis
Subject:	noise

KBayresident,

062-1 As a retired Marine, I applaud the arrival of the V-22 Osprey and the P-8's. Freedom is not free. Not knowing that there was folks opposing the future of the biggest employer on the Windward side and the arrival of the future of our defense, I will write NAVFAC and encourage their progress. Thanks for the note.

Steve Cameron

1

Amy Kepilino

From: Peter Van Lier Ribbink [petervlr@gmail.com]
Sent: Sunday, December 18, 2011 8:50 PM
To: mv22h1eis
Subject: RE: Kaneohe Bay Residents Initiative

Hi,

Not sure if you'll be able to use this or if it will help in anyway but, members from the Kaneohe Bay Residents Initiative are going around Kaneohe and unlawfully accessing people's mailbox's to distribute this FLYER. I know opening someone's mailbox isn't a major deal (Federal Offense) but I cannot stand what these people stand for and are trying to do to MCBH.

063-1 At any rate good luck with getting the squadrons out here and I can't wait to see them buzzing around,

Pete

063

This blog has been established pursuant to §2-13-102 of the Honolulu Neighborhood Plan as a means to provide reasonable means to increase and assure effective citizen participation in the decisions of government and to "increase and assure effective citizen participation in the decisions of government by providing additional and improved opportunities for public input and interaction, and communicating that input to the appropriate persons and agencies." Let us know what you think.

Saturday, December 17, 2011

Changes at MCBH will impact Kaneohe

listen now

Aloha, Please see below and attached information about the proposed changes at the Marine Corps Base. Please forward to all interested parties

The Kaneohe Marine Corps Base has submitted a plan (Draft environmental Impact Statement DEIS) to expand aircraft activity and infrastructure.
You have a short window to submit comments and concerns
Comments must be emailed (mv22h1eis@beltcollins.com) or postmarked by December 27, 2011.
Department of the Navy
Naval Facilities Engineering Command, Pacific Division
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

Some of the proposed changes
- Aircraft traffic will increase 49% over baseline activity. This increase will be phased in starting 2012.
- The current planes and helicopters will be changed out for jets (P8 modified 737) additional helicopters and the hybrid Ospreys which have the combined noise of a helicopter and a high pitched turbine aircraft. http://www.youtube.com/watch?v=4RkA47WPeX0
- The overall effect will be significantly more activity with louder

Kaneohe Neighborhood Board Links

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KNB #30 Standing Committees' Blogs

Legislation Committee
Environmental Committee
Planning Committee
Education Committee
Civilian and Military Relations Committee
Transportation Committee
Health & Safety Committee
Publicity Committee

KNB #30 Special Committees'

aircraft
See the draft online at
http://www.mcbh.usmc.mil/mv22h1eis/documents.html
The DEIS analysis- deficiencies
Noise
- The DEIS noise analysis is based on a computer generated model which does not reflect actual conditions in the bay area and the surrounding mountains.

This model skews the analysis in favor of lower proposed noise levels as noted below
- No actual measurements of existing noise levels.
- There was no mention of measurements from different points in the surrounding communities.
- The model did not address prolonged revving of the engines or hovering activity which is happening now and will increase if proposed aircraft arrive.
- The model used calculated sound generated from one runway rather than several other areas including helipads which may be used simultaneously with the runways.
- The computer modeling included a table which indicated that the P8s (737 size JETS) are not included in the sound modeling.

Effects on surrounding community
- The DEIS fails to address the increase in wastewater issues adequately. Wastewater is currently handled by an on base plant with overflow diverted to the Kailua Waster water facility by city contract. The analysis does not mention that the Kailua plant is only operating under a consent decree for repeated violations of governmental environmental regulations. The EIS does not mention that the Kailua ultraviolet sanitization equipment has been inoperable for several years releasing inadequately treated wastewater into Kaneohe Bay.

- The DEIS fails to adequately address the effect on property values. Numerous studies have shown that aircraft expansions with associated increase in noise result in a 15-43% (average 27%) decrease in property values.

- The DEIS describes the area as low population density (it considers uninhabitable areas such as mountains in its calculation) of residential areas. It fails to consider that most of the population is concentrated in the area surrounding the bay- and thus will be the most adversely affected by the expansion.

Effects on Humans and other animals
The EIS does not adequately address human health effects.
- Increases in serious cardiac events have been detailed in previous studies.
- Sleep deprivation Sleep disturbances are more likely to occur with helicopter operations at times of minimal background noise conditions such as in early morning and late evening. As the number of flight operations are scheduled to increase, the evening and early AM flights will likely increase as well. Sleep disturbance has been linked to high blood pressure, diabetes, vascular disease stroke and heart disease.

The DEIS does not adequately address effects on quality of life of surrounding residents
- Interference with daily life. Current levels of aircraft noise drown out or "mask" speech, making it difficult to carry on a normal conversation .Research has shown that "whenever intrusive noise exceeds approximately 60 dBs, there will be interference with speech communication." This is already happening and will happen

Blogs

Hawaiian Memorial Park Special Committee

Haiku Stairs Special Committee

Bayview Golf Park Special Committee

Websites of Other Boards and Organizations that We Send Representatives to

Oahu Metropolitan Planning Organization

Kaneohe Bay Regional Council

Minami Foundation

Websites of Elected Officials Represented at Our Meetings

Councilmember Ikaika Anderson

Mayor Mufi Hannemann

Gov. Linda Lingle

Congresswoman Mazie Hirono

Sen. Jill Tokuda

Sen. Clayton Hee

Rep. Pono Chong

Rep. Ken Ito

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063

more frequently if the EIS is approved.
- Irritation More people consider helicopter noise more disturbing than that from fixed wing aircraft.

More and larger helicopters and hybrids (Ospreys) are proposed in this document.

The DEIS does not adequately address effects on children health and educational impact
- Children - Airport noise can also have negative effects on children's health and development. Studies of children living or attending school near airports found:
  - High blood pressure
  - Lowered reading comprehension

The DEIS did not present adequate data on the effect on wildlife
There are 68 endangered/threatened/protected species present in the affected area some of which are monk seals, whales, green sea turtles and blue herons. Studies evaluating noise have shown disturbances of normal behavior including disruptions of feeding and mating.
- The DEIS minimally addresses these concerns and limits its analysis of these issues to effects of bird airstrikes.

Comments must be emailed (mv22h1eis@beltcollins.com) or postmarked by December 27, 2011.
Department of the Navy
Naval Facilities Engineering Command, Pacific Division
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

From the Kaneohe Bay Residents Initiative – email
kbresidentsinitiative@gmail.com

Kaneohe Bay Residents Initiative
kbresidentsinitiative@gmail.com

Posted by Bill Sager at 1:19 PM

Labels: Community Issues, News

3 comments:

Pete said...

WAY TO SUPPORT OUR TROOPS! Your flyer is chock-full of erroneous claims and arbitrary stats. Property values will not depreciate by 27%...people won't be dropping from cardiac arrest...sleep deprivation, blood pressure, lower reading comprehension...HA!

The P-3 Orion, in service since 1962 will be replaced by the P-8 Poseidon. P-3s have reached the end of their airframe fatigue life.

The V-22 Osprey will enable our troops to quickly enter and exit combat zones. Less time over combat zones = less time to get shot down.

The AH-1 Cobra will provide much needed close air support

for the troops on the ground. (The same troops that have sacrificed EVERYTHING for you and I.)

I believe that our GREAT neighbors over at MCBH ought to have the latest and greatest tools and equipment to get the job done and to safely return home to their families.

Furthermore, since we are on the subject of complaining and you are accusing the DEIS of its validity who exactly from Kaneohe Bay Residents Initiative took it upon themselves to unlawfully help themselves to my mailbox? Normally I could care less about someone throwing a flyer in there but since you are taking it upon yourself to claim shenanigans on the DEIS I think you ought to take a step back and hold yourself accountable to those same standards. Call it what you will...tampering, invasion of privacy...IT IS A FEDERAL OFFENSE!

December 18, 2011 8:36 PM

Bill Sager said...

This post has been removed by the author.
December 18, 2011 10:04 PM

Bill Sager said...

Thank you for you comments. We certainly need discussion and all points of view. The new aircraft are an important upgrade for the Marines. The fact that there are more aircraft and noisier aircraft will have an impact on the Marine Base neighbors. How bad that impact is depends very much on the person being impacted by increased noise.

The people who wrote the response to the DEIS we posted are pointing out what the consider to be valid deficiencies in the EIS.

Hopefully, a careful evaluation of the EIS and appropriate community response can improve the document and hopefully minimize some of the impacts.

Please understand that the purpose of the Kaneohe Neighborhood Board Blog is to stimulate just this kind of discussion. The Neighborhood Board has not taken a position on the EIS. We do want people to be aware that the EIS comment period ends on 12/27 and time to evaluate the document and submit testimony is short.

Be assured that the Neighborhood Board had nothing to do with the flier place in your mailbox.

We expect healthy disagreement. We also ask that discussion respect others point of view.

We share what we consider to be important information. In this case to notify as many people as possible about the changes proposed for the Marine Base and stimulate discussion and action.

Kaneohe people who will be impacted by these changes need

to be familiar with the EIS and submit their recommendation to help make the EIS a quality document that will help minimize community impacts.

Marine Corps Base Hawaii is a leader in Environmental Management. The have won numerous awards for their environmental work. They are responsive to noise complaints and in most cases I have been involved with when the situation that caused a complaint is understood the complainant is at least more understanding.

Please, everyone review the DEIS, evaluate these comments and prepare and submit your testimony. Also, add your comments here so others can benefit from the discussion.

December 18, 2011 10:23 PM

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1 Visitors to this blog

064

Amy Kepilino

From: Renee Wulzen [reneneg@gmail.com]
Sent: Sunday, December 18, 2011 10:53 PM
To: mv22h1eis
Subject: Draft EIS Comments

To: Belt Collins
Please send confirmation of received mail. Aloha!

064-1 Low- flying aircraft and helicopters create acoustic pollution which has a harmful impact on whales. Whales Porpoises, and Dolphins rely on underwater sound for survival. Multiple MV-22 Osprey tiltrotor aircraft, H-1 Cobras and Huey Helicopters landing at Upolu Airport would most definitely cause acoustic pollution. A whales acoustic communication is conducted at a low 1,000 Hertz. Some of the loud noise caused by low flying aircraft can be twice the amount of the whales frequencies. This noise pollution will disturb normal migration patterns, breeding sights and feeding areas of the Humpback whales. Not to mention our rare pigmy whales. Humpback whales Chang their migration routs due to noise pollution. Two Sperm whales where hit and killed by a cargo ship that they could not hear because their inner ears had undergone acoustic trauma. This information was provided by the NRDC. Besides the whales, the Hawaiian Monk seal has been spotted at manny of our kohala shores with their pups. The species population of the Hawaiian Monk seal is expected to drop below 1000 animals in the next fife years. The seals spend a third of their time seeking refuge on land while caring for their young. Multiple laud marine aircraft would send these creatures fleeing to the sea hopefully with their young.These animals are endangered and need to be protected. Which is why we cannot have Marine arial operations on an airport that is right next to the ocean and shoreline. If the U.S Marine Corps needed to do an emergency landing to save lives, then yes land. But for training purposes. I have to say no. Please do not operate here. This I say for the preservation of our fading and delicate animal and marine life. Thank you. And Aloha...

Renee Lei o kamalia Wulzen
P.O. Box 1263 Kapaau,HI 96755
Reneneg@gmail.com
Sent from my iPhone

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064

RECEIVED
'11 DEC 22 A8:14
NAVFAC Pacific

Renee L. Wulzen

P.O. Box 1263 Kapaau, HI 96755

Reneneg@gmail.com

Phone # (808)443-116

12/15/11

Naval Facilities Engineering Command, Pacific

Attn: Ev21, Mv-21, MV 22/H1 EIS Project Manager

258 Makalapa Drive, Suite 100

Pearl Harbor, HI 96860-3134

Attn: EV21, MV-22/H-1 EIS Project Manager

Dear project manager:

I am writing to you in regard to the proposal basing and operation of MV-22 Osprey tiltrotor aircraft and H-1 helicopters in Hawaii and specifically the impacts related to the use of Upolu airport located in the district of North Kohala in the county of Hawaii.

064-2 The EIS stated that the ground water in the Upolu airport area. The report stated, "status code of the ground water is that it is currently being used as fresh drinking water that it is irreplaceable and has a high vulnerability to contamination(Milk and Lau,1993)".The noise levels will stop the milk production of the cows. The Dairy farm is only one of two in the state.

064-3 The EIS admittedly allows jet fuel run off and the dumping of fuel over the ocean and land. The EIS stated that, "There would be no damage". Humpback whales, Green sea turtles, And Monk seals are in this area. The Pueo is mentioned but they do not mention the I'O that nests in this area. A whale's inner ear can be damaged by acoustic trauma, which is produced by low flying aircraft and helicopters. The EIS states that "noise impacts are not anticipated." How can this be true? They want to preform 250 exercises a year. And to be honesty, I do not believe that these exercises will be safe for the people in training. Especially with the 70mph winds that we have up here at Upolu. All of the studies that were made on Upolu airport are not current.

Please reconsider the project. Our community would suffer.

Thank you Renee L. Wulzen

Cc: Sen. Dan Inouye,Sen.Daniel Kahikina Akaka,Sen.Josh Green, Rep. Mazie Hirono, Rep. Colleen Hanabusa, Rep. Mark M. Nakashima

065

Amy Kepilino

From: Kyle A. Pyuen [kap@bhgrlaw.com]
Sent: Monday, December 19, 2011 3:38 AM
To: mv22h1eis
Subject: KMCB Expansion

065-1 My elderly mother, Corinne Shulman, lives on the Kaneohe/Kailua line on Kaneohe Bay Dr. We have, over the years, adapted to some of the noise coming from the base. However, the significant increase being proposed is very disturbing and un-welcomed news. My Mom's house is right on the water and there is nothing more exceptional then viewing the Bay especially when it is peaceful and quiet – that is the essence of the Windward side – far removed from the hustle of Honolulu & Waikiki. We are against the proposed increase in air traffic and noise and consider it invasive and intrusive to our everyday lives and would have a significant impact on our right to a peaceful and restful home and neighborhood.

Kyle Pyuen

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066

Amy Kepilino

From: reedosan@hawaii.rr.com
Sent: Monday, December 19, 2011 11:14 AM
To: mv22h1eis
Subject: MCBH noise

066-1 Going after the marine base is wrong! I live near the base, but get much more noise from loud cars and motorcycles, noisy trash trucks and loud music. Get worst things first. Bob Reed, Kaneohe Bay Dr.

1

067

From: clifft604@aol.com
Sent: Monday, December 19, 2011 9:26 AM
To: mv22h1eis
Cc: kbresidentsinitiative@gmail.com
Subject: MCBH: Current and Future Aircraft Noise at Night
Attachments: MCBH Night Noise2.doc

EIS Project Manager,
067-1 This letter-to-the-editor of the Star Advertiser (below) was recently printed in their daily newspaper. I and my neighbors are **very** concerned about the grave probability of being exposed to heightened aircraft noise (especially helicopter, and especially at night) as the MCBH increases its activity by an estimated 50% when the Base already does a poor job of mitigating high decibel levels at night. It is simply wrong to average decibel levels over a 24 hour period in analyzing the impact of noise on a community. Night-time noise has a much higher negative impact on the well-being of a community than day-time noise. This night-time noise pollution generated primarily by helicopter maintenance and late-night manuevers over the Bay needs to be honestly addressed in the EIS, and serious measures mandated to curtail its discordant effects on the health and harmony of our whole residential community (young and old) of Kaneohe.
Cliff Tillotson

MCBH Night Noise

The night-time generation of noise from the Kaneohe Bay Marine Corps base is the real problem. As seven year residents on Kaneohe Bay, we have adjusted to the daytime flight noise from the MCBH. However, Marines performing nighttime maneuvers over the Bay and mechanics jarring their neighbors out of sleep at 3:00 A.M. by revving and racing helicopter engines is rude and most probably unnecessary. Living four miles across the Bay, we have had our windows rattled at all hours of the night by unchecked noise levels broadcast from the Marine Corps' open helicopter and airplane maintenance hangers. As a contractor I know that the Noise Section of the Department of Health would never let my construction company emit noise of those decibel levels before 7:00 A.M. or after 6:00 P.M. With airfield operations expected to increase 50% in the next few years the MCBH commander Michael Antonio should limit nighttime helicopter and airplane maneuvers to outside the Bay over the ocean. The Marines should perform only quiet aircraft maintenance at night or build a sound wall to direct the high-pitched helicopter engine noise away from their neighbors attempting to sleep across the Bay. The current state of affairs is a double-standard that shows little regard for the residential community of Kaneohe.

--Cliff Tillotson, Kaneohe

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068

Amy Kepilino

From: Corinne Shulman [oahucork@aol.com]
Sent: Monday, December 19, 2011 11:22 AM
To: mv22h1eis
Subject: Noise at Kaneohe marine base

068-1 I am a cardiac patient, greatly disturbed by noise; I strongly object to this increase!
Sent from my iPhone

1

069

Amy Kepilino

From: David Davison [davisondf@hotmail.com]
Sent: Monday, December 19, 2011 5:41 PM
To: mv22h1eis
Subject: RE: KMCB Plan

From: davisondf@hotmail.com
To: mv221eis@beltcollins.com
Subject: KMCB Plan
Date: Tue, 20 Dec 2011 03:36:47 +0000

069-1 My husband and I would like to voice out our opposition to the increase aircraft activities and infrastructure in the Marine Corps Base.

David and Marietta Davison

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070

Amy Kepilino

From: clk [clk@quixnet.net]
Sent: Monday, December 19, 2011 7:07 PM
To: mv22h1eis
Subject: Kaneohe Marine Corps Base Expansion

To Whom It May Concern:

I am a resident of the Kaneohe Bay community who resides just across the bay from the Marine Corps base. I am very concerned that the Draft Environmental Impact Statement does not adequately address the following:

1. Noise due to a 49% increse in baseline activity. A computer generated model does not refelct actual conditions.
2. Effects on property values has not been addressed; studies have shown that there has been an average of 27% decrease in areas where there is aircraft expansion.
3. The statement describes the area as low population.
070-1 This is truly incorrect. I believe someone needs to review this by driving throughout the neighborhoods that will be effected.
4. There needs to be a more accurate assessment of the effects on heealth due to sleep deprivation, noise irritation and general interference of daily life. Airport noise has been shown to have very negative effects on children's health and development, i.e. high blood pressure and lowered reading comprehension.
5. Finally, there will be a definite effect on wildlife and the statement does not address these concerns by limiting its
070-2 analysis to effects of bird airstrikes. There will be many more effects to other wildlife, i.e. sea turtles, whales, blue herons and monk seals.

A much better analysis must be done prior to any final environmental impact statement. Thank you for your consideration.

Carolyn L. Knoll
44-133 Puuohalai Place
Kaneohe, HI 96744

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071

Amy Kepilino

From: Cory (Martha) Harden [mh@interpac.net]
Sent: Monday, December 19, 2011 11:31 PM
To: mv22h1eis
Subject: Comments - EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

Please evaluate this info:

071-1 Engott, J.A., 2011, A water-budget model and assessment of groundwater recharge for the Island of Hawai□i: U.S. Geological Survey Scientific Investigations Report 2011–5078, 53 p. http://pubs.usgs.gov/sir/2011/5078/

Pierce, H.A., and Thomas, D.M., 2009, Magnetotelluric and audiomagnetotelluric groundwater survey along the Humu'ula portion of Saddle Road near and around the Pohakuloa Training Area, Hawaii: U.S. Geological Survey Open-File Report 2009–1135, 160 p., on one CD. (Also available at http://pubs.usgs.gov/of/2009/1135.)

Cory Harden
PO Box 10265
Hilo, Hawai'i 96721
mh@interpac.net
808-968-8965

1

072

Amy Kepilino

From: Kitti Ford [kitti-ford-scholz@hawaii.rr.com]
Sent: Tuesday, December 20, 2011 7:48 AM
To: mv22h1eis
Subject: Comments - EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

Please complete the following information:

Name: Kitti Ford
Company/Organization:
Mailing Address: 44-623 Kaneohe Bay Drive
City: Kaneohe
State: Hawaii
Zip Code: 96744

Add to Mailing List? (Yes or No): Yes, please

072-1 Comments: First, I appreciate the military for their support of Hawaii's economy and have given my comments a great deal of thought. When I bought my house, which is directly across the bay from your base, there were jets stationed there. When engines were being serviced the noise actually rattled my house. The aircraft individually was loud, but not excessive, they revved up and left. It was the jet engine work on the ground, often more than one engine, running for long periods, which made life awful. If the maintenance work could be done in a hanger that contained the noise, I would be grateful. Has this idea been given any consideration? Also, consider having the helicopters fly over the ocean instead of the bay as much as possible. Mahalo for making Hawaii your home.

Kitti Ford

1

073

Amy Kepilino

From:	judy@lemus.us
Sent:	Tuesday, December 20, 2011 12:00 PM
To:	mv22h1eis
Subject:	Public Comment: Draft EIS on expanded aircraft activity and infrastructure at Marine Corps Base Kaneohe

To: EV21, MV-22/H-1 EIS Project Manager

I have the following concerns with the above mentioned DEIS:

The DEIS analysis does not accurately represent realistic impacts of increased noise.

- The DEIS noise analysis is based on a computer generated model which does not reflect actual conditions in the bay area and the surrounding mountains. This model skews the analysis to inaccurately project lower noise levels than realistically expected.
- No actual measurements were taken or reported of existing noise levels.
- 073-1 There was no mention of measurements from different points in the surrounding communities.
- The model did not address prolonged revving of the engines or hovering activity which is happening now and will increase if proposed aircraft arrive.
- The model used calculated sound generated from one runway rather than several other areas including helipads which may be used simultaneously with the runways.
- P8s (737 size JETS, a major component of the increased activity, are not included in the sound modeling.

073-2

- **The DEIS fails to address the increase in wastewater issues adequately.** Wastewater is currently handled by an on base plant with overflow diverted to the Kailua Waster water facility by city contract. The Kailua plant is only operating under a consent decree for repeated violations of governmental environmental regulations. The EIS does not mention that the Kailua ultraviolet sanitization equipment has been inoperable for several years releasing inadequately treated wastewater into Kaneohe Bay.

073-3

- **The DEIS fails to adequately address the effect on property values.** Numerous studies have shown that aircraft expansions with associated increase in noise result in a 15-43% (average 27%) decrease in property values.

073-4

- **The DEIS describes the area as low population density (it considers uninhabitable areas such as mountains in its calculation) of residential areas.** It fails to consider that most of the population is concentrated in the area surrounding the bay- and thus will be the most adversely affected by the expansion.

073-5

The DEIS does not adequately address human health effects, such as:

- Increases in serious cardiac events have been detailed in previous studies.
- Sleep deprivation Sleep disturbances are more likely to occur with helicopter operations at times of minimal background noise conditions such as in early morning and late evening. As the number of flight operations are scheduled to increase, the evening and early AM flights will likely increase as well. Sleep disturbance has been linked to high blood pressure, diabetes, vascular disease stroke and heart disease.

The DEIS does not adequately address effects on quality of life of surrounding residents

- Interference with daily life. Current levels of aircraft noise drown out or "mask" speech, making it difficult to carry on a normal conversation .Research has shown that "whenever intrusive noise exceeds approximately 60 dBs, there will be interference with speech communication." This is already happening and will happen more frequently if the EIS is approved.

1

074

JOHN F. METZLER

December 2, 2011

Naval Facilities Engineering Command Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makapala Drive
Suite 100
Pearl Harbor, HI 96860-3134

RE: US Marine Corps EIS @ Upolu Airport, North Kohala, Hawaii

Dear Sirs and Madams,

074-1 This letter is being written to support the EIS and proposed use of Upolu Airport by the US Marine Corps based at MCBH Kaneohe. We have a safe and useful airport facility in North Kohala and we welcome the military's use of this facility to train and prepare for our national security needs.

Thank you,
John F. Metzler

MAILING ADDRESS: PO BOX 617 KAPA'AU, HAWAII 96755
PHYSICAL ADDRESS: 57 1809 KOHALA MOUNTAIN ROAD HAWI, HAWAII 96719
EMAIL: mail@metzlercontracting.com

075

OMKM
Office of Mauna Kea Management

University of Hawai'i at Hilo
640 N. A'ohoku Place, Room 203, Hilo, Hawai'i 96720
Telephone (808) 933-0734 Facsimile (808) 933-3208
Mailing Address: 200 W. Kawili Street, Hilo, Hawai'i 96720

December 12, 2011

Attn: EV21, MV-22/H-1 EIS Project Manager
Department of the Navy
Naval Facilities Engineering Command, Pacific
258 Makalapa Drive, Suite 100
Pearl Harbor, Hawaii 96860-3134

Dear Sir or Madam:

Subject: Comments on the Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

Thank you for the opportunity to comment on the Draft Environmental Impact Statement (DEIS) for the Marine Corp proposal to base MV-22 and H-1 aircraft in support of third marine expeditionary force elements in Hawaii. The area of concern for the Office of Mauna Kea Management (OMKM) is the proposed activities at Pohakuloa Training Area (PTA) on the Island of Hawaii. Following are comments from OMKM.

Invasive Species

075-1 Of concern to OMKM are the introduction and potential impacts from the introduction of invasive species. OMKM is encouraged that the Marine Corps will be following the protocols and prevention measures in its Integrated Natural Resources Management Plan (INRMP). The INRMP is not described in detail, but OMKM would like to see that the plan also contains response actions in the event of an introduction of an invasive species. If the plan does not address response actions, these should be addressed in the DEIS. In addition, OMKM feels that because the aircrafts that will be landing at PTA may be carrying invasive species, OMKM recommends that all aircraft be washed down before flying and landing at PTA

Cultural and Natural Resources Orientation

075-2 OMKM also recommends as a mitigation measure that all personnel, including military, civilian, construction and contract workers undergo a cultural and natural resources orientation.

Again, thank you for the opportunity to comment on the DEIS. Should you have any questions, please do not hesitate to contact me by email at nagatas@hawaii.edu, or by phone, 808-933-0734.

Sincerely,

Stephanie Nagata

Stephanie Nagata
Interim Director

076

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

LORETTA J. FUDDY, A.C.S.W., M.P.H.
DIRECTOR OF HEALTH

In reply, please refer to:
File:
EPO-11-237

November 18, 2011

Department of the Navy
Naval Facilities Engineering Command, Pacific
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
Attention: EV21, MV-22/H-1 EIS Project Manager

Dear EIS Project Manager:

SUBJECT: EIS FOR THE BASING OF MV-22 AND H-1 AIRCRAFT IN SUPPORT OF III MARINE EXPEDITIONARY FORCE ELEMENTS IN HAWAII

076-1 Thank you for allowing us to review and comment on the subject document. The document was routed to the various branches of the Environmental Health Administration. We have no comments at this time, but reserve the right to future comments. We strongly recommend that you review all of the Standard Comments on our website: www.hawaii.gov/health/environmental/env-planning/landuse/landuse.html. Any comments specifically applicable to this application should be adhered to.

The same website also features a Healthy Community Design Smart Growth Checklist (Checklist). The Hawaii State Department of Health, Built Environment Working Group, recommends that State and county planning departments, developers, planners, engineers and other interested parties apply the healthy built environment principles in the Checklist whenever they plan or review new developments or redevelopments projects. We also ask you to share this list with others to increase community awareness on healthy community design.

If there are any questions about these comments please contact the Environmental Planning Office at 586-4337.

Sincerely,

Genevieve Salmonson

GENEVIEVE SALMONSON, Acting Manager
Environmental Planning Office

077

ALAN M. ARAKAWA
Mayor

GLENN T. CORREA
Director

PATRICK T. MATSUI
Deputy Director

(808) 270-7230
FAX (808) 270-7934

DEPARTMENT OF PARKS & RECREATION
700 Hali'a Nakoa Street, Unit 2, Wailuku, Hawaii 96793

December 1, 2011

Karen Sumida
Business Line Manager, Environmental
Department of the Navy
Naval Facilities Engineering Command, Pacific
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

Dear Ms. Sumida:

SUBJECT: EIS FOR THE BASING OF MV-22 AND H-1 AIRCRAFT IN SUPPORT OF III MARINE EXPEDITIONARY FORCE ELEMENTS IN HAWAII

077-1 Thank you for the opportunity to review the subject Environmental Impact Statement. We have no additional comment to offer at this time.

Should you have any questions or concerns, please feel free to contact me, or Steve Grogan, Capital Improvements Project Coordinator, at stephen.grogan@co.maui.hi.us or 808-270-6158.

Sincerely,

GLENN T. CORREA
Director of Parks & Recreation

c: Robert Halvorson, Chief of Planning & Development

GTC:RH:sg

S:\PLANNING\Steve G\No Objections\No Comment - EIS for III Marine EFE.doc

078

Department of Water
County of Kaua'i

Water has no substitute.......Conserve it

December 12, 2011

UID #249

Ms. Karen Sumida
Department of the Navy
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

Dear Ms. Sumida:

Subject: EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii, Pacific Missile Range Facility (PMRF), Mana, Kauai

078-1 We have no comments to the subject EIS. However, the applicant is made aware that the Department of Water does not have a domestic water system serving this area.

If you have any questions, please contact Mr. Edward Doi at (808) 245-5417.

Sincerely,

Gregg Fujikawa
Chief of Water Resources and Planning Division

ED:loo
T-13616 PMRF Mana, Sumida

4398 Pua Loke St., P.O. Box 1706, Lihue, HI 96766 Phone: 808-245-5400
Engineering and Fiscal Fax: 808-245-5813, Operations Fax: 808-245-5402, Administration Fax: 808-246-8628

079

Amy Kepilino

From: Steve Kittell [skittell@aol.com]
Sent: Tuesday, December 20, 2011 2:53 PM
To: mv22h1eis
Subject: Proposed increase in noise in Kaneohe Bay

Dear Sirs:

079-1 As a bayfront resident, I DO NOT SUPPORT AN INCREASE IN NOISE FROM KANEOHE MARINE CORPS BASE. I DO support our military here in Hawaii and am fine with the PRESENT NOISE LEVEL (even though at times it is quite loud) but cannot support an INCREASE. Kaneohe Bay is one of the most beautiful (and mostly peaceful) places in the world and that is why I chose to live here. When I purchased my home, I was aware of the noise from the Base and accept it at the present level. But I do feel that an INCREASE in that noise level will dramatically decrease the desirablity of living here, interupting normal living conditions and driving down property values. Most of my neighbors are elderly and have lived here 30+ years in family homes which are their main asset. They do not wish to have to move (and honestly most could not even if they wanted to).

Please see if there is not some way to change out the existing aircraft (if necessary) but NOT TO INCREASE THE AIRLINE TRAFFIC AND NOISE LEVEL above what we presently live with.

Thank you,

Steve Kittell

1

080

DEPARTMENT OF TRANSPORTATION SERVICES

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 3RD FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8305 • Fax: (808) 768-4730 • Internet: www.honolulu.gov

PETER B. CARLISLE
MAYOR

WAYNE Y. YOSHIOKA
DIRECTOR

KAI NANI KRAUT, P.E.
DEPUTY DIRECTOR

TP11/11-441479R

December 13, 2011

Department of the Navy
Naval Facilities Engineering Command, Pacific
258 Makalapa Drive, Suite 100
Pearl Harbor, Hawaii 96860-3134

Attention: EV21, MV-22/H-1 EIS Project Manager

Dear Sir:

Subject: Draft Environmental Impact Statement (DEIS) for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

This responds to your letter of November 8, 2011, requesting our comments concerning this project.

080-1 Our Traffic Engineering Division (TED) has the following comment. A Traffic Management Plan (TMP) for the Mokapu gate should be implemented as prescribed in the Traffic Impact Report (TIR) to mitigate traffic queues along Mokapu Road.

Thank you for the opportunity to review this matter. Should you have any further questions, please contact Michael Murphy of my staff at 768-8359.

Very truly yours,

WAYNE Y. YOSHIOKA
Director

081

Amy Kepilino

From: Alyssa Slaven [alohaalyssas@gmail.com]
Sent: Tuesday, December 20, 2011 3:29 PM
To: mv22h1eis
Subject: Comments
Attachments: Naval Facilities Engineering Command cover letter.docx; E.I.S. Points.docx; Upolu_Airport_LTR_12-6-11 OC.pdf; cover letter upolu.docx

Aloha,
I have attached coments on the E.I.S. for Upolu Airport.
I have also sent 400 signitures against this project along with this information to the Naval Facilities Engineering Command.
Thank you for taking the time to review this paperwork.
Aloha Alyssa Slaven
P.O. Box 1017 Kapaau, Hi 96755

1

081

Alyssa Slaven
P.O.Box 1017
Kappau , HI
96755
808-889-5138

December, 14th,2011

With my husband being a former Marine we are supportive of the marines and understand the importance of training. In fact we help host operation vacation at least four times per year here in our little town and provide meals for each family that comes to visit us. On very short notice and a 45 minute drive over a mountain, my self and group of Kohala neighbors met with the US Marines & their consultants (Belt Collins) during the public information meeting held in Waimea on November 30. I was frankly stunned at the proposal to conduct operations at the quiet Upolu Airport. Questions raised by at the meeting showed gaping holes and huge oversight in the current Environmental impact statement. Particularly frustrating It turns out that none of the consultants had visited Upolu within the last 10 years and had formulated their environmental impact statement that is over a decade old. Little to no research has been done to see if these proposed operations would have any impact. Currently the airport has little activity and an increase in use and type of aircraft should be studied in detail before any proposal made.

081-1

As the group asked questions about the report it became very clear this report was put together with little knowledge of this special place or the impact it would have. When asked questions on whales an E.I.S. was sited in Oahu over 10 years ago. This clearly is vastly different to the habitat of whales and other sea life we have here. Our unique island and the area in question is home to some of the most profound whale, honu, peuo, bird, wildlife, sea life and cultural sites.

081-2

081-3 Upolu is a land that is sacred to the Hawaiian people with the birthplace of Hawaii's unifying King Kamehameha and historic Mo'okini heiau so close by.

As a home owner in the area I believe the impact would be significant. I can remember on one quite night about 8 years ago being woke up to a night operations. I was so afraid I called the police It was loud scary and life changing for me. I do not want my daughter to wake up to these types of operations. These operations may include groups of very large aircraft in unspecified numbers and will include night missions. Kohala's ambient noise levels are so low, even single-engine planes and tour helicopters are quite invasive. If allowed to do these operations I believe my property value will plummet.

081-4

The E.I.S. states that there will be "no impact" as to Noise, Airspace, Aesthetic/Viewplane or Cultural elements--and so it states that there is no need for mitigation of any of these impacts. This simply does not match the reality of such military training on our rural community. We support our US Marines and I do understand the need for training. This training plan should not include Kohala. Troubling was also that the mediator said Upolu wasn't even on the proposal when the project started and was added later. The E.I.S. was quite clearly thrown together and sadly real concerns are not addressed.

081-5

081

Kohala's peaceful rural setting is absolutely not suited in any way to airborne military training. Although
081-6 the location may seem convenient, the negative impacts of regular military flight missions clashes completely with the lifestyle of the Kohala community and our economic reliance on tourism attracted to our uniquely rural atmosphere. There is no benefit to this community from a military training activity only loss and negative impacts.

I question the effect these operations will have on the residents of Kohala, the cultural sites, wildlife, whales and sea life, tourism and enjoyment of life this will have on our community. To risk the precious qualities of North Kohala in favor of a convenient landing area is completely unacceptable. Furthermore
081-7 the community was not asked about this project, we want a town meeting held in our town to address our concerns. Hosting a meeting two days after Thanksgiving with little notice was unfair to our community. Additionally asking that all comments be submitted two days after Christmas has also proved to be interesting timing given the nature of this proposal. I do not believe our island has grasped the magnitude of this project or how it will effect our island.

While I support the marines I do not want to host any trainings in this very special place. A place that needs to be protected. The E.I.S. statement showed very little impact. The report did not address many concerns. I have attached a quick reference sheet as to the comment points I find important and unaddressed. Our special place deserves the respect of a well though out and current E.I.S. Statement.

Warmest Aloha

Alyssa Slaven

081

081-8 Air Quality: Could Increase mobile source emissions which could have an impact on humans, wildlife, marine life, farm lands or environment.

Archeological Recourses: Cultural sites. The birth place of King Kamehameha the first a Heiu and sacred rocks, is it appropriate to fly over? Will these operations have an impact on this spiritual and culturally sensitive place?

081-9 Residents: Noise and disruption. Night time or multiple aircrafts would intensify this. Land and property values. The wildlife and domestic animals and farming on our lands.

081-10 Noise: Noise receptacles include a far reaching neighborhood as the air is so quite in our towns you can hear noise far away. Wildlife, domestic animals and Ocean animals could all be affected. The entire coastline could hear operations including hotels and our tourism industry and residents.

Whales: This place has many whales at the same spot every year. The whales have chosen this special place and will this disrupt their behaviors or welfare? Nothing currently in the Environmental Impact statement (E.I.S.) addresses whales. When asked about an E.I.S. done on whales a study was sited done over a decade ago on Oahu. Please see comment letter from the Ocean Conservation Society.

081-11 Birds. The more than 10 year old report shows lots of bird activity including the Plover which at one point reported 250 birds. The Pueo was also sited in the report. This is one of the rare places you can see all kinds of birds. Will the aircraft detour any of them? Audubon society was contacted and addressed concerns about the date of E.I.S. and change of use of airport. An updated study should be done and updated using the new aircraft and increase in traffic. Please see comments from the Audubon Society.

081-12 Sea life and Ocean Habitats: How will these operations impact the sea?

081-13 Hawaiian Monk Seals : Endangered and have been sited close to this area.

081-14 Hawaiian Sea Turtle: Honus (endangered and raised on our island exclusively.) How will this impact them a current E.I.S. study should be done.

The big Island and the coast in question is home to an effort to save the Hawaiian Sea turtle the I.E.S. Should address the impact on the turtles and other marine life.

081-15 Ocean habitat or reefs: Will there be an impact and what study has been done?

081-16 Fishing: Will there be an impact on fish or fishing that is a heavily used area?

081-17 Erosion: Recently the airport was fenced as the erosion was getting worse.

081-18 Fire and emergency hazards: The report is not correct that the nearest fire services is in Hawi 3 miles away. In fact it is 8 miles away in the town of Kappau. Furthermore we only have one fire truck and one ambulance and one flat bed to service the area. If there was an emergency who would get priority the

081

towns people or Military? Also has the fire or emergency department been contacted to see if this is even an option? If a fire happens it will ignite this already dry and very windy area putting homes and farm lands at risk. These are training operations so is the risks higher for accidents?

081-19 Access: The one lane road to the airport is small and used heavily for walking and recreation. Would this road ever be used?

081-20 Weather: The wind is very strong at the airport and on one side of the airport is a hill and the other side is the windmills. Making the only entry from the whales favorite spot. Additionally the residents fought long and hard to get the minimal lights on the windmills will these operations require more lights on the windmills?

081-21 Domesticated animals and adrenaline: Animals in the area include, Cows for both meat and milk, goats for both meat and milk, horses, dogs, cats, pigs, turkeys, chickens and many others. If you scare animals especially in the middle of the night will the adrenaline pass to animal meet or milk? Any other effects on these animals or egg laying abilities?

Tourism: Our towns are a step back in time and both residents and tourists alike treasure this about Kohala. In fact this is the reason most people live here. It is a special place like no other and a military presence is not conducive to our current life style or to the tourists we host here.

Our guests pay a premium to come to our island because it is quite, dark and a place like no other. We do not want to lose this charm.

081-22 Other Costal communities: The flight path included the northern coast line. This coast line is home to some of the wealthiest and most prized properties including the bulk of our tourism hotels on our island. Have the hotels been contacted and aware of this possible flight path? Tourists come to our island because it is very peaceful more air traffic is not conducive to our tourism industry.

081-23 Tsunami evacuation zone: It states the airport is not a evacuation zone the maps show it is very close if not in one.

081-24 Pollution and hazards waste materials: What types of pollution and radiation? The report showed some concerns. We want an investigation as to how it would relate to our area, humans, wildlife, sea life and domestic animals and farm lands.

081-25 Children: A very quite place and night time flights could scare young children or adults for that matter. I have called the police in the middle of the night due to night operations.

081

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
Regarding: Proposed US Marines training at Upolu Airport on Big Island

Aloha from North Kohala,

Some of our community members attended the November 30, 2011 information meeting in Waimea regarding the airborne training proposed at Upolu Airport on the Big Island. While we support the Marines we do not want Upolu airport to be used for military operations.

We have many questions about the impact such activity might have on our already-fragile local economy and rural lifestyle.

Attached are signatures, A list of questions and comments about the E.I.S. that need addressing, A letter from the ocean Conservation Society, Comments by the Audubon Society and Letters asking the Marines not to use our airport.

We would like to make several requests:

081-26
1. Prepare and have a detailed (with current professional source citations) Environmental Study of this unique area. The current one is outdated and not sufficient Addressing the whales (especially the marine sanctuary), birds, cultural and historical aspect of this ancient place, other wild and sea life, noise, emergency services needed, erosion, local residents impute and concerns

081-27
2. North Kohala Information Meeting: Prior to the ending of the public comment period on the Draft EIS, we request that an additional information meeting be held here in North Kohala so that both our residents and business owners can evaluate the impact such training might have on our quiet, rural community.

081-28
3. Reasonable notice: That reasonable & effective notice be given to the community of such a Meeting. The timing of the holidays in both the original meeting and the cutoff date for comments was neither fair or appropriate.

081-29
4. Extend the period for Public Comments on the Draft EIS: After the requested Information Meeting here in North Kohala, we request a reasonable extension of time be given for public comments on the Draft EIS.

We want to express our support for our troops but feel a need to understand the details of the proposed training to evaluate the impact on our community.

082

Amy Kepilino

From: Alyssa Slaven [alohaalyssas@gmail.com]
Sent: Tuesday, December 20, 2011 4:55 PM
To: mv22h1eis
Subject: Letter from the Kohala Merchants Association
Attachments: Kohala Merchant letter.docx

Aloha,
This letter is in regards to the Kohala Merchants Association and Uplou E.I.S..

--
Aloha
Ackerman Galleries
Alyssa Ackerman Slaven

1

082

RECEIVED

'11 DEC 22 A8 :12

NAVFAC Pacific

Naval Facilities Engineering Command, PacificAttn:
EV21, MV-22/H-1 EIS Project Manager258 Makalapa Drive, December 15, 2011
Suite 100Pearl Harbor, HI 96860-3134

Regarding: Proposed US Marines training at Upolu Airport on Big Island MV-22 Osprey & H-1 Cobra

Aloha from the North Kohala Merchant's Association—

Some of our Association members attended the November 30, 2011 information meeting in Waimea regarding the airborne training proposed at Upolu Airport on the Big Island. Many details about the frequency and scale of such proposed training seem quite unclear---and our merchants group has many questions about the impact such activity might have on our already-fragile local economy and rural lifestyle. So we would like to make three requests:

082-1 1/ North Kohala Information Meeting: Prior to the ending of the public comment period on the Draft EIS, we request that an additional information meeting be held here in North Kohala so that both our residents and business owners can evaluate the impact such training might have on our quiet, rural community.

082-2 2/ Reasonable notice: That reasonable & effective notice be given to the community of such a Meeting.

082-3 3/ Extend the period for Public Comments on the Draft EIS: After the requested Information Meeting here in North Kohala, we request a reasonable extension of time be given for public comments on the Draft EIS. We want to express our support for our troops but feel a need to understand the details of the proposed training to evaluate the impact on our community.

Alyssa Slaven x Alyssa Slaven

Vice President

Kohala Merchant's Association

083

Amy Kepilino

From: mahinahula@aol.com
Sent: Tuesday, December 20, 2011 5:01 PM
To: mv22h1eis
Cc: kbresidentsinitiative@gmail.com
Subject: DEIS

083-1 We live on Kaneohe bay directly across from the marine corps base. We have been impacted on a regular basis by the noise level of the ops that already take place on the base. To add more ops with larger and louder noise impact will surely increase the Intrusive and irritating noise levels in the surrounding areas and neighborhoods on the bay. This area is way to small and too many people and animals will be hugely affected by additional aircraft noise.

I hope that efforts are being made to stop this from happening.
Sent from my iPhone

1

084

Amy Kepilino

From: Michael Bonahan [Michael@kohalacc.com]
Sent: Wednesday, December 21, 2011 10:28 AM
To: mv22h1eis
Subject: Attn: EV21, MV-22/H-1 EIS Project Manager
Attachments: Draft EIS for Basing of MV-22 & H-1 Aircraft in Hawaii Comments by Michael Bonahan.pdf

Attached please find my comments regarding the above EIS.

Michael Bonahan
PO Box 44316
Kamuela, HI 96743

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

December 21, 2011

To whom it may concern:

Following are my comments on the EV21, MV-22/H-1 EIS:

084-1 I am shocked that the EIS authors would ignore the need to address noise. The very quiet area of Upolu and the surrounding coastline would be devastated by the noise of the Osprey and other military aircraft. The need for in-depth noise modeling and analysis is patent.

084-2 Previous use of Upolu Airport for trainings does not justify the use for future trainings. Our defense department has used many sites for trainings in the past (some with adverse environmental consequences – Kahoolawe,Waikoloa, etc). This statement in the EIS, regardless of its veracity is irrelevant.

084-3 As a pilot, and local resident, I can testify that the figure of 800 annual operations is a huge exaggeration. There are days, sometimes weeks that there are no approaches or take-offs and landings at Upolu. And when these occur, these are mostly small single engine recreational or private pilot training type aircraft. The MV-22 is a behemoth in comparison – therefore has no right to be compared to such light aircraft. This data is false and any extrapolation made from such "data" is myth.

I would also like to point out 3 additional areas that were poorly addressed in the EIS:

084-4
1. Economics: Our beleaguered and fragile economy relies heavily upon ecotourism and real estate appreciation. The proposed operations will adversely impact both of these major sources of financial sustenance for our community.

084-5
084-6
2. Wildlife: There is no doubt that mother-nature will be adversely impacted. Humpback whales use Upolu point as a sounding station for their journey between Maui and the Big Island. During the winter months you can watch dozens of these endangered animals can be seen mating and giving birth just off Upolu point. There are documented cases of reduced animal numbers at shoreline airports. Additionally, the Koa'e kea or White-tailed Tropicbird (Phaethon lepturus), with only 1,800 mating pairs left in Hawai'i, relies heavily on Upolu point for navigation and nesting. These State Recognized indigenous animals are threatened physically by bird strike and loss of habitat by the MV-22.

084-7
3. Finally, the cultural and historical aspects have not been properly addressed. Situated Mo'okini Heiau and King Kamehameha's birthplace, Upolu point is an inappropriate location for military operations.

1

084

Please accept these above comments with immense respect for our troops and the officers that lead them.

Sincerely:

Michael Bonahan

Michael Bonahan
PO Box 44316
Kamuela, HI 96743

2

084

RECEIVED
'11 DEC 22 P1 :02
NAVFAC Pacific

Michael Bonahan
PO Box 44316
Kamuela, HI 96743

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

December 21, 2011

To whom it may concern:

Following are my comments on the EV21, MV-22/H-1 EIS:

I am shocked that the EIS authors would ignore the need to address noise. The very quiet area of Upolu and the surrounding coastline would be devastated by the noise of the Osprey and other military aircraft. The need for in-depth noise modeling and analysis is patent.

Previous use of Upolu Airport for trainings does not justify the use for future trainings. Our defense department has used many sites for trainings in the past (some with adverse environmental consequences – Kahoolawe,Waikoloa, etc). This statement in the EIS, regardless of its veracity is irrelevant.

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I would also like to point out 3 additional areas that were poorly addressed in the EIS:

1. Economics: Our beleaguered and fragile economy relies heavily upon ecotourism and real estate appreciation. The proposed operations will adversely impact both of these major sources of financial sustenance for our community.
2. Wildlife: There is no doubt that mother-nature will be adversely impacted. Humpback whales use Upolu point as a sounding station for their journey between Maui and the Big Island. During the winter months you can watch dozens of these endangered animals can be seen mating and giving birth just off Upolu point. There are documented cases of reduced animal numbers at shoreline airports. Additionally, the Koa'e kea or White-tailed Tropicbird (Phaethon lepturus), with only 1,800 mating pairs left in Hawai'i, relies heavily on Upolu point for navigation and nesting. These State Recognized indigenous animals are threatened physically by bird strike and loss of habitat by the MV-22.
3. Finally, the cultural and historical aspects have not been properly addressed. Situated Mo'okini Heiau and King Kamehameha's birthplace, Upolu point is an inappropriate location for military operations.

Please accept these above comments with immense respect for our troops and the officers that lead them.

Sincerely:

Michael Bonahan

From: James Land [herenowjim@gmail.com]
Sent: Wednesday, December 21, 2011 10:53 AM
To: mv22h1eis
Cc: sengreen@capitol.hawaii.gov; repnakashima@capitol.hawaii.gov
Subject: Comments regarding MV-22/H-1 EIS at Upolu

James Land

PO BOX 551699, Kapa'au, HI 96755 · (808) 889-5715

12/21/11

Naval Facilities Engineering Command, Pacific

Attn: EV21, MV-22/H-1 EIS Project Manager

258 Makalapa Drive, Suite 100

Pearl Harbor, HI 96860-3134

Attn: EV21, MV-22/H-1 EIS Project Manager

Dear Project Manager:

I am writing to you regarding the proposed basing and operation of MV-22 Osprey tiltrotor aircraft and H-1 helicopters in Hawaii and specifically the impacts related to the use of Upolu Airport located in the district of North Kohala in the county of Hawaii.

If I had turned in a report like this to my high school social studies teacher I am certain I would have been given the grade F. Had I then somehow made it to college using such research skills I would not have lasted a semester. The reasons are obvious; the supporting sources are

outdated and inadequate to support the stated conclusions. I will enumerate a few of them for you:

<u>Questionable Source #1</u> is found in Section 4.9.3.4 that states:

4.9.3.4 Upolu Airport, Island of Hawaii

Operational Impacts

Based upon two archaeological surveys conducted in the immediate vicinity of Upolu Airport, there are no archaeological resources of any significance within and adjacent to the facility. There would be no operational impacts on cultural resources due to the proposed action. No mitigation is required.

085-1 The source for this claim is not footnoted and a review of the references listed in Chapter 9 of the report indicates that there was only one "Archaeological Inventory" conducted of the site in 1999. The inventory survey was conducted for 28 acres of land and yet it included only "six backhoe trenches on the inland side of the airport buildings" (a space smaller than 1 acre) to test for subsurface cultural deposits. Given the huge archaeological and cultural significance of the adjacent Kamaehameha Birthsite and the equally significant Mookini heiau located less than 4,572 feet away this circumscribed study calls into question its relevance. Additionally, a 12-year-old study that used only six trenches located in the place where the proposed aircraft would likely have little or no impact is also irrelevant. Moreover, the MV-22 Osprey was not fielded until 2007 or used for Marine Corps training until the year 2000. (Wikipedia) This information clearly points to the obsolescence of the source data. Furthermore, . . .

<u>Questionable Source #2</u> is found in Section 4.9.2.4 that states:

4.9.2.4 Upolu Airport, Island of Hawaii

Areas of Potential Effect

(Fornander 1969:II-33-36; Kamakau 1991:100). Construction of the luakini (sacrificial) heiau Mookini, located 1.6 mi (2.6 km) south of the airport, is attributed to Paao (Kamakau 1991:100).

and

was born (Kamakau 1961:68). The event is commemorated at a place called Kamehameha Birthsite, located two mi (3 km) south of the airport.

085-2 The distance measurements cited above are inaccurate and thereby call into question the attention to detail of the author. The actual distances are 1.1 miles to Mookini and 1.2 miles to Kamehameha birth site. Attached here is a link to a Google map that precisely shows the distances:

http://maps.google.com/maps/ms?msid=218128554696168788292.0004b49bba0e60edbe20c&msa=0&ll=20.260063,-155.869453&spn=0.015943,0.028045

Questionable Source #3 The next source error would be humorous due to the absurdity of its inclusion if it were not for the huge scale of potential damage that might result from such unscholarly work. Section 4.8.2.4 states:

4.8.2.4 Upolu Airport, Island of Hawaii

Information about natural resources at Upolu Airport is derived from the *Upolu Airport Final Environmental Assessment* prepared for DOT Airports Division (DOT 1999).

And on page 4-91

No important coral reef ecosystems are known to exist in waters offshore from Upolu Airport. The ocean bottom consists of hard basalt pavement, boulders, a few sand channels, and

sparse coral cover.[28]

And footnote 28 states

[28] Tribble, Gordon. Personal communication. June 24, 2011. Mr. Tribble made a large number of dives in the waters off Upolu Point 20+ years ago. He recalled that there was not much coral and concluded that the low abundance was due to big winter surf that pounds the coastline.

085-3 The audacity of including the 20-year-old diving experience from a single individual as evidence that there are no important "coral reef ecosystems" is preposterous! Moreover, Gordon Tribble is not cited in the list of reference (EIS Chapter 9), nor are his credentials listed in the footnote above, nor are the exact locations of the dives listed, nor are the exact numbers of dives cited from his recollections. I assume that if Mr. Tribble's 20-year-old recollections are valid then my diving experience from 2011 ought to be germane as well. As both a SCUBA and free diver with over 30 years of diving experience I would be happy to prepare a detailed map of the underwater terrain adjacent to Upolu airport. On that map I will document not only coral reef ecosystems, but Green Sea Turtle (Chelonia mydas) cleaning stations, known locations of Hawaiian Monk seals (Monachus schauinslandi) sightings, as well as Humpback Whale (Megaptera novaeangliae) birthing sites complete with date stamped video.

I would be happy to continue doing your research for you, except for the fact that I am not being paid for my efforts, nor would the results of my research support the conclusions contained in the EIS. There are many more deficiencies with the report that I have not cited in this letter due to the fact that it seems obvious that contemporary and scholarly studies are necessary before any attempt is made to use Upolu Airport for the proposed operations.

085-4 Finally, I would like to point out a huge environmental impact that is almost always neglected in reports such as the one being discussed. The most important environmental impact relates to my family and our community's ability to peacefully enjoy the place we have chosen to call home. Why do bureaucrats so often fail to recognize this? Why is peace of mind not included in an environmental impact study? Our small town of Hawi is completely built around a quasi-agricultural and tourist centered economy. We depend on our calm and quiet surroundings for our livelihood as well as much of our spiritual grounding. The noise and even the very presence

085-4 of war machines and training operations are completely inconsistent with the visions we hold for our community.

At the November 30th informational meeting that was conducted in Waimea regarding the proposed use of Upolu Airport I asked a question to the assembled military staff and contractors that numbered at least 15. Among the military representatives were the archeologist and biologist who studied the Upolu region for this report. My question, which was recorded on video was, "how many of you have been to North Kohala?" Only one person raised their hand and stated that she had lived here 10 years ago. What a travesty that our beautiful home could be besmirched by an effort that includes little or no social contact and studies that do not even meet the most basic of scholarly requirements. I hereby request that the department of the Navy reevaluated the impacts of using Upolu Airport for military operations in a manner that is more precise and accurate concerning the actual impacts of such operations.

Respectfully,

____

James Land

Cc: President Obama, Sen. Dan Inouye, Sen. Daniel Kahikina Akaka, Sen. Josh Green, Rep. Mazie Hirono, Rep. Colleen Hanabusa, Rep. Mark M. Nakashima

Comments regarding MV-22/H-1 EIS at Upolu also sent by US mail on 12/21/11

James Land
Hawi, Hawaii
808 889-5715

5

086

DEPARTMENT OF FACILITY MAINTENANCE

CITY AND COUNTY OF HONOLULU

1000 Uluohia Street, Suite 215, Kapolei, Hawaii 96707
Phone: (808) 768-3343 • Fax: (808) 768-3381
Website: www.honolulu.gov

PETER B. CARLISLE
MAYOR

WESTLEY K.C. CHUN, PH.D., P.E., BCEE
DIRECTOR AND CHIEF ENGINEER

KENNETH A. SHIMIZU
DEPUTY DIRECTOR

IN REPLY REFER TO:
DRM 11-992

November 30, 2011

Department of the Navy
Naval Facilities Engineering Command, Pacific
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
Attn: EV21, MV-22/H-1 EIS Project Manager

Dear Gentlemen:

Subject: EIS FOR THE BASING OF MV-22 AND H-1 AIRCRAFT IN SUPPORT OF III MARINE EXPEDITIONARY FORCE ELEMENTS IN HAWAII

086-1 Thank you for the opportunity to review the subject EIS. At the present time there appears to be minimal impact to the roads and streams in the City and County of Honolulu since most of the development will be on Federal property. Therefore, we do not have any comments for the proposed EIS.

Should you have any questions, please call Lan Yoneda, Assistant Chief of the Division of Road Maintenance at 768-3600.

Sincerely,

Westley K.C. Chun, Ph.D., P.E., BCEE
Director and Chief Engineer

087

DEPARTMENT OF PARKS & RECREATION

CITY AND COUNTY OF HONOLULU

1000 Uluohia Street, Suite 309, Kapolei, Hawaii 96707
Phone: (808) 768-3003 • Fax: (808) 768-3053
Website: www.honolulu.gov

PETER B. CARLISLE
MAYOR

GARY B. CABATO
DIRECTOR

ALBERT TUFONO
DEPUTY DIRECTOR

November 19, 2011

'11 NOV 21 A9 :48
RECEIVED
NAVY AC...

Ms. Karen Sumida
Department of the Navy
Naval Facilities Engineering Command, Pacific
258 Makalapa Drive, Suite 100
Pearl Harbor, Hawaii 96860-3134

Dear Ms. Sumida:

Subject: Draft EIS for the Basing of MV-22 and H-1 Aircraft in Support of the Third Marine Expeditionary Force Elements in Hawaii

Thank you for the opportunity to review and comment on the Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force Elements in Hawaii.

The Department of Parks and Recreation has no comment, as the proposed project will not impact any program or facility of the department. You may remove us as a consulted party to the balance of the EIS process.

Should you have any questions, please contact Mr. John Reid, Planner, at 768-3017.

Sincerely,

Gary B. Cabato

GARY B. CABATO
Director

GBC:jr
(441678)

088

From: Jacqueline Newell [starfishjack@yahoo.com]
Sent: Wednesday, December 21, 2011 2:31 PM
To: mv22h1eis
Subject: Proposed expansion of aircraft activity Kaneohe MCB

To whom it may concern:

My name is Jacqueline Newell. I am a former spouse of a USMC Col. I traveled and moved with the Marine Corps for the last 15 years of my life. I honor and respect the United States Marine Corps.

I am writing concerning the proposed expansion of aircraft activity at Kaneohe Marine Corps Base. I purchased a home here above Kaneohe Bay two years ago. I live directly across from the USMC base.

When military planes and helicopters and fly above my home the sound is deafening. Because it happens only now and then I feel I can handle it and of course it is our US military practicing so I can relate. However, if this begins happening more often than it already does there will be no peace at all. Atmospheric Conditions above and around the Bay, where many, many, neighborhoods are, sometimes make the aircraft feel like it's coming down on top of you.

Even being a former military spouse I feel this area is to densely populated to allow ANY additional aircraft activity. Being a graduate in Social and Behaviorial Science I also believe that ANY increase above current noise levels may become seriously problematic with the local population.

088-1 Please do not allow any expansion or change of aircraft activity at this base. People are accepting and tolerant of the current levels of noise because of the respect we all have for our military. If these noise levels were to increase, even a small amount, quality of life on this side of the island will diminish greatly. I also feel this will have a detrimental impact on how the Marine Corps is viewed by locals in the area. There surely is a more suitable area that does not have such a high population density. Too many residents will be effected if this expansion is allowed. It surely will be the beginning of a long arduous fight between local residents of Hawaii and the United States Marine Corps until it is then remedied. What a waste of time, money and resources.

We, as Kaneohe Bay Residents, do our part. We already do sacrifice our serenity to a point. We already do our part to insure proper training and safety of our Marines. Please do not attempt to take away the tranquil nature of our lives that is "Hawaii."

Sincerely,

Jacqueline Newell

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089

WRITTEN COMMENT FORM

Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

NAME: Dillon N. Cruz USMC vet. ~~1990~~ 1994

ADDRESS: PO Box 190721
Hawi HI 96719

PHONE/EMAIL: 808 430 6540

COMMENTS: *(Please print legibly)*

089-1 Thank you for respecting our desire to have an unblemished coast line. Thank you that we respect the sanctity & sacred nature of the North Kohala Coast. Thank you that we value a land free of military operations. Thank you that we love the migratory whales & choose to keep them safe. Thank you that we love the ocean & choose to keep it sacred & clean. Thank you for leaving us in PEACE.

Submit your comments at the meeting today, or mail or email no later than December 27, 2011, to:

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

This form may be used as a mailer if folded, taped or stapled, and stamped.

090

William P. Kenoi
Mayor

Darren J. Rosario
Fire Chief

Renwick J. Victorino
Deputy Fire Chief

County of Hawai'i
HAWAI'I FIRE DEPARTMENT
25 Aupuni Street • Room 2501 • Hilo, Hawai'i 96720
(808) 932-2900 • Fax (808) 932-2928

November 17, 2011

RECEIVED '11 NOV 22 AM 11:11

Attention: EV21, MV-22/H-1 EIS Project Manager
Naval Facilities Engineering Command, Pacific
258 Makalapa Drive, Suite 100
Pearl Harbor, Hawai'i 96860-3134

SUBJECT: EIS FOR BASING OF MV-22 AND H1 AIRCRAFT IN SUPPORT OF THIRD MARINE EXPEDITIONARY FORCE (III MEF) ELEMENTS

We have no comments to offer at this time in reference to the above-mentioned Environmental Impact Statement.

DARREN J. ROSARIO
Fire Chief

GA:lpc

Hawai'i County is an Equal Opportunity Provider and Employer.

091

DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAI'I

345 KEKŪANAŌ'A STREET, SUITE 20 • HILO, HAWAI'I 96720

TELEPHONE (808) 961-8050 • FAX (808) 961-8657

December 8, 2011

EV21, MV-22/H-1 EIS Project Manager
Department of the Navy
Naval Facilities Engineering Command, Pacific
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

DRAFT ENVIRONMENTAL IMPACT STATEMENT
THE BASING OF MV-22 AND H-1 AIRCRAFT IN SUPPORT OF III MARINE EXPEDITIONARY FORCE ELEMENTS IN HAWAI'I
ISLAND OF HAWAI'I, HAWAI'I

We have reviewed the subject Environmental Impact Statement and have the following comments based on the two (2) training facilities on the island of Hawai'i.

Please be informed that there are no Department of Water Supply facilities within Pōhakuloa training area.

091-1 There is an existing service from the Department of Water Supply for the 'Upolu Airport. However, it is our understanding that training at this location will be transient in nature and will not increase the water demand at the Airport.

Should there be any questions, please contact Mr. Ryan Quitoriano of our Water Resources and Planning Branch at 961-8070, extension 256.

Sincerely yours,

Milton D. Pavao, P.E.
Manager-Chief Engineer

RQ:dfg

copy - Office of Environmental Quality and Control

. . . Water, Our Most Precious Resource . . . Ka Wai A Kāne . . .

The Department of Water Supply is an Equal Opportunity provider and employer.

092

From: Erich Wida [ewida@hawaii.rr.com]
Sent: Wednesday, December 21, 2011 5:40 PM
To: mv22h1eis
Subject: Noise

092-1 This is a letter to voice my families opinion that the current noise levels on Kaneohe Marine Corps are already too much. It constantly keeps my young children awake at night, when they need to get enough sleep for the next day at school. The helicopters constantly fly over our houses for some reason when they have the whole ocean and bay to use. I realize these troops need to train, and we support them by putting up with the current noise. Adding more aircraft and noise would just be over the top. We ask that you please think of the taxpaying hawaii residents that you are already inconveniencing before allowing more noise at that base. If you would limit the training from 7am to 8pm it would help. But we've seen fighter jets take off in the middle of the night waking up thousands of people. PLEASE NO ADDITIONAL NOISE AT MCBH!!!!

Mahalo,

The Wida family

44-

543b Kaneohe Bay Dr

Kaneohe, Hi 96744

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093

From: William Sager [mailto:kumuwaiwai@me.com]
Sent: Tuesday, December 27, 2011 9:47 AM
To: Sue Sakai
Subject: MCBH DEIS

I'm a member of the Kaneohe Neighborhood Board and have been watching the flurry of communications regarding the DEIS with interest.

Personally, I think the great deficiency in the DEIS is in the way they analyze potential noise problems. Averaging the dbh over a 24 hr period doesn't properly reflect the problem. Over the years I've gotten numerous complaints from my constituents about being woken up by blasts of noise from low flying helicopters or from the roar of jet engines while fuel was being burned off. It always about how loud they were blasted by noise and for how long.

093-1 People have no experience with the noise generated by an Osprey. They have not experienced the affects of expanded operations, Kaneohe people are very supportive of the Marines. We tolerate the noise as a necessary part of their operations, but there is a limit of that tolerance and many people are concerned with how much impact the changes at the Marine Base will have on them. Many others will not become concerned until they have experienced the real thing. Then the Marine Corps can expect a very serious negative reaction. I sincerely request that the DEIS more adequately address the noise issue and recommends ways to mitigate the impact on our community.

William Sager, 808-375-1114
Malama Aina - Caring for Hawaii
kumuwaiwai@me.com
Watch Olelo Channel 52 Thursdays at 5pm or go to http://ow.ly/3PUqu

1

094

From: george coates [george.coates1@gmail.com]
Sent: Saturday, December 24, 2011 10:18 AM
To: mv22h1eis
Cc: kbresidentsinitiative@gmail.com
Subject: Kaneohe Marine Corps Base DEIS, public comment

Dear DEIS Administrator

Subject: Draft Environmental Impact Statement/ Kaneohe Marine Corps Base

I am informed that Belt Collins is receiving comments from the public regarding the Subject DEIS. Please include my comments:

We are resident home-owners on Kaneohe Bay. Our home is on Bayside Place, about 4 miles from the Kaneohe Marine Base. Our concern is that expanded aircraft activity will subject ourselves to additional and excessive noise. Although we do not live immediately below the final approach for aircraft landing, we are "downwind" from the runway and at times the noise, especially from the "fighter aircraft", is severe. Also, when helicopters "circle" the Bay as they do from time to time, they create noise levels high enough to inhibit conversations between two people. So far, the Base has kept the noise from the fighter aircraft to daytimes, about once every two weeks so that except for when the pilots practice "touch and gos" we can live with the noise. The helicopter noise is more frequent and sometimes it happens at night. The noise from large transport type aircraft has, so far, been less intense and is tolerable.

The large hangars, built as they are one the Bay, exposed to view are an eyesore.

In summary:

094-1 1) Because of the noise generated, we are opposed to the increased use of fighter aircraft and helicopters. We are also opposed to night aircraft opeations.

094-2 2) Because of the appearance of the Bay shore, we are opposed to seeing the large "white" omnipresent builidngs. We would want these and any new such structures to be shielded from view by more considerate painting and landscaping.

Sincerely,

George Coates
45-005 Bayside Place
Kaneohe, Hi. 96744

1

095

From: Robert Coster [rcoster22@yahoo.com]
Sent: Thursday, December 22, 2011 2:17 PM
To: mv22h1eis
Cc: kbresidentsinitiative@gmail.com
Subject: KBMCB LETTER OF OPPOSITION
Attachments: KBMCB LTR.docx

Please find attached my letter in opposition of the effort to expand aircraft inventories and flight hours at the Kaneohe Bay Marine Corp Base.

Regards,

Mr. & Mrs. Robert Coster

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095

Mr. & Mrs. Robert A. Coster
46-317 Ikiiki Street
Kaneohe, HI 96744
Rcoster22@yahoo.com
360-852-4815

Department of the Navy
Naval Facilities Engineering Command
Pacific Division
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive Suite 100
Pearl Harbor, HI 96860-3134

SUBJECT: OPPOSITION TO PROPOSED INCREASE IN AIRCRAFT TRAFFIC KBMCB

095-1 The current proposal to bring new aircraft types, and with them an increase in OPTEMPO is dismaying. As I sit here overlooking Kaneohe Bay writing this, a very large military cargo plane is in the pattern making laps while helicopters orbit the inner area adjacent to the base runway. The noise level is no different than living at the end of the runways at an international airport. I don't even bother attempting to watch television or listen to music while flight operations are being conducted. It's useless. Flight operations are supposed to cease at 2200W however that doesn't seem to apply to maintenance activities when both helicopters and fixed wing aircraft sit on the ground and do engine run-ups at all hours of the night (all days of the week). Additionally, training missions are routinely planned to take advantage of both day and night landings. This conveniently coincides with the early evening dinnertime for most families. So we sit and eat and stop talking to watch our drinks vibrate about every three minutes to allow the aircraft to pass overhead. If it wasn't for DVRs on our televisions, we would never be able to watch the evening shows. Now, we just pause the show and wait for the sound to fade to a level where we can hear the audio again. Paradise.

095-2 Let me address pollution concerns for a moment. The neighborhoods down wind of the base are always beset with the smell of unburned jet fuel during flight operations. When the winds are light it is especially bad. One of your spokesmen stated that the majority of the fuel is carried up and over the populated areas by the trade winds. So it's suppose to be better to have it impact the mountainside where it can more easily enter our water supply? Have you studied how much benzene is accumulating in the groundwater and bay?

095-3 For the base to now push for a plus-up on runway activity with newer, louder aircraft and increase the OPTEMPO is unconscionable. Further, to not have actually taken sound level readings, and instead use computer modeling is not sound (no pun intended) science. Then to take those figures and average them into the time when no aircraft are running is at best insincere. Did you realize we hear morning and evening colors across the bay when aircraft noise doesn't drown it out?

095

095-4 Let's talk a moment about being good stewards of tax dollars for a moment. Please explain to me how it is better to bring more people and equipment to the far ends of supply chains makes budgetary and logistical sense. Personnel transportation, housing, fuel, parts, freight, and cycle times are all negatively impacted by having a training operation here in Hawaii. Why is it better than being centrally located at areas on the mainland?

095-5 It is our sincerest wish that you would strongly reconsider the current course of action to bring the new aircraft and increased OPTEMPO to our already negatively impacted bay. If you insist however, I would hope that you do an actual EIS to identify actual baseline levels of ongoing noise pollution and chemical contamination of our neighborhoods and bay. In fact this community is going to insist on it.

Sincerely,

Mr. & Mrs. Robert Coster

096

United States Department of the Interior

NATIONAL PARK SERVICE
Kalaupapa National Historical Park
P.O. 2222
Kalaupapa, HI 96742

Tel: 808-567-6802
Fax: 808-567-6729

RECEIVED
'11 DEC 28 P1:42
NAVFAC Pac

December 27, 2011

Department of the Navy
Naval Facilities Engineering Command, Pacific Division
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

Subject: Review comments from Kalaupapa National Historical Park regarding compliance with National Environmental Policy Act (NEPA) and Section 106 of the National Historic Preservation Act (NHPA) on the undertaking 'Basing of MV-22 and H-1 Aircraft in Support of III MEF Elements in Hawai`i'

To the MV-22 / H-1 EIS Project Manager:

096-1 Kalaupapa National Historical Park (NHP) appreciates that two Department of Defense representatives visited the historical park for a community meeting on December 13, 2011 however; we are disappointed that Kalaupapa was not recognized earlier on in the EIS process as an important location to hold a community meeting. We believe that this would have allowed Kalaupapa NHP to be more engaged in the development of the NEPA environmental document as well as ongoing Section 106 consultation, and would have allowed us more time to pool our comments together.

096-2 Kalaupapa NHP recognizes the critical need for military training with various aircraft in order to protect the American people, however there are at least two other State airports in Hawaii that are not currently utilized by the Department of Defense that should be considered in the EIS process as alternate training sites to eliminate the need for such flight training activities at Kalaupapa. There needs to be recognition and appreciation of the importance to preserve and perpetuate special and sacred places in this country; this being the mission of the National Park Service. The site-specific mission at Kalaupapa NHP is not only to preserve and protect the many natural and cultural resources, but also to preserve and protect the character of Kalaupapa. Through lengthy analysis[1], Kalaupapa's character is largely defined by its sacredness, uniqueness, and remoteness.

096-3 In addition to being a national historical park, Kalaupapa NHP also contains the designation of Kalaupapa Leprosy Settlement National Historic Landmark (NHL). Section 106 of the NHPA regulations (see §36 CFR 800.10) state that there are special requirements for protecting National Historic Landmarks including 'special consideration' to protect NHLs (§36 CFR 800.10(a)), and Involvement of the Secretary of the Interior (§36 CFR 800.10(c)) in consultation involving an NHL. We have not seen this reflected in either your Section 106 hand-outs, or the DEIS[2].

[1] *Kalaupapa NHP General Management Plan / Environmental Impact Statement*
[2] *Draft Environmental Impact Statement*

In addition, Kalaupapa NHP is now a designated National Natural Landmark (North Shore Cliffs) and we have identified the need to pursue additional designations through our on-going General Management Plan[3] including designating the Kalaupapa peninsula as a Traditional Cultural Property (TCP) and / or an Archaeological District, as well as a UNESCO[4] World Heritage Site.

Furthermore, you may be aware that Saint Damien was recently canonized in 2009 and is internationally recognized and associated with his work in Kalaupapa. Another missionary renowned for her work in Kalaupapa, Blessed Mother Marianne will be canonized as Hawaii's second saint in October 2012. The fact that both Saint Damien and soon to be Saint Marianne are both from Kalaupapa and widely celebrated for their labor with the Hansen's disease patients at Kalaupapa is extraordinary.

096-4 On the whole, we do not find that the existing, and/or proposed expansion training activities by the military at Kalaupapa to be compatible with the historic character of this sacred site. There does not seem to be a compelling argument grounds to continue, and furthermore expand, training activities at this location. It is true that there is a continuance of 'past practice' and 'existing conditions' that have allowed the military to conduct training procedures at the Kalaupapa location. However, this was done before the park was established. There are other alternate airport locations in Hawaii for the military to engage in these training operations and these alternative training locations should be fully investigated.

096-5 We do not concur that the Area of Potential Effect (APE) of 350 feet around the airport strip is appropriate. Furthermore, there should also be a vertical APE to reflect the 0-500 ft. of airspace, especially since a national historical park site with the growing stature of Kalaupapa needs to be protective of soundscapes and visual aesthetics such as night sky that are significantly diminished by military training flights. These two elements are crucial in defining the character of what is Kalaupapa. We have identified soundscape and night sky as necessary analysis within our own undertakings.

096-6 We are also very concerned that the soundscape from continued flight training exercises may negatively impact the following marine animals through habitat avoidance by the increase in the frequency of events or an overall increase in decibel levels during a given event due to multiple aircraft utilizing the airport:

a) Humpback whales (endangered species) during winter and early spring months when they migrate around Kahiu Point at the tip of the peninsula.

b) Hawaiian monk seal (endangered species) throughout the year, but especially during the spring and summer months as seals utilize Iliopi`i beach as a pupping area and Ho`olehua beach as a haulout site. Air decibel levels need to be considered in a section 7 consultation with NOAA. Kalaupapa National Historical Park went through this process on a previous project

c) Green sea turtle (threatened species) throughout the year in near shore waters around the airport.

096-7 We noticed that in Table 6-8, that MBTA-listed birds have been recorded at the airport but the impact statement only talks about the Bird / Wildlife Aircraft Strike Hazard (BASH) risks. We believe that this analysis is in the view of the aircraft, but is not sensitive to the affect on birds.

a) Migratory birds such as the Pacific Golden Plover (*Pluvialis fulva*, Kolea) which utilize the coastal vegetation around the airport for feeding and forage in the nearshore waters.

b) Seabirds such as the Black Noddy (*Anous minutus*, Noio) which nest in rookeries along the eastern side of the peninsula in close proximity to the airport.

[3] *Kalaupapa NHP General Management Plan / Environmental Impact Statement*
[4] *United Nations Educational, Scientific and Cultural Organization*

096-7 c) The threatened Newel Shearwater (*Puffinus auricularis*, 'A'o) and endangered Hawaiian Petrel (*Pterodroma sandwichensis*, 'Ua'u) seabirds breed up in the valleys but may transit around the airport and forage in the nearshore waters. Visual identification of these species has been limited to handful of sightings on the peninsula.

Strong consideration needs to be given to Kalaupapa National Historical Park's enabling legislation that mandates protection and preservation of the community life for the remaining Hansen's disease population as well as the cultural resources and natural resources throughout the park in perpetuity for the American people. We do not find the undertaking within our park boundary and jurisdiction to be compatible with the mission of the National Park Service. If you would like to discuss these comments further, please contact me at: 808-567-6802 x 1100 or by email: steve_prokop@nps.gov.

Sincerely,

Stephen Prokop
Superintendent, Kalaupapa National Historical Park

CC:
William Aila, Department of Land and Natural Resources
Alapaki Nahale-a, Department of Hawaiian Homelands
Marvin Moniz, Department of Transportation (Maui District Manager)
Loretta Fuddy, Department of Health

From:	Joy Quick [quicks001@hawaii.rr.com]
Sent:	Monday, December 26, 2011 2:42 PM
To:	mv22h1eis
Subject:	Comments regarding the proposed increase in aircraft activity
Attachments:	KMCBH EIS Complaint 12-11.doc

Dear EIS Project Manager,

I am sending my comments in attachment. Please contact me if you have any questions.

Thanks, Susan Quick

1

097

12/26/11

Department of the Navy
Naval Facilities Engineering Command, Pacific Division
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Dr., Suite 100
Pearl Harbor, HI 96860-3134

RECEIVED
'12 JAN -3 A11:12
NAVFAC Pacific

Dear EIS Project Manager,

I am writing to give my comments and concerns about the proposed increase in aircraft and infrastructure at MCBH in Kaneohe. I believe it is important for you to hear from Kaneohe community members who would be greatly impacted by the increase in activity on the base.

097-1 The current levels of aircraft activity and noise are at times loud and disruptive to normal conversation within my home. When aircraft engines are running and are allowed to sit on the runway for hours at night, the noise disrupts my sleep, sometimes for many nights in a row. When the helicopters fly over my house, the noise is overwhelming and my windows shake. These noises make me feel tense and uptight as they are not normal neighborhood noises and were not present until just a few years ago. I feel that I have no recourse about the disturbing aircraft noises and am extremely concerned that the situation will be made worse if there is an increase in aircraft activity.

During the last two weeks it seems like the aircraft activity at the KMCBH has been considerably quieter than before, perhaps because of the holidays, the current visit from the President and his family, or something else completely unrelated. Only now have I noticed the return of the birds singing in the early morning and have enjoyed a quiet and peaceful beginning of my day. The birds used to sing every morning, something I have cherished about living in Hawaii.

I have lived in my house here off the Bay for over 20 years and never intended to live on an active military base. I understand the importance of defense and military activities, especially in recent years. I want to be a good neighbor, but feel that there is a current disregard for me and my neighbors who are forced to endure the current noise levels on base. To allow an increase in aircraft activity on base and the surrounding area will make the situation much worse, and for some of us, unbearable.

097-2 In addition to my concern about the noise levels, I also have concern about the increase in black dust/pollution that comes in my windows and screens from the jet fuel drifting across the bay. I have no idea what chemicals are being carried within the dust, and would be happy to provide a sample to the Environmental Protection Agency to study. I have greatly appreciated our relatively clean air quality here in the islands and am concerned about the additional pollution from an increase in aircraft activity.

097-3 My final concern stems from the likelihood that property values in my neighborhood will significantly decrease if there is an increase in aircraft activity at KMCBH. This has been a very nice neighborhood where I have raised my kids and enjoyed a spectacular view of Kaneohe Bay. If there is an increase in aircraft noise, the peaceful serenity I have enjoyed will be taken away. I likely would want to sell my

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house and move. My home has been a major financial investment, and that investment stands to decline if property values drop due to deterioration in the standard of living which I have enjoyed.

I urge you to consider my comments and re-evaluate the plan to increase the aircraft activity at KMCBH. I greatly value my lifestyle and home here in Kaneohe and do not want to move away because of a decision that will be incredibly disruptive to the people living here.

Sincerely,

Susan J. Quick

Susan J. Quick, homeowner
44-117 Puuohalai Pl.
Kaneohe, HI 96744
quicks001@hawaii.rr.com

098

United States Department of the Interior

NATIONAL PARK SERVICE
Hawai'i Volcanoes National Park
Post Office Box 52
Hawaii National Park, Hawai'i 96718

IN REPLY REFER TO:
L7621 (8300)

December 20, 2011

Memorandum

To: Regional Environmental Officer,
DOI Office of Environmental Policy and Compliance

From: Park Superintendent, Hawaii Volcanoes National Park

Subject: ER 11/1056 DEIS Basing of MV-22 and H-1 Aircraft in Hawaii

Hawai'i Volcanoes National Park appreciates the opportunity to review the Draft Environmental Impact Statement (DEIS) for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii. Our primary concerns lie specifically with the potential for impacts from activities adjacent to Mauna Loa Volcano within the boundaries of Hawai'i Volcanoes National Park (HVNP) or resources that may be shared by HVNP and Pohakuloa Training Area (PTA). We are especially concerned with noise that could potentially travel to parklands and could impact park resources and values including visitor experience, cultural resources including cultural landscapes, Congressional designated wilderness and threatened and endangered wildlife.

098-1 Section 4.5.2.3 (pg. 4-45) discounts any noise impacts due to aircraft operations 'not in proximity to residential or noise sensitive land uses.' However, PTA is adjoined by HVNP, which lies only 4 miles from the southern edge of PTA. The document needs to consider, model, and analyze the potential noise impacts to cultural resources, recreational users and wildlife, as they are important 'noise sensitive receptors' from a conservation perspective.

098-2 The National Park Service manages park soundscapes or "natural quiet" as a park resource, which is based on public law and is defined in NPS policy. In 2007, park studies revealed nearly two-thirds of surveyed visitors rank the ability to hear natural sounds as important to their enjoyment and appreciation of the park and three-quarters of these visitors equate annoyance and negative feelings with human-caused sounds including aircraft and vehicle noise (2007 Social Science Research to Inform Soundscape Management, Steve Lawson, Department of Forestry, Virginia Polytechnic Institute and State University). We encourage you to address soundscapes in your analysis, or at a minimum, consider the impacts of noise on recreational users, wildlife and cultural resources not only within PTA but in the surrounding areas.

098-3 We also request advance notice of aerial gunnery and live fire activities so that we may post information at trailheads and alert our backcountry office to better inform our wilderness users.

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Mauna Loa Volcano is part of the park's 123,100 acres of congressionally legislated Wilderness. Known as the Mauna Loa Unit, this designation provides special protection to this area of Mauna Loa that is demarcated by the park boundary on the north and east sides of the park. We appreciate your selection of alternatives that avoid any impacts to designated park wilderness.

098-4 Our concerns also include the potential impacts of noise generated from ground activities and low flying aircraft that may be adjacent to or in close proximity to the park's designated wilderness. The primary wilderness trail for visitors to access the Mauna Loa Summit and associated backcountry cabins run parallel to the boundary of PTA. The associated noise is unexpected for park visitors and would potentially limit opportunities for solitude that are protected under the Wilderness Act. The island's large expanses of lava produce landscapes that offer little sound shielding, creating long "time audibles" for human or mechanized sounds. Our own noise modeling in this type of lava terrain indicates that noise travels great distances (2007 NPS Natural Sounds Program Draft Acoustic Report). In these areas, noise has the potential for creating an acoustic impact on wilderness users.

The NPS mission to conserve park resources and values unimpaired requires a different standard than *significance* as defined by the Federal Aviation Agency (FAA) and other agencies. For example, FAA Order 1050.1E, Environmental Impacts: Policies and Procedures, notes that special consideration needs to be given to the evaluation of the significance of noise impacts on

098-5 noise sensitive areas within national parks. In order for the NPS to assess potential impacts to park resources, values and visitor experience, we request that the environmental impact analysis include audibility based, or "time above," metrics in order to express the time that sound levels are above ambient. This takes into account the duration of aircraft noise events, the number of aircraft noise events, and the absolute sound level of events. Time above metrics correlates better with flight operations than day-night average metrics (DNL), which may obscure the dynamic range of acoustic events (www.fican.org/pdf/HanscomNoise.pdf). We believe these supplemental metrics would also better satisfy the requirements under the National Environmental Policy Act to characterize impacts to the environment in terms of intensity, context and duration (40 CFR 1508.27).

NPS is aware that typically the Department of Defense uses the day-night average sound level (DNL) metric in their environmental impact assessments. DNL is an energy-based noise averaging metric widely used by the Federal Aviation Administration (FAA) and the Department of Defense as the primary means for determining the cumulative noise energy exposure of individuals to noise resulting from aviation activities. Hence, thresholds of significance that have been established by the FAA are based on community response. FAA Order 1050.1E notes that special consideration needs to be given to the evaluation of the significance of noise impacts

098-6 on noise sensitive areas within national parks. Since assumptions regarding DNL levels are community-based in relation to airports, this metric and the 65 DNL threshold is not adequate to assess impacts of noise to park resources, values and visitor experience. Supplemental noise metrics that have been useful to supplement DNL analyses for both military and civilian aircraft noise exposure around noise sensitive areas include the following:

- Maximum A-weighted Sound Levels (Lmax);
- Sound Exposure Level (SEL);

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098-6

- Equivalent Sound Level (Leq);
- Time Above a Specified Sound Level (TA);
- Number-of-events Above a Specified Sound Level (NA);

Source: Improving Aviation Noise Planning, Analysis and Public Communication with Supplemental Metrics, Guide to Using Supplemental Metrics, Department of Defense Noise Working Group, December 2009. Hawaii Volcanoes National Park can provide location points for modeling noise impacts at noise sensitive locations of concerns in the park.

098-7 The DEIS only addresses the use of the actual landing zones/drop zones (LZs) at PTA. However, the training activity that will occur with the MV-22 and H-1 includes terrain flight (TERF) and low altitude training (LAT) (pg 2-31). Both of these are low altitudes flights that are presumably occurring more than just over the LZs that were addressed in the document. The impacts of the overflights and associated ground training activities (including live fire training) on wildlife, recreational users, wilderness values and cultural landscapes need to be considered as part of the environmental analysis, not just the hovering, landing and take-off. The impacts of increased noise and activity related to this training needs to be clearly analyzed (e.g. number of personnel, numbers of days/hours for aerial gunnery, type of live fire to be used, noise levels generated, noise contours, etc. The document states that there will be an increase in annual operations of aircraft by 14,697 at PTA. How will this annual increase be implemented per each actual training day? Will it be concentrated over a specific period of time or spread out over the year? The cumulative impact of the recent PTA Modernization DEIS should be considered in the cumulative impact analysis. In addition, the travel route of MV-22 and H-1 between Oahu, other training sites, Upolu Airport, and PTA needs to be similarly analyzed. The document currently only addresses impacts to residential areas.

098-8 The DEIS states there are only five T&E species at PTA (pg. 6-28) which is contrary to previous PTA military planning documents (e.g. 2011 PTA Modernization DEIS). The DEIS needs to be clear regarding whether it is referring to PTA in general or the project area, or if it is referring to plants, animals, or both. Appendix F does list all T&E species consistent with previous documents. On page 4-139 the wrong scientific name is listed for the Hawaiian goose.

The T&E surveys were conducted at one point in time and don't account for seasonal variations that may occur in species' use of areas, or the ephemeral nature of some T&E plants. The DEIS should not discount that species may use these areas in other times of year and hence be impacted by the proposed project. There are also species that traverse the area and may be impacted by the proposed operations (e.g. Hawaiian petrels).

098-9 The federally endangered Hawaiian Petrel ('Ua'u) and proposed endangered (and presently state listed endangered) Band-rumped Storm Petrel ('Ake 'ake) are nocturnal long distance flyers whose nesting activities and aerial displays occur within the park primarily from 5,000'-10,000' elevation on Mauna Loa. Recent documented calling birds in the Kohala Mountains at 3,000'-3,200' suggest the federally endangered Hawaiian petrels may still use lower elevations on Hawaii Island where conditions permit.
There is potential for these birds to occur within the region of influence, particularly when in transit.

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The noise, vibrations and visual intrusions generated by ground activities and low flying aircraft, particularly any night activities during the breeding season, could potentially alter bird behavior and result in negative impacts to birds.

098-10 We have additional concerns about the potential impacts to the federally endangered Hawaiian goose (Nēnē) that is known to utilize several areas in the Saddle region including PTA and the neighboring Kipuka Ainahou Nene Sanctuary. The majority of birds found in the Saddle region actually originate from other populations across the island. Nene are known to move seasonally between multiple areas, including to and from Hawaii Volcanoes National Park, and flight routes and stops around Mauna Loa and in and through the Saddle area are still not well understood and not necessarily consistent. Because endangered Nene do indeed utilize as well as traverse the project area, it is not possible to rule out the potential for impacts due to increased noise, vibrations and visual intrusions generated by ground activities, low flying aircraft or potential wildfire which could alter bird behavior on the ground and result in negative impacts to birds. We appreciate that you indicate that you will consult with USFWS as consultation with subject experts familiar with bird use in the impact area are recommended to effectively evaluate potential impacts to birds by the proposed expansion and increase in use, and mitigation measures identified as needed.

098-11 On page ES-15 the DEIS states that no unmitigable impacts have been identified. However, since consultation with USFWS and SHPO has not been completed, this is undetermined at this point in time.

098-12 Although your project does not propose flights above the park, please note Kīlauea Volcano continues to experience an ongoing summit eruption at Halemaumau Crater. The FAA has issued a Temporary Flight Restriction, (TFR) for aircraft safety for explosive eruptions and presence of ejected volcanic particulates at Kīlauea Summit (NOTAM: Hilo Vortac (ITO) 209 degree radial at 24.6 miles (Latitude 19°24" 20" N, Longitude 155° 17"26"W) for a current radius of 3 nautical miles. This is from the surface up to and including 4000'agl.) Eruptive activities are continuing to produce a hazardous ash cloud which may cause aircraft engine damage/failure and abrasion damage due to airframe and windshield surfaces. Plume size fluctuates. Explosive events with large amounts of ash can appear with no warning.

Visitors come to their national parks to experience the natural quiet and solitude. Park managers are charged with protecting critically endangered species, designated wilderness and park soundscapes as well as limiting activities that cause unnecessary noise or threaten the natural quiet. Both agencies are jointly engaged in protecting our country and its resources. We anticipate working with you to build a cooperative relationship and resolve our concerns as the planning progresses.

For further information or clarification on these comments, please contact Danielle Foster, Environmental Protection Specialist, at (808) 985-6073.

099

William P. Kenoi
Mayor

William T. Takaba
Managing Director

Dora Beck, P.E.
Acting Director

Hunter Bishop
Deputy Director

County of Hawai'i

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

25 Aupuni Street • Hilo, Hawai'i 96720
(808) 961-8083 · Fax (808) 961-8086
http://co.hawaii.hi.us/directory/dir_envmng.htm

December 20, 2011

Department of the Navy
Naval Facilities Engineering Command, Pacific
258 Makalapa Drive, Suite 1009
Pearl Harbor, HI 96860-3134

Attention: EV21,MV-22/H-1 EIS Project Manager

Re: EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawai`i

We have no comments to offer on the subject project.

Thank you for allowing us the opportunity to review and comment on this project.

Sincerely,

Dora Beck

Dora Beck, P.E.
ACTING DIRECTOR

100

From: Cathy Brigham [cathybrigham@hawaii.rr.com]
Sent: Thursday, December 22, 2011 4:45 PM
To: mv22h1eis
Subject: Kaneohe Bay

Dear Department of Navy:

100-1 We have experienced an increase in air traffic over Kaneohe Bay and are very disturbed by the increased noise. I understand the noise level is going to increase dramatically if it were to be that you move forward with your plan to bring this training to Kailua.

Kailua and Kaneohe are residential communities in addition to being them home of the Kaneohe Marine Corp. We have always lived as neighbors and would hate for this to become an issue. Please reconsider bringing this training to our peaceful airspace. We have been very tolerant of the current amount of noise and activity. We love our Marines, but would love to see you find a more suitable situation to conduct your training.

Sincerely,

Cathy Brigham
116 Kailuana Loop
Kailua, HI 96734

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101

From: christian werjefelt [mailto:cwerje@hotmail.com]
Sent: Tuesday, December 27, 2011 11:25 AM
To: mv22h1eis@beltcollins.com
Subject: Proposed Expansion for KMCBH

To whom it may concern,

I am very concerned about the proposal to increase aircraft activity at KMCBH. The level of activity is already at a near unbearable level for the surrounding community and an increase will be irresponsible and indicate a clear lack of concern for the surrounding communities and wildlife in the area.

The DEIS which was made is inadequate and does not accurately reflect the true repercussions of this action. The dificiencies include:

Inadequate and incorrect analysis of:
-noise pollution
101-1 -effects of surrounding community
-effects of quality of life
-analysis of wastewater treatment facility
-human health effects
-wildlife and conservation area surrounding the base

101-2 The current level of activity on the base already is too much. There are endless jets running their engines sitting on the runway, endless touch and go's, helicopters flying over the community. It is unacceptable that the community is not more aware of the proposed increase in activity which is just around the corner. The military base has endlessly disregarded community requests to stop having the helicopters buzz the surrounding community. One helicopter crashed within the last year. Luckily it was over Kaneohe Bay and not the residential area. An increase in activity will increase the chances of these incidents. Furthermore, the quality of life for residents and wildlife will be negatively impacted.

What is the need for such an increase in our backyard on such a small island??? There must be military bases in more remote areas which could handle this type of activity.

Sincerely,

Christian Werjefelt

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From: Isayama [mailto:isayama@hawaii.rr.com]
Sent: Monday, December 26, 2011 7:49 PM
To: 'mv22h1eis@beltcollins.com'
Subject: DEIS for the basing of MV-22 and H-1 aircraft in support of III MEF Elements in Hawaii

RECEIVED

December 26, 2011 '12 JAN -3 A11:17

NAVFAC

Department of the Navy
Naval Facilities Engineering Command
Pacific Division
Attn: EV21, MV-22/H-1 EIS Project Manager258 Makalapa Dr., Suite 100
Pearl Harbor, HI 96860-3134
E-mailed as well to mv22h1eis@beltcollins.com

Response to DEIS for the Basing of MV-22 and H-1 Aircraft in Support of the III Marine Expeditionary Force Elements in Hawaii

I request that no action be taken on either Plan A or Plan B at least until further and correct analysis is made of the impact on the environment.

102-1 We have resided on the shore of Kaneohe Bay for 25 years and of course were aware of Kaneohe Marine Corps Air Base when we purchased our property. There has been a varying level of noise from Base activity over the years, but the level of noise and other environmental disturbance proposed in the subject DEIS far outweighs anything heretofore. Consideration of any activity's impact on the environment is invalid unless one also considers the combined activity of all the services that use the Kaneohe Base and fly over the Bay---the Army, the Navy, and the Marine Corps.

102-2 I must begin by saying that it appears ingenuous of the Department of the Navy to have chosen this particular time of year to present the DEIS to the public as many residents are either off island or busy with family. Both individuals and community groups requested a time extension to allow for more community consideration, but the request was denied by the Navy.

We believe the DEIS is flawed in the following aspects

Inadequate assessment of NOISE

*When the DEIS states that the future aircraft noise increase from the introduction of 24 Osprey helicopters, 15 Cobra helicopters, and 12 Huey attack helicopters is minimal, it defies belief. "Existing noise sensitive land uses in the surrounding civilian community exposed to aircraft noise levels greater than 65 DNL would continue to be exposed to **similar** noise levels."???

102-3 *The noise from the subject aircraft must be considered in conjunction with the noise from the P8 jets that are also being introduced. The activity from the helicopters and the fixed wing aircraft may often take place at the same time. Therefore the combined sound must be measured with activity from the two concurrently.

*The increased frequency of aircraft noise resulting from these additional aircraft is not addressed in the DEIS. Obviously frequency plays a large role in the degree of disturbance to the affected community. It is merely common sense to think that when aircraft traffic increases 49%, there will be more noise.

102-4 *No actual measurements of existing noise levels were made. A computer-generated model differs from actual measurements as it does not reflect the effect of the water, mountains, and trade winds, factors that vary within the affected locations. The model failed to take into consideration the disturbing noise created by the present prolonged revving of engines and hovering which will increase with the introduction of additional aircraft.

102-5 *Perceived noise from helicopters has been found to be more disturbing than that from fixed wing aircraft. (http://www.medscape.com/viewarticle/516462)

Inadequate assessment of WASTE WATER ISSUES

102-6 * The DEIS proposes an addition of more than 1,000 residents on the Base and thus an increase in wastewater. At present, the overflow wastewater from the Base is handled by the Kailua Wastewater Plant which is currently acting under a Consent Decree for repeated violations of governmental environmental regulations. The Plant's ultraviolet sanitization equipment has been inoperable since 2009 releasing inadequately treated wastewater into the bay---in violation of the Clean Water Act, 33 U.S.C. #1251et. The use of this treatment plant by the Navy is then also noncompliant.

Inadequate assessment of POTENTIAL HEALTH EFFECTS ON HUMANS AND ANIMALS

102-7 *No assessment was made of the effects on human and animals from the increased contaminants resulting from aviation fuel in the bay or fumes in the atmosphere. These should be studied and included in an EIS.

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102-8 *No assessment was made of the effects of increased and more frequent noise on cardiac patients and others with fragile health. These should be studied and included in an EIS.

Inadequate assessment of the EFFECT ON EDUCATION

102-9 *No evaluation or assessments has been made as to the effect of the proposed increased activity and concomitant noise has on the teaching and learning environment at the several schools surrounding the bay. Many residents report having the suspend conversation during over flights, and one must wonder about classroom teaching in the same regard. An assessment should be made.

We strongly support the military and are enormously grateful for the protection they give our country. The above comments relate to flaws we believe exist in the DEIS and are in no way a reflection of any lack of appreciation of our armed forces. We thank you for this opportunity to express our views.

Respectfully submitted,

Pamela and Koichi Isayama
44-321 Kaneohe Bay Dr.
Kaneohe, HI 96744

103

Amy Kepilino

From: Debbie Chun [chund003@hotmail.com]
Sent: Tuesday, December 27, 2011 1:36 PM
To: mv22h1eis
Subject: Increase in Aircraft Activity

via email to mv22h1eis@belftcollins.com
Department of the Navy
Naval Facilities Engineering Command, Pacific Division
Attn: EV21, MV22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

Aloha:

Like most of my neighbors in Kaneohe and Kailua, I greatly respect and appreciate our military and its role in our community. Having lived on Kaneohe Bay Drive for more than 15 years and in the Kaneohe/Kailua areas all of my life, I think I speak for many residents that have quietly accepted the noise, pollution and other disturbances that Kaneohe Marine Corps Air Base (KMCAB) has generated. After all, many of us have family members who have or are serving, and we want to ensure that they are well trained for any deployment that may arise.

103-1 However, an increase in aircraft by nearly 50% and around the clock air traffic for maneuvers is unthinkable. The detriment to the quality of life for all residents in the Kaneohe/Kailua area will be severe. How will we be able to sleep? How will we be able to converse with our families? When will we have any peace and quiet? The idyllic windward side will turn into a nightmare.

103-2 Over the past 15 years there has been a considerable amount of growth at KCMAB, taxing our local resources and infrastructure. Please reconsider your plans for further (and noisy) expansion. Surely there are other alternatives you might explore. For many of us on the windward side, who have peacefully coexisted and supported KCMAB for many years, your recent plans have angered and saddened us.

Very truly yours,

Debra Chun
44-313 Kaneohe Bay Drive #C

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From: Wiecking, Ken [Ken.Wiecking@twtelecom.com]
Sent: Thursday, December 22, 2011 12:18 PM
To: mv22h1eis
Cc: Donna Wiecking
Subject: Comments - EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii
Attachments: 11MCBHFlightPaths30Nov.docx

Please complete the following information:

Name: Ken Wiecking
Company/Organization: Kaimalino Community Home Owner
Mailing Address: 663 Old Mokapu Rd
City: Kailua
State: Hawaii
Zip Code: 96734

Add to Mailing List? (Yes or No): Yes

...This message is sent requesting receipt of delivery and of reading of the text.

...A copy of this message will also be sent to;
Dept of the Navy
Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Management
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

Comments on the EV21, MV-22/H-1 EIS :
1. The main issues effecting me, my family and our Kaimalino neighbors relate to the current and future helo/tilt rotor/fixed wing operations at MCBH Kaneohe. These issues include but are not limited to:
a. Route..The least offensive route would be one on the extreme northern edge of the ponds that adjoin the Kaimalino community. A map is attached to portray a route which could be less offensive to our community. Current helo/rotary wing aircraft of not only USMC but other helo/rotary wing operators, have been offensive to our community in this flight corridor which requires a clear definition and enforcement of such flight operations now and in the future, including the next generation equipment described in the DEIS.

104-1

b. Altitude: A minimum of 500 ft MSL altitude is recommended for this flight route/path for all helo/tilt rotor/fixed wing operations over land masses including MCBH nearby ponds. .
c. Hours of Operation: Recommend all helo/tilt rotor operations be limited to 0700-1900.
d. Enforcement/Compliance: Enforcement of defined flight rules in this flight corridor must be the province and responsibility of MCBH Kaneohe since all such aircraft/helo operations are within the MCBH areas of responsibility..
e. A petition describing these four major points is attached herein. This petition is being submitted separately from this letter/message.

2. Other detailed responses to the draft EIS (DEIS) distributed by the USMC recently.
a. Noise evaluation methods:
(1) The DEIS noise analysis is based on a computer generated model which does not reflect actual conditions in the Kaimalino area and surrounding mountains.
(2) No actual measurements were taken of existing noise levels
(3) There was no mention of measurements at different points in the surrounding communities.
104-2 (4) The model did not address prolonged "Revving" of the engines or hovering which is a current and future issue/problem.
(5) The model used calculated sound generated from one runway but did not include areas such as helo pads which could be in use simultaneously with runway use.
(6) The computer modeling included a table which indicated that the P8s are not included in the sound modeling.

104-3 b. Effects on nearby real estate values.
The DEIS fails to adequately address the impact of these aircraft changes on property values in the effected civilian communities/areas. It is quite certain from even the DEIS noise figures that the Kaimalino and other similarly

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104-3 effected areas would have to be declared to be within an Air Installation Compatible Use Zone (AICUZ) and that such a fact would by law have to be revealed by any agent selling a property in the AICUZ, which numerous studies have shown that this could result in an average 27% decrease in property values. Perhaps the government could be required to provide such compensation for loss to each owner selling their home within the effected areas.

c. Other Noteworthy Effects on the surrounding community
104-4 (1) The DEIS fails to address and assess the increase in wastewater issues, i.e., wastewater is currently handled by an on base plant with overflow diverted to the Kailua wastewater facility via a contract with the city. The DEIS analysis does not mention that the Kailua plant is currently operating under a consent decree due to repeated violations of government environmental regulations. The DEIS also did not mention that the Kailua ultraviolet sanitization equipment has been inoperable for several years thereby releasing inadequately treated wastewater offshore.

I respectfully request that serious consideration be given to these constructive comments on the DEIS so that flight operations can be supported in the effected nearby areas but with serious consideration and concern for the effected civilian communities who are being effected.

Ken and Donna Wiecking
663 Old Mokapu Rd
Kailua

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Petition to Marine Corp Base Hawaii

We the citizens of Kaimalino are concerned about the noise level and our safety from the rotary wing aircraft that are entering and departing MCBH in close proximity to our neighborhood, both in current and proposed flight operations(flight paths and altitudes).

In order to reduce the current and future offensive flight operations we propose the following:

1. That the flight path be moved north closer to Eagle or Boondocker (the northeast edge of Nuupia Pond and Kaluapuhi Pond) to minimize the offensive/intrusive noise level and safety concerns being observed in our Kaimalino neighborhood.

2. That these aircraft fly at 500 feet or higher on their ingress and egress from MCBH Kaneohe.

3.That these flight operations. be limited after 1700 hours

4. That a continuous monitoring system be developed by the USMC to insure and authenticate compliance with these new flight path restrictions to insure that all pilots are conforming to the restrictions.

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From: Tom Mitchell [mailto:Tom@ThomasMitchell.com]
Sent: Tuesday, December 27, 2011 3:24 PM
To: Sue Sakai
Subject: FW: Upolu Airport Comment Letter

Please acknowledge the receipt of this email.
Thank you very much.
Tom Mitchell

Tom and Michelle Mitchell
PO Box 1011
Kapaau, HI 96755
(808) 889-1988
(808) 345-7100

12/22/11

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

Attn: EV21, MV-22/H-1 EIS Project Manager

To Whom It May Concern:

We are writing regarding the proposed basing and operation of MV-22 Osprey tilt-rotor aircraft and H-1 helicopters in Hawaii and specifically the impacts related to the use of Upolu Airport located in the district of North Kohala on the island of Hawaii.

Our home is at 55-164 Kokoiki Road, Hawi, 96719 just over one mile from the airport. Please see a Google map below for our and other neighbor's locations in proximity to the Airport.

As residences who live very close to the Upolu airport and whose home overlooks the airport facility, we feel that our lives would be impacted greatly by this proposal and we have serious questions about the EIS concerning:

Noise

On Page 4-46, the EIS states:

4.5.2.4 Upolu Airport, Island of Hawaii

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"Aircraft operations are not in proximity to residential or other noise sensitive land uses to warrant noise modeling and analysis, i.e., noise impacts are not anticipated. Hence, no evaluation of existing conditions for aircraft noise was conducted at Upolu Airport."

Our Comment is any additional aircraft noise will have a negative impact. The fact that no study was done, or deems to be necessary, is not acceptable. Our home was built in 2005 and overlooks the airport. Even small single planes & tour helicopters are intrusive.

105-1 At the Nov 30, 2011 information meeting, many residents near Upolu stated that they would be directly opposed to additional air traffic and noise. We emphatically request a review of the increased noise levels and how this will impact the people living in homes in the area as well as those along the flight path.

The coastline proposed for flight training is lined with resorts filled with tourists expecting a tropical retreat to get away from the noises of their city and suburban lifestyles. The tourist industry, as you may know, is one of the top employers on the gold coast of Kohala and tourism is a driving source of revenue in our town of Hawi as well as the surrounding cities of Kapa'au, Waimea, and Kawaihae. We request that a study been done to understand how the noise will affect tourism, the mainstay of many local families. The town of Hawi is a "quiet, sleepy town" with many tourists, which is the economic support for the community.

Airspace & Aesthetics

4.3.2.4 Page 4-19: States that previous training had occurred there. We have occasionally seen military helicopters fly in and out of Upolu, but what is being proposed would be a 1000% increase as to what we have witnessed.

Table 4-6 States that annual operations at Upolu in 2009 was 800.

105-2 **Our Comment is that we work at home and look at that airport all day long.** We find this figure to be an exaggeration. We would like to know what this number is based on? With no airport control at Upolu, where did the 800 operations number come from?

Page 4-29, Line 1: states that 242 new MV-22 operations constitute 23% increase and that airspace impacts would be minimal. It does not offer a valid baseline for the increased training proposed.
Also the figures on Table 4-20 are misleading if the baseline of 800 is used.

4-9-2-4 Cultural Impacts

105-3 Upolu Airport and the surrounding lands are sacred to the Hawaiian people with the birthplace of King Kamehameha right nearby. We request further investigation into this matter with input from the local Hawaiian community. This is a serious matter with the need of an in-depth study.

4.8.2.4 Upolu Airport, Island of Hawaii

105-4 Information about natural resources at Upolu Airport was derived from the Upolu Airport Final Environmental Assessment prepared for DOT Airports Division (DOT 1999). This report is no longer valid and is outdated. Please have more updated information assessed.

105-5 Also, more in depth studies need to be done to determine the impact of the coral reef ecosystems known to exist in waters offshore from Upolu Airport.

2

Also the impact to sea life and other animals including, but not limited to the:

1. Green Sea Turtle
2. Endangered Hawaiian Monk seals
105-5
3. Humpback Whale
4. Hawaiian Owl (Pueo)
5. Other Native Bird Species

We have personally witnessed all of these animals in abundance in the past few years in the proximity of Upolu Airport.

We believe that the EIS for the proposed training activity at Upolu Airport in North Kohala does not accurately reflect the many impacts of increased helicopter activity.

We respectfully request, that updated revisions to the EIS document be conducted to reflect the reality of the Upolu Airport location. We know that some of the assumptions made in the EIS by the Belt Collins staff, whatever the sources, are outdated and incorrect seeing as we look directly down on the airport from our house.

105-6 We feel that the timing for comments was placed directly over the Christmas holidays 2011 in the hopes that no one would take time to comment. We were also disturbed that the November 30th , 2011 informational meeting was not conducted in the town where Upolu Airport resides (Hawi). The meeting was in Waimea, thirty miles from the proposed site and then another meeting in Hilo a hundred miles from Upolu Airport. Why was that the choice of meeting sites?

Why was a meeting not conducted in our community? Before any action is taken, we strongly insist that a meeting be held in our community of Kohala, not a far off location.

At the meeting mentioned above, the question was asked to the military staff and contractors, “How many of you have been to North Kohala?” Only one person raised their hand and stated that she had lived here 10 years ago.

Last, as an Army veteran, I offer support to our troops and to the need for training. My wife’s brother was a Naval Commander and Pilot as well, so she is supportive of the military. We hereby request that the department of the military and Belt Collins reevaluated the impacts of using Upolu Airport for military operations in a manner that is more precise and accurate concerning the actual impacts of such operations on the local community, animals (some of them endangered), tourism, and cultural heritage.

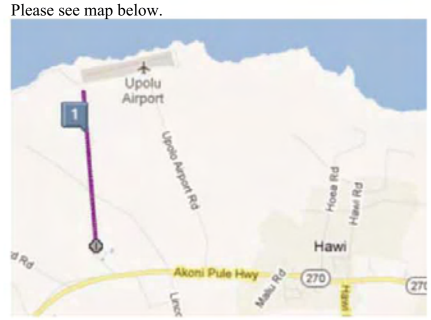
Respectfully,

Thomas and Michelle Mitchell
PO Box 1011
Kapaau, HI 96755
808 345 7100
808 889 1988

Physical residence:
55-164 Kokoiki Road
Hawi, HI 96719

Cc: Sen. Dan Inouye, Sen. Daniel Kahikina Akaka, Sen. Josh Green, Rep. Mazie Hirono, Rep. Colleen Hanabusa, Rep. Mark M. Nakashima

Please see map below.



~~~~~~~~~~~

Tom Mitchell
PO Box 1011
Kapaau, HI 96755
808-889-1988 phone
808-889-1688 fax
~~~~~~~~~~~

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Kohala Lihikai, Inc.

P.O. Box 76
Hawi, Hawaii 96719

Naval Facilities Engineering Command Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makapala Drive, Suite 100
Pearl Harbor, HI, 96860-3134.

Aloha,

Following are the comments of the North Kohala community organization Kohala Lihikai, which is an incorporated non-profit dedicated to the stewardship of lands both public and private in the district of North Kohala. The group partners with eight other community groups in cultural and historic preservation, stewardship of access and coastal restoration projects. It is currently involved in all three of those activities on State land seaward of the Upolu Airport runway. The project will involve identifying and relocating the public access trail/jeep road, identifying and stewarding preservation of any historic sites, taking steps to stabilize the surface run-off, creating a nursery of native plants and planting and nurturing native plants. The project is described in two news stories in the community newspaper Kohala Mountain News, July 23, 2011 and Oct. 29, 2011 (attached).

The project is being undertaken with the cooperation of the State Department of Transportation Airports Division, the National Parks Service Ala Kahakai Historic Trail, the Hawaii County Planning Department, the Kohala Middle and High Schools, and eight other Kohala community groups.

The connection between Upolu Airport and the military is long standing, and the Kohala community has long supported our men and women in uniform who have used the field for training. The comments by Kohala Lihikai are directed, not to the scope of the increased military use of the airport, but to the methods and findings of this EIS in identifying and mitigating impacts.

These comments can be summarized into two categories:

106-1
1. The EIS does not identify the current state of bare soil and surface erosion that is damaging both the land and the offshore reef seaward of the runway. (see attached photos) It does not acknowledge that the community, specifically Kohala Lihikai, the County, State and Federal agencies are working in cooperation to correct the situation. It does not offer ways to mitigate the possible extra damage that downdraft from helicopter landings would cause.

106-2
2. The EIS improperly limits the Area of Potential Effect (APE) of the project to a small parameter of the runway and ignores the noise, wind and vibration effects on two historic and cultural sites very important to Hawaiian history – Mo'okini Heiau and

106

106-2
Kamehameha the Great's Birthsite. It fails to locate these two sites as directly below the approach to the runway in prevailing wind conditions. Military actions such as the Confined Area Landings (CAL) listed in the EIS will have negative impacts on the cultural integrity and sensitivity of the sites as well as people associated with the sites and therefore steps should be taken to mitigate these impacts.

It is the opinion of Kohala Lihikai that its members, members of cooperating community groups and native Hawaiian members of the Kohala community will be impacted by the actions proposed at Upolu Airport. We are willing towork with the military to help mitigate these problems.

Thank you for the opportunity to comment on the EIS.

____
Toni Withington for Kohala Lihikai

ES.6 PUBLIC INVOLVEMENT

106-3
While notice of the EIS preparation were published in the Federal Register and the State OEQC Environmental Review, the preparers made no effort to contact organizations or individuals in the district of North Kohala either during the scoping process (August – September 2010) or through the Notice of Availability. It is probably fair to say that almost no one in the district was aware of the proposed increased activity at Upolu Airport until publication of a story in the West Hawaii Today on Nov. 10, 2011. During the scoping and 45-day comment period four public meetings were held on the Big Island. None were in North Kohala. The closest meeting was in Kamuela, 25 miles from Upolu Airport on Nov. 30, 20 days into the 45-day comment period. Even the groups and individuals who have been actively working on coastal restoration of land seaward of the Upolu runway since June 2010 were not aware of the proposed activity or pending EIS. It is our opinion that the preparers of the EIS did not make a good faith effort to notify the people living near the airport about the pending activity or EIS. A public meeting should have been scheduled in North Kohala.

No Recent Survey

106-4
The material stating the environmental findings in the EIS regarding Upolu Airport seems to have been taken mostly from a 1999 EIS prepared by the Department of Transportation, Airports Division. There is no indication that the preparers made any independent survey or review of conditions at the airport in the 12 years since the DOT EIS. Conditions have changed. The soil seaward of the runway has seriously eroded. The district is now subject to the North Kohala Community Development

106-4 Plan (Hawaii County Ordinance 08-151) which is implemented by the North Kohala CDP Action Committee. This document is evidence of increased community awareness of historic and cultural preservation as well as preservation of traditional access rights. Eight community groups are currently involved in a series of projects to restore native coastal vegetation and steward recently acquired public coastal land for cultural preservation and public access. The failure to address these physical and social changes is a major flaw in the EIS.

Environmental consequences 4.3.3.4

Nearby Land Uses.
A large wind farm is located in close proximity southeast of the airport with towers and blades reaching over 160 feet high.

Quality of the Built Environment.
106-5 Upolu Airport has limited potable water supply and no wastewater or solid waste facilities.

Public Access
106-6 The land seaward (north) of the runway has been used for generations for hiking, fishing, gathering, picnicking. A jeep road runs along the length of the shoreline. In recent years off-road vehicles and motorcycles have heavily used and created bare tracks over much of the land just above the rocky cliff on the western third of the strip of land seaward of the runway. New fences and gates installed by Airports Division in 2011 have limited the access of these vehicles and work has begun by eight community groups, coordinated by Kohala Lihikai, as well as the Ala Kahakai Historic Trail (NPS) to re-identify the original lateral jeep trail and replant the bare ground with native vegetation.

Noise 4.5.2.4

106-7 There are two residences and a farming business now located near the airport – one immediately off the west end and one south of the runway. Other homes are expected to be built on newly subdivided lots east of the runway.

Soils and topography 4.6.2.4

106-8 While soil erosion may have been moderate in 1999, it has reached a critical stage seaward of the runway today. Off road vehicle use has stripped vegetation from the tops of the cliff creating gullies that during heavy rains pour soil over the rocks onto the reefs offshore. Significant coral loss and diminished fish life have been noted by traditional users of the waters. No mention of these obvious conditions is noted in the EIS despite the fact that the Airports Division is taking steps with community help to mitigate the serious erosion.

Drainage 4.7.2.4

106-9 The EIS lists the rainfall at Upolu Airport as 15 inches (21 cm). The 2011 Rainfall Atlas of Hawaii lists the rainfall at Upolu Airport as 44.5 inches (113.2 cm).

106

Biological 4.8.2.4

Terrestrial Flora
106-10 The EIS says: Land surrounding the airport was dominated by introduced species. While there may be many exotic plants, the groups working on restoration have identified many native plants on site including Akulikuli (*Sesuvium portulacastrum)*, Hinahina (Argyroxiphium sandwicense), Ilima (Sida fallax), Naupaka Kahakai (Scaevola sericea), Niu (Cocos nucifera) and Pa'u O Hiiaka (Jacquemontia ovaliformis subsp. sandw.)

Terrestrial Fauna
106-11 The reported counts of the Pacific Golden Plover, apparently taken in 1997, do not reflect the number of plover (kolea) seen at the airport in the winter this year. The EIS gives a count for July (1997) at 23 birds. As a migratory species only a few birds overstay the summer, a large number roost during the winter and a much greater number gather at Upolu in the spring in preparation for migration and in the fall as they return from Alaska. The importance of this northern tip of the island to the migration of the kolea is significant. The birds arrive in September and start to leave in late April. The heavy season presence of the kolea should be noted in the EIS and efforts to mitigate BASH should be recommended.

Habitat
106-12 The coral reef system offshore of the airport is underrated in the EIS. This is an important fishing ground for the people of Kohala. Before the recent soil erosion the reef supported abundant populations of reef and pelagic fish. Who is Gordon Tribble? What makes him an expert having dove at Upolu 20 years ago? The EIS fails to mention that during the winter humpback whales are regularly seen and photographed very close to the shore. The whale sightings from shore are so prolific that NOAA uses the Airport as a location for counting whale populations during the winter.

Environmental Consequences 4.8.3.4

Operational Impacts
106-13 The EIS does not address the impact of turbulent air from the helicopters on the bare soil of the land seaward of the runway. Erosion by water is already a big concern. Add to that the turbulence of the aircraft. The coastal restoration program is expected to have young native plants growing in a nursery setting with volunteer workers and students tending and propagating plants. The impact of operations on these activities is not addressed.

Cultural -- Affected Environment 4.9.2.4

Areas of Potential Effect
106-14 It is not correct to say, as the EIS does, that the effects of the proposed military use of the airport on the archaeology and cultural resources will be limited to "the paved runway of Upolu Airport plus a 100-ft (30-m) buffer measured from the edge of the tarmac." It is unlikely that an archaeologist or cultural practitioner would make such a limited parameter for the impacts of the helicopter landings anticipated. This section of the EIS shows the greatest lack of investigation into the impacts of the proposed action. No original investigation or observation seems to have been made. No contact with people in the North Kohala community was made to determine the APE or the potential effects on cultural sites.

Historic Context

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106-15 The location of Mo'okini Heiau, a stunning structure whose construction marked a highly significant turning point in Hawaiian cultural history, and Kamehameha the Great's Birthsite are misrepresented in the EIS, which says Mo'okini is "located 1.6 mi (2.6 km) south of the airport" and Kamehameha's Birthsite is "located two mi (3 km) south of the airport." The heiau and birthsite are located west, directly in the approach pattern of the runway in prevailing winds. It is very unfortunate that of all the "other locations" studied in the EIS Upolu Airport is the only one without a locating map. Figure 2-10 of the Big Island shows Upolu as only a dot. For the cultural section and for training of any personnel intending to land at Upolu a map showing the locations of Mo'okini Heiau, Kamehameha Birthsite, Kukuipahu Heiau and the terraced Kohala Field System is necessary.

106-16 This section also needs to note that Upolu has been used for emergency medical evacuation purposes of Kohala residents since it was built. It is a primary function of the airport for people living in Kohala. For many years it was the only place to medivac people from the district.

Archaeological Resources

106-17 It is ridiculous to say there are no archaeological sites within the APE, when the APE is just the runway itself with a 30 meter buffer. The APE needs to be revised to reflect the true area of effect from the proximity of large military aircraft.

Traditional Cultural Resources

106-18 Again the APE needs to be revised. At least in this paragraph the heiau and birthsite are now called "highly significant" and are now located south west of the airport. This location is still not correct. They are more than highly significant; they both represent major turning points in the history of Hawaii.

Cultural Environmental Consequences 4.9.3.4

106-19 This section reads: "Based upon two archaeological surveys conducted in the immediate vicinity of Upolu Airport, there are no archaeological resources of any significance within and adjacent to the facility. There would be no operational impacts on cultural resources due to the proposed action. No mitigation is required."
These statements show a lack of sensitivity to the cultural history of a once sovereign nation separate from the United States. Would cultural historians make the same statements about military activities that were to take place in close proximity to the First Church of Boston or the birthplace of George Washington? Writers of the EIS need to look beyond simply two archaeology studies to interpret the impacts of the proposed action on the cultural environment of Upolu.

Safety – Affected Environnment 4.10.2.4

Bird Aircraft Strike Hazard (BASH)

106-20 The hazard of bird strike is greater than represented by the EIS since the bird population, particularly the seasonal Pacific Golden Plover (kolea), is higher than represented in 4.8.2.4.

Airfield Safety

106-21 The EIS should note that Upolu Airport has limited potable water, no wastewater facility, no solid waste facility. In the rainy season the grassy area around the tarmac turns to mud. High winds are common at Upolu.

Wildland Fires

106

106-22 Firefighting facilities in North Kohala are not located in Hawi as stated in the EIS, but in Kapa'au town 4.5 miles away.

Socio-economic impacts 4.11.2.4

In mentioning the Hawi Renewables wind farm in close proximity to the airport, it would be appropriate to mention that the V-47 Vesta turbines are each over 160 feet tall with a blade rotation of 47 meters in diameter.

Cumulative Impacts 5.3.8 CULTURAL RESOURCES

106-23 The MV-22 rotor downwash is expected to have a negative impact on the denuded soil of the area immediately seaward of the Upolu Airport runway. It is also expected to have impact on the coastal restoration work that is beginning at Upolu to restore native vegetation to the area. These impacts need mitigation.

106-24 The noise and turbulence of the aircraft are expected to have negative impacts on the cultural and historic sites of Mo'okini Heiau and Kamehameha's Birthsite. These impacts need mitigation.

107

-----Original Message-----
From: Crouch Maj Alan F [mailto:alan.crouch@usmc.mil]
Sent: Tuesday, December 27, 2011 4:59 PM
To: mv22h1eis
Cc: Sue Sakai; Patrick CIV Tiffany L
Subject: FW: Military training use of Upolu Airport and Waimea Community Airport

In case this message wasn't forwarded to Belt Collins, a copy is below.

R/S,
Maj. Alan Crouch
(808) 257-8841

-----Original Message-----
From: Carol Porter [mailto:cporter@design-matters.com]
Sent: Monday, December 26, 2011 18:35
To: Crouch Maj Alan F
Subject: Military training use of Upolu Airport and Waimea Community Airport

Hello,

My husband and I reside on the Kohala Coast between Waimea (Kamuela) and Hawi. We are adamantly opposed to the proposed expansion of military training operations on the island of Hawaii, to include aviation exercises at subject airports.

107-1 We retired to Hawaii to escape such noise and bother. The proposed training areas will disturb and cause great discomfort to all of the residents of our community. Such exercises will also negatively impact property values. Please limit training to the Pohakuloa training area.
Thank you.

Sincerely,
Carol Porter

--
Aloha,
Carol

A problem well defined is a problem half solved.

Yes We Can!

1

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Amy Kepilino

From:	Susan Sturges [Sturges.Susan@epamail.epa.gov]
Sent:	Thursday, December 22, 2011 3:10 PM
To:	mv22h1eis
Cc:	ThomasP Kelly; Carol Sachs
Subject:	EPA Comments on Basing of MV-22 and H-1 Aircraft DEIS
Attachments:	20110379.PDF

Please accept EPA comments on the DEIS for the Basing of MV22 and H-1Aircraft in Support of III MEF Elements in Hawaii. A hard copy of the letter will follow by postal mail.

Thank you.

Susan Sturges, Life Scientist
Region 9 Environmental Protection Agency
Environmental Review Office
75 Hawthorne St. (CED-2)
San Francisco, CA 94105

415-947-4188 (office)
415-947-8026 (fax)
sturges.susan@epa.gov

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108

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

DEC 28 2011

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NAVFAC PAC...

Naval Facilities Engineering Command, Pacific Division
Attention: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

Subject: Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of III MEF Elements in Hawaii (CEQ # 20110379)

The U.S. Environmental Protection Agency (EPA) is providing comments on the Draft Environmental Impact Statement (DEIS) for the Basing of MV-22 and H-1 Aircraft in Support of III MEF Elements in Hawaii. Our comments are provided pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality regulations (40 CFR Parts 1500-1508), and our NEPA review authority under Section 309 of the Clean Air Act.

The preferred alternative would construct more than $500 million dollars in new facilities at Marine Corps Base Hawaii Kaneohe Bay by 2018. This presents an ideal opportunity to build facilities that meet or exceed the Marine Corps Commandant and Secretary of the Navy's ambitious energy goals, such making 50% of Navy and Marine Corps installations net-zero energy users by 2020. We urge the Navy and Marines to demonstrate their leadership in net-zero energy and renewable energy generation on this project.

We have rated the DEIS as *Environmental Concerns -Insufficient Information (EC-2)* (please see the enclosed "Summary of EPA Rating Definitions"). In our enclosed detailed comments we raise concerns about Greenhouse Gas Emissions, Water Resources, Air Quality, Noise, and Solid Waste.

We appreciate the opportunity to review this DEIS. When the Final EIS is released for public review, please send one hard copy and one electronic copy to the address above (mail code: CED-2). If you have questions, please contact Tom Kelly, lead NEPA reviewer for this project, at (415) 972-3856 or kelly.thomasp@epa.gov.

Sincerely,

Kathleen Martyn Goforth, Manager
Environmental Review Office
Communities and Ecosystems Division

Enclosures: EPA's Detailed Comments
Summary of EPA's Rating Definitions

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ENVIRONMENTAL PROTECTION AGENCY DETAILED COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE BASING OF MV-22 AND H-1 AIRCRAFT IN SUPPORT OF III MEF ELEMENTS IN HAWAII (CEQ # 20110379)

Greenhouse Gas (GHG) Emissions

Facilities

The new facilities built as part of the action alternatives would meet the Leadership in Energy and Environmental Design silver certification (p. 2-50) and include rooftop solar power generation (p. 2-17), unless the later requirement is waived. In Section 5, Cumulative Impacts, the Draft Environmental Impact Statement (DEIS) refers to a goal from *U.S. Marine Corps Expeditionary Energy Strategy* (March 2011):

> "By 2020, we will increase the amount of alternative energy consumed at installations to 50 percent of total energy consumption. Through the combination of aggressive demand reduction and on-installation renewable energy production, we will transform half of our installations into net-zero energy consumers."

This goal is also consistent with one of the energy goals from the Secretary of the Navy[1] and further described in *Department of the Navy's Energy Program for Security and Independence*[2]. If such an ambitious goal is to be seriously undertaken, new facilities constructed as part of this project need to be designed for net-zero energy use; however, the DEIS does not mention this. We realize renewable energy facilities could be located at other facilities, or in a separate NEPA analysis. If this is the case, the EIS should discuss it as a cumulative impact.

Recommendations:

108-1 The Final EIS (FEIS) should specify that all new facilities constructed as part of this project will have net-zero energy use.

The FEIS should maximize renewable energy generation through the use of roof-top solar energy generation and other appropriate technologies.

Biofuel

The DEIS cites Executive Order 13514, Federal Leadership in Environmental, Energy, and Economic Performance, which states, "Where appropriate, the target shall exclude direct emissions from excluded vehicles and equipment (i.e., military aircraft, tactical vehicles)." While the Executive Order excludes military aircraft, the Secretary of the Navy has not excluded aircraft from his energy goals. As outlined in *Department of the Navy's Energy Program for Security and Independence*, a short term Navy goal is to "Certify aircraft and ship systems to operate on a 50/50 alternative fuel blend." In the case of the MV-22, the Navy has already tested a 50/50 blend of aviation fuel (JP-5) and camelina[3].

[1] Department of the Navy's Energy Goals, <http://www.navy.mil/features/Navy_EnergySecurity.pdf>
[2] Department of the Navy's Energy Program for Security and Independence, <http://greenfleet.dodlive.mil/files/2010/04/Naval_Energy_Strategic_Roadmap_100710.pdf >
[3] See http://www.navair.navy.mil/index.cfm?fuseaction=home.PrintNewsStory&id=4730

1

Recommendation:
108-2 The FEIS should discuss plans to use biofuel for MV-22 and H-1 aircraft, and provide a best estimate of GHG mitigation based on future biofuel use.

Estimating Emissions

CEQ in its Draft Guidance[4] suggested that if a project would be reasonably anticipated to cause direct emissions of 25,000 metric tons of carbon dioxide equivalent emissions (MTCO2E) or more per year, a quantitative and qualitative assessment may be meaningful to decision-makers and the public. The DEIS does include a GHG emission estimate for new aircraft of 74,000 MTCO2E (p. 5-20), but it does not include emissions from construction, new equipment (e.g. tractors and tows) or new operations such as maintenance shops. The concern about quantifying emissions is not limited to GHGs; we have also discussed the same concern for other air emissions in our comments on Air Quality.

Recommendation:
108-3 The FEIS should include a thorough evaluation of GHG emission sources.

Water Resources

Surface Water Quality

The DEIS does not identify impaired water bodies, also called Clean Water Act Section 303(d) listed water bodies, so it also does not evaluate the possible impacts of the project to these waters or the applicability of Total Maximum Daily Load requirements. Of particular concern are the two unpaved landing zones with high erosion potential, Schofield Barracks East Range and Kawailoa Training Area (p. 4-60).

New construction for the action alternatives will include areas with a high potential for contaminated surface water, such as the new landing area, hangar aprons and parking lots. Runoff from these areas may include oils, exhaust particulates and fuel. While the DEIS discusses low impact development (LID), it does not clarify treatment processes that will remove contaminants prior to discharge.

Recommendation:
108-4 The FEIS should describe impaired water bodies that could be impacted by the project and describe a system that will treat contaminated surface water before discharge.

Low Impact Development

We note the DEIS includes compliance with "the Energy Independence and Security Act (EISA) and UFC 3-210-10[5], Low Impact Development (LID), which call for projects to maintain storm water discharge to predevelopment hydrology conditions to the maximum extent technically feasible, and for application of BMPs for water quality (UFC 2010)." The DEIS does not provide detail on methods to achieve this goal. EPA understands that this work may be left to contractors

[4] Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions, February 18, 2010.
[5] United Facilities Criteria (UFC), Low Impact Development, 15 November 2010, <http://www.wbdg.org/ccb/DOD/UFC/ufc_3_210_10.pdf>.

designing facilities, but further discussion would be informative. For example, an initial step identified in the Unified Facilities Criteria LID process is the design objective. The design objective would specify 95th percentile storm event, and the percentage of water volume to be retained or infiltrated.

Recommendation:
108-5 The FEIS and Record of Decision (ROD) should include commitments necessary to ensure compliance with LID requirements.

Water Conservation

The DEIS mentions the goal to reduce water consumption by 2% per year through 2020 (p. 5-38). Water conserving fixtures, such as those recommended by EPA's Watersense Program (http://www.epa.gov/watersense), can ensure that new facilities built as a part of this project achieve the stated goals.

Recommendation:
108-6 The FEIS should include contract specifications or additional detail for water conservation fixtures and strategies at new facilities.

Air Quality

The DEIS includes emissions estimates for emissions from new aircraft in Section 3.4.3, but does not include emissions from construction or operations. The action alternatives would include new equipment (e.g., tractors and tows) and new operations such as maintenance shops and corrosion control.

Recommendations:
The FEIS should discuss and quantify construction and operating air emissions.

108-7 The FEIS should also describe operations that will require Clean Air Act permits from the Hawaii Department of Health.

Noise

We are pleased to see the discussion of noise effects on children's learning and sleep disturbance, discussed in Appendix D (D.3.7.1), but these discussion were not summarized in the DEIS. Appendix D includes a range of classroom noise criteria (D-3/119 and 120). It questions the legitimacy of the criteria to address aircraft noise impacts without acknowledging the impact of aircraft noise on learning. The Federal Interagency Committee on Aviation Noise states[6], "Recent research, which confirms conclusions from the 1970s, shows learning decreases in reading when outdoor-noise LA_{eq} is 65 dB or higher (Stansfeld, 2000)." In light of Executive Order 13045, Protection of Children from Environmental Risks and Health Risks, we support specific analysis of noise impacts to schools.

We also note that Appendix D of the DEIS states that the Federal Interagency Committee on Aircraft Noise supports the use of ANSI S12.9-2008 to predict awakenings, but stops short of calculating awakenings.

[6] Findings of the FICAN PILOT Study on the Relationship Between Aircraft Noise Reduction and Changes in Standardized Test Scores, July 2007.

Recommendations:
To make a valid comparison of school noise level with the school noise criteria of Table C-2 (in Appendix D), the FEIS should adopt the Federal Aviation Administration calculation
108-8 for noise during a school day (e.g. 8:00 a.m. to 3:00 p.m. on weekdays).

The FEIS should calculate awakenings for the baseline, no action alternative and action alternatives, and summarize the results in the body of the document.

Solid Waste

The Proposed Action and Alternatives briefly describes solid waste management in Section 2.6.1.7. It states, "To the extent practicable, recycling and reuse is encouraged over the disposal of C&D [Construction and Debris] waste." Marine Corps Base Hawaii Kaneohe Bay diverts nearly two-thirds of the waste generated on-base (p. 3-147); however C&D waste differs from office, housing, and maintenance shop waste. The Navy should plan in advance to segregate materials, so it can be recycled, composted and otherwise properly managed. Stone, rock, brick and concrete can be rubblized and used in mixing new concrete. Wood waste can be chipped or shredded and composted or used as a groundcover. We encourage the exploration of additional management options through EPA's Deconstruction webpage[7]. It includes a variety of resources to reduce the costs of construction debris disposal through proper management. Landfill space is a critical concern for many Pacific Islands. While Oahu may have 10 to15 years of capacity in its C&D Landfill (p. 5-36), a large project such the new facilities at Marine Corps Base Hawaii Kaneohe Bay could quickly reduce available capacity.

Recommendations:
The FEIS should include conditions placed on contractors to ensure demolition waste is
108-9 segregated, and specify the use of segregated waste in new construction where possible.

The FEIS should estimate the total quantities of segregated C&D waste streams.

[7] See http://www.epa.gov/osw/conserve/rrr/imr/cdm/reuse.htm

SUMMARY OF EPA RATING DEFINITIONS*

This rating system was developed as a means to summarize the U.S. Environmental Protection Agency's (EPA) level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the Environmental Impact Statement (EIS).

ENVIRONMENTAL IMPACT OF THE ACTION

"LO" (Lack of Objections)
The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

"EC" (Environmental Concerns)
The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

"EO" (Environmental Objections)
The EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

"EU" (Environmentally Unsatisfactory)
The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

ADEQUACY OF THE IMPACT STATEMENT

"Category 1" (Adequate)
EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

"Category 2" (Insufficient Information)
The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analysed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

"Category 3" (Inadequate)
EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analysed in the draft EIS, which should be analysed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640, Policy and Procedures for the Review of Federal Actions Impacting the Environment.

109

From: Snyder Robert [snyderr628@hawaii.rr.com]
Sent: Friday, December 23, 2011 9:32 AM
To: mv22h1eis
Subject: DEIS Kaneohe Marine Corps Base

109-1 I oppose any increase in air operations at the Kaneohe Marine Corps Base! Considering that you are projecting a 49% increase in air traffic beginning in 2012 fails to address the increase in activity over the past year. As a long time resident of Kaneohe Bay area I know that the noise and traffic have increased significantly and that the echo effect from the surrounding Koolau Mountains is very disturbing. I realize that training is necessary it just seems that the flight paths over residential areas could be reduced to decrease these noise levels. 109-2 The average decrease in property values of 27% is probably lower than what they will actually be after all who wants to live with the increased air and noise pollution caused by this activity. 109-3 The increased expense to area residents that will be caused by the increase in wastewater to the Kailua plant when upgrades will have to be done to meet environmental standards in an already overpriced market.

Robert Snyder
44-722 Alakai St
Kaneohe, Hi. 96744

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110

From: Jody Gilbert [jodyg808@gmail.com]
Sent: Friday, December 23, 2011 10:50 AM
To: mv22h1eis
Subject: proposed changes to Marine Base activities

Dear Sirs/Madams,
I received a very disturbing notice in my mailbox this week detailing plans to increase air traffic in Kaneohe Bay area to an unprecedented level. While I understand the need for our troops to maintain competency by practicing aerial maneuvers, 110-1 I am quite certain that this is not in the best interest of all in the ahupua'a of Kane'ohe. We already have overcrowded conditions in the base area since the closure of Barber's Point and the addition of the Navy personnel to the Kane'ohe base. Currently, the decibel level of the air activities in the late evenings, early mornings, makes a sound sleep impossible. The tragedy at the sand bar last year reaffirms in my mind that civilians are constantly at risk of disaster with so much activity concentrated in this bay area. I watch planes touch and go repeatedly daily. The noise is nerve racking. The lights are a constant distraction after dark lighting up my living room and bedrooms directly. Good neighbors keep peace in the neighborhood. Why not keep the air traffic concentrated over a less populated community or one that has a higher concentration of military maneuvers already in place. 110-2 Kaneohe Bay is a fragile environment that has been abused by human pollution for years. Where will the wastewater from the influx of personnel go? Into the bay no doubt. The overexpansion of the Kaneohe base over the past 10 years has resulted in more pollution from improper, insufficient, inadequate wastewater management. Address the issues at hand FIRST then, make your suggestions for expansion. A uniform does not give anyone the right to be irresponsible and to take advantage of their neighborhood community.
Sincerely disheartened,
Jody G

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111

From: Ross Anderson [ross@tsrestaurants.com]
Sent: Friday, December 23, 2011 1:52 PM
To: mv22h1eis
Subject: Kaneohe Marine Corps Base EIS

To Whom it may concern:

We have recently been made aware of the proposed changes to the aircraft traffic surrounding Marine Corps Base Hawaii, located on Kaneohe bay. We understand that the aircraft traffic will be increasing close to 50% over current activity. In addition we understand that there will be new or additional aircraft, including changes from prop aircraft to jet aircraft, and the change to the Osprey hybrid helicopters.

111-1 We would like to express our concern over the proposed increased noise levels coming from the base. Under the current conditions the late night and early morning noise coming from aircraft operations causes disruption to sleep and can cause headaches for my wife while the aircraft are stationary on the runway or helicopter pad with the engines running. I feel that any increased noise from additional or new aircraft would be very unpleasant. It is not uncommon for aircraft to begin warming up at 3:00 am. We feel this is unacceptable and would be made worse by jet aircraft.

111-2 We understand the need to continue innovation and development of our defense systems; we would like to respectfully ask that the hour of operation be considerate of the residential neighbors surrounding the base. We suggest that the flight and aircraft operations be limited to 6am to 10pm.

Respectfully submitted

Ross and Stefanie Anderson
44-007 Aina Moi Place
Kaneohe, Hi
96477
ross@tsrestaurants.com

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112

From: kaudagmar@yahoo.com
Sent: Friday, December 23, 2011 3:06 PM
To: mv22h1eis
Subject: Expand Aircraft Activity

It is absolutely insane to expect the residents of all of Kaneohe, He'eia and surrounding highly populated areas to put up with more noise from aircraft than we already are.
112-1 At the present planes practice takeoffs and landings nonstop for hour on a daily basis and they fly at extremely low altitudes over residential areas. I mean you can look into the wheel wells of the aircraft from below and have to cover your ears. Windows rattle and walls shake.
Kaneohe sits in a bowl, surrounded by the Ko'olau mountain range. All aircraft noise on takeoff is directed towards land at which time it echos back from the mountains extremely loud I don't care how many more aircraft you want to bring in but
112-2 your practicing needs to take place somewhere else. It should be at Barbers point where nobody lives and the area is mostly industrial so people won't be disturbed I have lived in Kaneohe for over 47 years and Kaneohe bay is really a jewel of the Pacific with it's beautiful blue and green water and the only barrier reef in the Hawaiian islands. How dare you come here and with no consideration for Kaneohe residents just do however you please Dagmar Kau
45-207 Mahalani Circle
Kaneohe, HI 96744
Sent from my Verizon Wireless BlackBerry

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113

Amy Kepilino

From: Robin McCann [rmccann@hawaii.rr.com]
Sent: Friday, December 23, 2011 3:28 PM
To: mv22h1eis
Subject: DEIS

Aloha, I am a resident of Alii Shores in Kaneohe. My property is oceanfront off Kaneohe Bay and I am very concerned
113-1 about the Draft Environmental Impact Statement that the Kaneohe Marine Corps Base is submitting. I am opposed to it
since it will increase the noise level with more aircrafts in the air. I work from home and need to be able to conduct
113-2 business over the phone. I am also a light sleeper and awake with the aircraft flying over my house. I also have children
and I am concerned about their health with more aircraft in the air. My property value could decrease as well. There will
113-3 be significant negative effects on the surrounding community. I do not support the DEIS and believe it needs to address
these issues.

Sincerely,

Robin McCann

114

From: Katherine Orr [orrk001@hawaii.rr.com]
Sent: Saturday, December 24, 2011 10:01 AM
To: mv22h1eis
Subject: Attn: EV21, MV-22/H-1 EIS Project Manager

RECEIVED

'12 JAN -3 A11:12

NAVFAC Pacific

From: orrk001@hawaii.rr.com
To: mv22h1eis@bellcollins.com
Re: Draft Environmental Impact Statement DEIS

December 23, 2011

Department of the Navy
Naval Facilities Engineering Command, Pacific Division
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

SUBJECT:
DEIS FOR THE BASING OF MV-22 AND H-1 AIRCRAFT IIN SUPPORT OF THE THIRD MARINE EXPEDITIONARY FORCE (111 MEF) ELEMENTS IN HAWAII

As a resident of Kaneohe, I am deeply concerned about several aspects of the proposed plan to expand aircraft activity and infrastructure in our area, as well as apparent inadequacies of the DEIS intended to address these issues. These are my major concerns:

Noise Pollution

According to the DEIS, no actual field measurements were taken of noise levels, nor were there any measurements taken from various points in the surrounding neighborhoods to evaluate the current noise impact and establish a baseline. Since the impact from noise depends upon the type of noise, level of noise, and both the frequency and duration of noise events, I question how a computer model based on a single runway can substitute for data gained by monitoring real-life situations from various locations under various environmental conditions.

For those of us who live in the communities surrounding Kaneohe Bay, *noise impact* may well be our first concern. At my house, when helicopters are
flying overhead, and when jets are taking off from the runway, we need to pause during conversation until the noise has passed. Several days ago, I
was talking on the phone to someone in CA when a helicopter flew overhead. We paused until the din died down, whereupon my friend exclaimed,
"Where *are* you calling from?" The saving grace thus far has been the relative infrequency of these events, but recently we've noticed an increase in
114-1 aircraft activity. This has led me to wonder what the "baseline level" of noise and activity is, and whether it is already being surpassed.

We humans can verbally share our experiences, but what about other life forms? I acquired a pet dog last spring. One day she began to cringe and tremble. It was a beautiful day, nothing seemed amiss, yet her bouts of trembling were prolonged. They came and went so inexplicably that I grew concerned that she was either ill or in pain. I finally realized these bouts coincided with helicopters hovering low over the bay and engine-revving exercises on the base. I am deeply concerned about the impact these exercises have on the health and welfare of other animals and wildlife in the area.

Contrary to the description in the DEIS, the residential area I live in is densely populated. To include the unpopulated mountain areas behind us so as to create data that suggests a low population density overall seems deliberately misleading. The fact is, we live shoulder-to-shoulder around the bay, as anyone can see who drives through our area. If the expansion plan moves forward, we will suffer not only from the mental and physiological health effects of increased noise impact (gathered and referenced by Eileen Hilton, MD) but will face decreases in our property values as well.

Chemical Pollution

I am concerned about the impact of aircraft pollution (such as unburned jet fuel; benzene is a carcinogen) on our extraordinarily beautiful environment,
114-2 our residences, and our bodies. I find myself questioning the wisdom of the small organic garden I've planted in my yard... a symbol of good health and
clean self-sufficiency.

Sewage Pollution

The awful smell surrounding the Kailua Wastewater Treatment Plant signals that the plant has made no headway on their repairs and improvements. This plant is not in compliance with EPA regulations and is operating under a consent decree. The UV (ultraviolet) lights required to sanitize the effluent before discharging it to the sea still remain broken after two and a half years.

114-3 According to the DEIS, the expansion plan would use the Kailua Treatment Plant to process its additional waste, adding more sewage load to a system that is already not operating up to snuff. While noise pollution is obvious because it immediately impacts our senses, microbial pollution is in some ways a much more serious matter because it works so insidiously through environmental contamination to cause illness, disease, and even death. This issue of health safety and compliance is one that I hope will be examined in the detail it deserves. The continued use of this plant and its inclusion in your plan, while it functions at a level that compromises environmental and human health, invites a host of unnecessary problems.

To conclude, please find a more appropriate site for the proposed plan – a site that will not impact one of the most beautiful bays in the world, nor the highly populated residential community that surrounds it. The Navy should not move forward with this plan without additional studies addressing the environmental and health issues at stake, including the noise, chemical and sewage concerns I have mentioned above.

Thank you very much for taking the time to read and evaluate my concerns.

Sincerely,

Katherine Orr

115

From: Phil Carey [careyp001@hawaii.rr.com]
Sent: Saturday, December 24, 2011 4:27 PM
To: mv22h1eis
Subject: DEIS to expand KMCB aircraft activity & infrastructure

115-1 As home owners at Makani Kai Marina since 1996 we are Kaneohe Bay neighbors to MCBH. While we support all branches of our military, we have serious concerns regarding the proposed addition of jets, Ospreys and additional helicopters. We have personally experienced the increased noise when weather conditions reduce trade winds; when jets are visiting the base; and when P3s practice touch and go daily. We are directly down wind and smell fuel when there is prolonged revving of engines or increased hovering activity. In addition to our concern regarding the additional noise

115-2 levels negatively impacting our quality of life, sleep and health; we also have financial concerns regarding our property value as we near retirement.

Phil & Anita Carey
Sent from my iPad

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116

From: Mark Perchan [perchan1@hawaiiantel.net]
Sent: Saturday, December 24, 2011 6:04 PM
To: mv22h1eis
Cc: perchan1@hawaiiantel.net
Subject: Kaneohe Marine Corps Base Increase in Air Traffic

Follow Up Flag: Follow up
Flag Status: Completed

Dear Sir(s),

116-1 I am writing on behalf of my wife and I. We have lived happily on Kaneohe Bay for 22 years. (**Except for the noise emitted by the base's helicopters**
And fixed wing aircraft)!! We already experience sleep deprivation, and constant headaches due to the excessive noise associated with the base.
As much as we support our Armed Forces, we cannot stand by and allow **even more air traffic!!** The noise already makes it difficult to enjoy our peace
And quiet in our "golden years". The base runs air traffic **at all hours**! Sometimes we can't even hear one another talk across the room, or carry on
Phone conversations, because of the **loudness of the air traffic!!** If they could approach from the ocean side of the base perhaps it would help some.
As it is now, they fly directly over us constantly!!
We need LESS air traffic noise, not MORE!! Since we are no longer at "war", we wholeheartedly oppose any increase in the air traffic
At the Kaneohe Marine Corps Base!! We would **hope** the powers that be **actually DECREASE the already excessively loud noise we currently**
Have to put up with!! Please Start being GOOD neighbors, and **stop the excessively loud noise , not increase it!!**

Respectfully yours,

Kaneohe Bay Residents,

Leilani & Mark Perchan
44-308 Olina St.
Kaneohe, Hi.

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Amy Kepilino

From:	Bob Sterne [metldoc@mindspring.com]
Sent:	Sunday, December 25, 2011 12:10 PM
To:	mv22h1eis
Cc:	Josh Green; Mark Nakashima
Subject:	Draft EIS re Kaneohe and Upolu airports et. al.

Aloha:
I am a resident of North Kohala on the Big Island, and the attached letter is in opposition to the use of Upolu airport for training purposes, involving V22 Osprey and other helicopters.

Bob Sterne metldoc@mindspring.com Phone 808 882-1513

Naval Facilities Engineering Command, Pacific December 24, 2011
Attn: EV 21,MV22H-1, EIS Project Manager
258 Makalapapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

Response to the Draft EIS to base V-22 Osprey and Cobra and Huey Aircraft in Hawaii.

I am a resident of North Kohala and have, over the last 10 years, expressed my opposition to many of the proposed projects that, in my opinion, threaten our life style. The draft EIS which targets Upolu airport is one of them. This letter takes a broad view, in that it addresses issues that go beyond the immediate Hawi area. First, in this time of massive budget deficits, why is the Marine Corps spending $763 million at Kaheohe? This does not include the cost of the aircraft, which, if added in, runs the cost up to well over a billion dollars.

I have read the Marine Corps EIS, all 400 + pages and agree that the preferred site is Alternate A at Kaneohe. Thus, if approved, this facility will be built in Kaheohe Bay on Oahu, at the existing Marine Corps base . If you read the executive summary, there is hardly any mention of Upolu airport in it. I have copied the following from the abstract, at the beginning of the EIS, and *italicised* the words I feel are important.

Site Selection:
"As a result of a systematic analysis to identify possible basing locations, ***only Marine Corps Base (MCB) Hawaii Kaneohe Bay met all requirements,*** and the alternatives evaluated in this EIS are facility siting alternatives at that installation. In Alternative A, all facilities would be on the southeast side of the runway. In Alternative B, VMM facilities would be located on the northwest side of the runway at West Field, and would include construction of a runway underpass for access. New bachelor enlisted quarters (BEQ) would also differ between the two action alternatives. Aviation training activities associated with each action alternative would be identical. Approximately 1,000 active duty personnel, 22 civilian personnel, and 1,106 dependents would be associated with the VMM and ...

Page 2
HMLA squadrons. With the No Action Alternative, the squadrons *would not be based in Hawaii*, and *no facilities would be constructed at MCB Hawaii Kaneohe Bay or any of the other training areas to support them*" ***Thus, if the Navy does not approve the project, nothing in the EIS will happen.***

On page 2-21, last paragraph, the EIS states: " As explained in Chapter 1, various non-military sites would continue to be used and consist mainly of State airports routinely used by existing Marine Corps squadrons for *refueling* (emphasis added) and related activities. The proposed MV-22 and UH-1/AH-1 aircraft would use these sites in accordance with FAA procedures. Impacts of their use are not addressed in this EIS, since the State Department of Transportation (DOT), Airports Division, conducts analyses in separate environmental documents." ***To the writer's knowledge, Upolu is not equipped to refuel military aircraft, and since no improvements are contemplated there, it could***
117-1 ***not be used as a refueling site. Why then, is it being considered? And what will it be used for? The EIS only describes the use as limited area landings, whatever those are.***

Runway Length and Operational Considerations:
However, if the project is approved, Upolu would be used as a training area, except that , at least for the Osprey, the runway is not adequate for that aircraft. It is 3800 feet long, and the requirement is for about 7000 feet in length. (see Table 2.3, page 2-23).This does not preclude the use of Upolu for the Cobra and Huey helicopters. In addition, Upolu is outside of the 65 NM operational range from Kaneohe for training. So why is it being considered as a training site? (See Figure 2, Page 2-8)
If the basing location (Kaneohe) must have a 7041 foot
117-2 ***runway, how can the V22 operate in and out of Upolu, with a 3800 foot runway? And Bradshaw has the same problem, with a 4000 foot runway. See page 2-5 and the following, copied from the Draft EIS: "Runway and overrun lengths. The basing location needs to have a runway and overruns that are sufficiently long so that pilots and aircraft based at the airfield can return and safely land in an emergency with one engine inoperative. For the MV-22B, the airfield must be at least 5,039 ft (1,536 m) long, with two 1,000-ft (305-m) overruns,***

Page 3
for a total minimum length of 7,041 ft (2,146 m" Why should
117-2 ***the basing location have different (more stringent) conditions than other training locations?***

Over Flight Issues:
The EIS states that, in effect, Upolu is in a thinly populated area. However,
117-3 the flight path from Upolu to Bradshaw is anything but thinly populated. The flight path from Upolu to Bradshaw Helicopter base, high on Mauna Kea at about 6400 feet elevation, would be over North Kohala, passing over, or slightly off shore from Kohala Ranch, Kohala Estates, Kohala Waterfront, Kohala by the Sea and Hawaiian Homelands, then over Kawaihae, the "Gold Coast" resorts, and then close to Waimea, over Waikii Ranch to Bradfield. In North Kohala , about 1000 homes would be subjected to over flights; the Gold Coast resorts, from Mauna Kea, Hapuna and Mauna Lani to Waikoloa on the south have about 3000 hotel rooms, and at least that many condominiums. Although the EIS does not say so, I assume that some V-22 aircraft will be based at Bradshaw since the EIS says specifically that there will be no improvements at Upolu (see Table 4-1). At present, there is only one small building on the latter site, and the EIS specifically shows improvements at Bradshaw for the V-22. ***There are both noise and safety considerations involved in flying the Upolu to Bradfield route***

Note that in the EIS, no noise studies were performed at Upolu. Common sense says that the noise level will increase if the airport is used for military aircraft. Table 2.4, page 2-31in the EIS states:***" Terrain Flight (TERF): Flying and navigating at low altitudes . Typical activities include low level, contour, and nap of the earth (NOE). NOE flights are conducted from as close to the surface as terrain and vegetation allow. Contour and low level flights***
117-4 ***are from 50 feet above ground up to 200 feet above ground." This certainly indicates that low level operation (i.e., high noise levels) will be part of the training. I could find no mention of the large wind farm that is adjacent to Upolu, and the very high winds that are common in North Kohala; up to 80 mph. These are important considerations that must be taken into account.***

Page 4

MV-22 Osprey Safety Record:

The Osprey was first funded in the early 1980's , and was only approved in 2007 for combat use. Why such a long development cycle? The safety record, or lack of safety tells the whole story. Also, cost overruns were massive. During testing from 1991 to 2000 there were four significant
117-5 crashes resulting in 30 fatalities. Since becoming operational in 2007, the V-22 has had one loss due to accident, and seven other notable, but minor, aviation incidents. From 2000 to 2010, there were four crashes with 34 fatalities involving the V-22 (see below for details).

- On 11 June 1991, the left nacelle of a pre-production Osprey struck the ground while the aircraft was hovering 15 feet (4.6 m) in the air causing it to bounce and catch fire; subsequent investigation found miswired flight control system to be responsible.[135] The pilot, Grady Wilson, suspected that he may have accidentally set the throttle lever the opposite direction to that intended, exacerbating the crash if not causing it.[136]
- On 20 July 1992, a leaking gearbox led to a fire in the right nacelle pre-production V-22, causing the aircraft to drop into the Potomac River in front of an audience of congressmen and other government officials at Quantico, killing all seven on board and grounding the aircraft for 11 months.[137] Boeing later denied speculation that pressure to perform had been a factor in the accident.[138]
- On 8 April 2000, a V-22, loaded with Marines to simulate a rescue, attempted to land at Marana Northwest Regional Airport in Arizona; it stalled when its right rotor entered vortex ring state, rolled over, crashed, and exploded, killing all 19 on board.[47]
- On 11 December 2000, after a catastrophic hydraulic leak and subsequent software instrument failure, a V-22 fell 1,600 feet (490 m) into a forest in Jacksonville, North Carolina, killing all four aboard. This caused the Marine Corps to ground their fleet of eight V-22s, the second grounding that year.[139][140]
- On 9 April 2010, a CV-22 crashed near Qalat, Zabul Province, Afghanistan, killing four.[141] The USAF investigation ruled out Brownout conditions, enemy fire, and vortex ring state as causes. The investigation found several factors that significantly contributed to the crash; these include low visibility, a poorly executed approach, loss of situational awareness, and a high descent rate.[142] (Source: Wikipedia)

Page 5

Based on the safety record of the V-22, concerned citizens should be suspicious of safety claims made by the Marine Corps and Boeing. The EIS provides details about most every airport in the state, leading
117-6 ***one to believe that the V-22 and other rotary wing aircraft will be widely deployed. (see Table 2.3, page 2-23). I question the prudence of using commercial airports for training, in light of many military airports in Hawaii.***

Summary

I have many unanswered questions on the potential use of Upolu airfield, which is about 12 or so miles up the coast from my residence. These include being outside the 65NM operational radius from Kaneohe, the short runway at Upolu, and the lack of addressing high winds and obstacles around Upolu (20 wind farm towers). Besides those issues, we already have significant commercial flights over our subdivision, from 6 am until about 11 pm. Most are from Keahole airport to the mainland, and are at an altitude of approximately 6000-8000 feet when they pass over Kohala by the Sea. We don't need additional air traffic from the north, with the consequent increase in noise level. ***In light of the V-22 's past safety***
117-7 ***record and 118 decibel noise level, and low level operations,, I am concerned about the additional noise levels and possibility of a crash over a heavily populated residential area, with subsequent loss of life and/or injuries.***

Sincerely,

Bob Sterne (808) 882-1513) Fax (808) 882-7752

metldoc@mindspring.com

P.O. Box 44571, Kamuela, HI 96743

118

From: Volker [hildebrav001@hawaii.rr.com]
Sent: Monday, December 26, 2011 10:39 AM
To: mv22h1eis
Subject: Damn earsplitting noise

118-1 We live on Kaneohe Bay and cannot even use the phone when the damn jets race over our house. And noise makes sick. When helicopters train rescue, saltspray covers our house when the wind is right. I am strongly condemming more flight activity! The noise travels directly across the water with nothing in the way!

Volker Hildebrandt, Charlotte Yamane , Mitzi Yamane
45-253 Ka Hanahou Circle
Kaneohe , HI 96744

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119

From: Noelani Fowler [NoeFowler@hawaii.rr.com]
Sent: Monday, December 26, 2011 11:53 AM
To: mv22h1eis
Subject: Expansion of aircraft activity

Dears Sirs,

119-1 I am a current resident on Kaneohe Bay near the Kaneohe Marine Corps air Base. Our family is extremely troubled by the intention to expand aircraft activity and infrastructure on the Base. As it is, the existing noise activity is intolerable. Planes are active at all hours of the night and planes sit on the runway with their engines revving at 2 and 3 AM in the mornings. Just within 5 contiguous houses (including ours) there are 9 babies and young children. That's just a small section of the entire Bay!

The noise bounces off the surrounding mountains making the noise louder than you might think. My son who is Autistic (6 yrs. old) wakes up every time the engines are revving and has difficulty going back to sleep. Needless to say, I can barely drag him out of bed to get him to school on time. Most people in Hawaii do not have well constructed homes that keep sound out. We live with jalousie windows to allow the breeze to come in and rarely have air conditioning to drown out any sound.

We can't sleep so many nights as it is and can't imagine the increase in the noise if aircraft traffic is allowed to increase by 49%. As it is, for our sanity and health, we would like to request that current aircraft operations and repairs end no later than 10PM and do not start again until 7AM.

119-2 We take our health and the beauty of the Bay seriously and do not want an increase in sound and water pollution, not to mention the effects on a huge number of endangered species we love so much.

Sincerely,
Noelani Fowler

____
Noelani Fowler
Kaneohe, Hawaii

E-Mail: NoeFowler@hawaii.rr.com

1

Amy Kepilino

From:	Eileen Hilton [ehiltonmd@aol.com]
Sent:	Monday, December 26, 2011 1:55 PM
To:	mv22h1eis
Subject:	Response to Draft Environmental Impact Statement
Attachments:	Letter to navy 12-25-11 7PM.pdf

To the Attention of: EV21, MV-22/H-1 EIS Project Manager
Please note the attached response to the
DEIS FOR THE BASING OF MV-22 AND H-1 AIRCRAFT IIN SUPPORT OF THE THIRD MARINE EXPEDITIONARY FORCE (111 MEF) ELEMENTS IN HAWAII
Hard copy will follow by US mail
Thank you
E Hilton MD
808-254-8088
917-371-3467

1

120

RECEIVED

'11 DEC 28 P1:41

NAVFAC Pacific

44-317B Kaneohe Bay Drive
Kaneohe, Hi 96744
December 26, 2011

Department of the Navy
Naval Facilities Engineering Command
Pacific Division
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive
Suite 100
Pearl Harbor, Hi 96860-3134
Emailed as well to mv22h1eis@beltcollins.com

SUBJECT: DEIS FOR THE BASING OF MV-22 AND H-1 AIRCRAFT IIN SUPPORT OF THE THIRD MARINE EXPEDITIONARY FORCE (111 MEF) ELEMENTS IN HAWAII

I reside on Kaneohe Bay Drive and strongly support our military and those who protect this great country. Many things make this a great country, not least is the protection and maintenance of the environment for the current and future generations. There should be no double standard applied to the enforcement of environmental and health protections. I am writing to express my strong opposition to the proposed changes at Marine Corps Base Hawaii (MCBH) and contest several assessments put forth in the above DEIS. The DEIS, in many instances, does not satisfy the requirements of the National Environmental Policy Act (NEPA), 42 USC 4332

Failure to Consider Reasonable Alternatives

The analysis of alternatives in the DEIS was insufficient. The Navy must thoroughly analyze all reasonable stationing alternatives that might be pursued with less environmental impact and more benefit to the public. The alternatives section of the DEIS offers only options (A and B), each with the same environmental impact.

120-1 The Kaneohe Bay region is one of the most beautiful in the world rivaling, if not surpassing, many our national parks. It is a favorite of landscape artists and cinematographers. As there is the potential for additional substantial cultural, biological and other environmental harm associated with additional military training in Oahu other alternatives in other regions should have been examined and discussed in more detail. These might include other areas in the Pacific (i.e. Guam) as options. The ratio of public benefit to harm might be much more advantageous in these alternative regions.

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Failure to take a Comprehensive Look at Cumulative Impacts

120-2 The DEIS fails to satisfy NEPA's mandate to analyze the impact of alternatives in light of each alternative's interaction with the effects of past, current and future projects that may cumulatively impact the resources under review. Nor does it sufficiently evaluate the connection between individual projects – specifically the recent submission and separate EPA approval of the EIS approving the introduction of the P8 jets to the Navy Fleet (CEQ 20080079).

The Navy failed to adequately address environmental impacts and supply detailed data and about cumulative data in alternatives A and B and the no action alternative other than general, conclusory comments

Failure to Provide the Public with Adequate Information in a Timely Manner

120-3 The Navy failed to provide to the public adequate copies of both the DEIS and source documentation during the public comment period. Re: the DEIS; despite the over 1000 page length, only a few copies were available at nearby libraries.

The scheduling of the DEIS meeting for Kaneohe Bay residents and comment period deadline was unfair as it fell during the holiday season insuring less opportunity for public scrutiny and comment. Many residents were off island or busy with family, visitors, and holiday preparations. Additionally, the Navy refused requests by individuals and community groups to extend the deadline to allow more residents to participate in the response to the DEIS.

Additional comments

Effects on Surrounding Community

The DEIS fails to address the increase in wastewater issues adequately.

120-4 Wastewater from the Marine Corps Base Hawaii (MCBH) is currently handled by 2 mechanisms –1) an on base plant with 2) overflow diverted to the Kailua Wastewater facility by city contract for disposal through an ocean outfall system. The contract agreement with the City of Honolulu allows for 450 mg [Million gallons) of discharge annually (equivalent to 1.23 mgd (million gallons per day) to the City ocean outfall.

The Kailua plant processes overflow from the MCBH. Effluent is discharged via an ocean outfall to 5,083 ft (1,549 m) offshore at a depth of about 110 ft (33.5 m). Alternatives A and B would increase the base average day discharge for the outfall by 120,000 gallons per day.

- The analysis omits information regarding the ongoing environmental infractions, fines and enforcement actions at the **Kailua Wastewater Plant. This plant is currently** operating under a federal court-sanctioned consent decree for repeated violations of governmental environmental regulations including violations of the Clean Water Act, 33 U.S.C. § 1251 et. seq. ("CWA"). Thus, the use of the Kailua wastewater plant by the Navy under its current and planned usage (per city contract) is not in compliance with the CWA. The DEIS is

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flawed in that it proposes additional residents at the base when the existing sewage treatment facilities are already deficient and in violation of the CWA.

- **The DEIS states the sewage discharge is permitted and "meets discharge standards and criteria".** The DEIS omits critical information regarding several years of the broken ultraviolet sanitization equipment at the Kailua plant. This equipment has been inoperable for several years and has is releasing inadequately treated wastewater about 1 mile offshore. **Thus, the plant is not in compliance with the Environmental Protection Agency ("EPA") regulations, has been fined numerous times, is operating under a consent decree and has inadequate and non-compliant sanitizing as an ongoing problem.**
- The DEIS fails to take a hard look at bay and sea water pollution and chemical contamination. Kaneohe Bay is home to several communities that depend on subsistence activities (fishing, gathering limu and similar practices specifically protected by Hawaii constitution) (See Haw. Const. art. XII, 7). Bay water measurements of toxins was not done or discussed in the DEIS

NOISE

The DEIS states noise contours representing the proposed action would remain similar in size when compared to contours for the No Action Alternative. "Existing noise sensitive land uses in the surrounding civilian community currently exposed to aircraft noise levels greater than 65 DNL would continue to be exposed to similar noise levels."

120-5 **The DEIS's noise model is not an accurate measure of the noise generated now or in the future. They failed to use actual sound measurements heard in the surrounding community and relied entirely on a computer model.**
Even in this instance when technology exists to measure current sound pollution the Navy elected to use computer modeling.
Even if one were to use computer modeling, the model used here is suboptimal, with numerous deficiencies apparent.

- The DEIS analysis of baseline and projected noise is based on a computer model that did not rely on any actual measurements from sites in the affected community. The DEIS does not address the impact of marked increased frequency of exposure to noise. Operations are expected to increase by a 49% from baseline,
- The model does not address prolonged revving of the engines on the ground or prolonged hovering of helicopters. These activities already occur and will increase if overall activity increases.
- The DEIS states "that the increases in future aircraft noise levels associated with introduction of the MV22 and AH/UH1 aircraft are expected to be minimal and would be difficult to measure or discern due to the lower noise levels the aircraft when compared to other aircraft operating at MCB Hawaii Kaneohe Bay".

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120-5 The current CH-53 Sea Stallions helicopters have a different sound than the proposed aircraft. The Osprey hybrid combines the noise of a helicopter with a high pitched whine of a turbo engine. Adding this to the noise additional helicopters and the P8 jets is not a minimal change.

The DEIS failed to address that qualitative changes may be as or more disruptive than qualitative changes.

Annoyance from Helicopter Noise

120-6 The DEIS failed to address the differences in perceived noise from helicopters versus fixed wing airplanes

- More people consider helicopter noise more disturbing than that from fixed wing aircraft (http://www.medscape.com/viewarticle/516462).

  The heightened adverse reaction to helicopter noise is detailed in a report citing the experience of the U.S. Navy at Miramar Marine Corps Air Station. Miramar had long been a naval air station famed for its Top Gun School and its F-14 Tomcats. Top Gun moved to Fallon, Nevada. Miramar was turned over to the Marine Corps, which brought in helicopter and F-18 operations. Soon after the change, residents complained about noise and pollution and expressed concerns over possible helicopter crashes. Yet, the noise contour map was not significantly different from when the F-14 aircraft were operating. *In addition, the contribution of helicopter operations to the overall DNL is much less than that of the F-18 operations.* Aware of this adverse qualitative effect of helicopter noise the Navy failed to address it in the current DEIS.
  http://www.faa.gov/regulations_policies/policy_guidance/envir_policy/media/04Nov-30-RTC.pdf
- At an airport where the noise exposure was dominated by fixed-wing aircraft and with less than two helicopter operations per week, 7 percent of the people exposed to a DNL of 66 dB reported themselves *to be "highly annoyed" by helicopters. P.D. Schomer, 1983b.*
- *A study from the United Kingdom also found a heightened rea*ction to helicopter noise. In the community of Lower Feltham, the contribution of fixed-and rotary-wing aircraft to the overall noise exposure was about equal. However, the percentages of people who considered helicopters more disturbing than fixed-wing aircraft were 2 to 2.5 times as large as the percentages that considered helicopters less disturbing. In the communities of Esher and Epsom, where the numbers of helicopters and a fixed-wing aircraft were about equal, the disturbance due to helicopter noise was 2.5 times as large as that due to fixed-wing aircraft noise. People were more annoyed by the helicopters even though, on average, the fixed-wing aircraft were 5.0 decibel ("dB") louder.
  See below numerous studies supporting these comments.
  J.A. Molino, 1982, "Should Helicopter Noise Be Measured Differently from Other Aircraft Noise?," NASA Contractor Report No. 3069, Wyle Laboratories, Crystal City, VA.
  J.B. Ollerhead, 1982, "Laboratory Studies of Scales for Measuring Helicopter Noise," NASA Contractor Report 3610, November 1982.

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W. Passchier-Vermeer, 1994, "Rating of Helicopter Noise was Respect to Annoyance," English Version, TNOReport 94.061, Leiden, The Netherlands.
\T. Ohshima, and I. Yamada, 1993, "Psycho-Acoustic Study on the Effect of Duration on the Annoyance of
Helicopter Noise Using Time Compressed or Expanded Sounds," *Inter-Noise 93*, 1087-1090.
T. Gjestland, 1994, "Assessment of helicopter noise annoyance: A comparison between noise from helicopters and from jet aircraft," *Journal of Sound and Vibration,* **171**, 453-58.
G. Bisio, U. Magrini, and P Ricciardi, 1999, "On the helicopter noise: A case history," *Inter-Noise 99*, 183-
Wyle Research Report WR 94-25, 1995, Aircraft Noise Study for Marine Corps Air Station Miramar, CA, Wyle Laboratories, Arlington, VA, August 1995.
P.D. Schomer, 1983b.
C.L.R. Atkins, 1983, "1982 Helicopter Disturbance Study: Tabulations of the Responses to Social Surveys,"
C.L.R. Atkins, P. Brooker, and J.B. Critchley, 1983, "1982 Helicopter Disturbance Study: Main Report," London: Civil Aviation Authority, DR Report 8304.
P. Prescott-Clarke, 1983, "1982 Aircraft Noise Index Study and 1982 Helicopter Disturbance Study:
Methodological Report," Social and Community Planning Research, London.3-8

120-7
- **The surrounding community: descriptions of the environment are misleading; the DEIS describes the area as low population density** (it considers uninhabitable areas such as mountains in its calculation) of residential areas. It inaccurately describes the surrounding areas as serving as buffers between the base and the Windward Oahu communities. It fails to consider that most of the population is concentrated in the area surrounding the bay- and thus will be the most adversely affected by the expansion. The surrounding area is densely populated with little land left for development. Particularly ingenuous is the use of the quote from Honolulu's City's General Plan (DGP 2002) "**residential areas with limited future population growth" as the reason the region has "limited growth potential" is that it is already fully populated.**

Health Effects on Humans and other animals
The EIS does not adequately address human health effects.

120-8 **The DEIS fails to evaluate potential human health impacts associated with contaminants accumulating bay and ocean water from aviation fuel and may be consumed in foods such as limu and fish.**

120-9
- **Elevated noise levels are associated with an increase in serious cardiac disease**. In a large German trial, a day-time average sound pressure level of 60 decibels increased coronary heart disease by 61% in men and 80% in women. As another indicator, a night-time average sound pressure level of 55 decibel increased the risk of heart attacks by 66% in men and 139% in women. Statistically significant health effects started as early as from an average sound pressure level of 40 decibel. (*Tödlicher Lärm* - Spiegel*, Nr. 51, 14 Dezember 2009, Page 45* **)**

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More recent studies have suggested that noise levels of 50 dB(A) at night may also increase the risk of heart attack by chronically elevating cortisol production. (Franssen EA, van Wiechen CM, Nagelkerke NJ, Lebret E (2004). "Aircraft noise around a large international airport and its impact on general health and medication use". *Occup Environ Med* **61** (5): 405–13. doi:10.1136/oem.2002.005488. PMC 1740783. PMID
120-9 15090660.
)http://www.pubmedcentral.nih.gov/articlerender.fcgi?tool=pmcentrez&artid=1740783.

^ [?] Lercher P, Hörtnagl J, Kofler WW (1993). "Work noise annoyance and blood pressure: combined effects with stressful working conditions". *Int Arch Occup Environ Health* **65** (1): 23–8. doi:10.1007/BF00586054. PMID 8354571.)

120-10

- **Elevated noise levels have been associated with birth defects**. The EPA has described a correlation between low-birth weight babies and higher incidence of birth defects when expectant mothers are exposed to elevated sound levels, such as typical airport environs.
  - Per Lester W. Sontag of The Fels Research Institute (as presented in the same EPA study): "There is ample evidence that environment has a role in shaping the physique, behavior and function of animals, including man, from conception and not merely from birth. The fetus is capable of perceiving sounds and responding to them by motor activity and cardiac rate change."

(Passchier-Vermeer W, Passchier WF (2000). "Noise exposure and public health". *Environ. Health Perspect.* 108 Suppl 1: 123–31. doi:10.2307/3454637. JSTOR 3454637. PMC 1637786. PMID 10698728.
http://www.pubmedcentral.nih.gov/articlerender.fcgi?tool=pmcentrez&artid=1637786)
Elevated noise levels have been reported to create stress, increase workplace accident
120-11 rates, and stimulate aggression and other anti-social behaviors. (Kryter, Karl D. (1994). *The handbook of hearing and the effects of noise: physiology, psychology, and public health*. Boston: Academic Press. ISBN 0-12-427455-2.)

120-12 **Elevated noise levels impair hearing** (S. Rosen and P. Olin, *Hearing loss and coronary heart disease, Archives of Otolaryngology*, 82:236 (1965))
.

The DEIS does not adequately address effects on quality of life of surrounding residents interference with daily life. Current levels of aircraft noise drown out or "mask" speech, making it difficult to carry on a normal conversation. Research has shown that "whenever
120-13 intrusive noise exceeds approximately 60 dBs, there will be interference with speech communication." *www.faa.gov/.../ApxH_**Noise**AndItsEffectOnPeople_122805.pdf*
Sound levels well in excess of 60 dB are already occurring and will occur more frequently if the DEIS is approved.

The DEIS does not adequately address effects on children health and educational impact

120-14

- **Children -** Airport noise can also have negative effects on children's health and development. Studies of children living or attending school near airports found:
  - High blood pressure
- **Learning** There is data that shows that when children learn in noisier classrooms, they have a more difficult time understanding speech than those who learn in quieter settings.

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(Nelson, Peggy B. (1959). "Sound in the Classroom". *ASHRAE journal* 45 (2): 22–25_.
In 1993, a study conducted by Cornell University revealed, children exposed to noise in learning environments experienced trouble with word discrimination as well as various
120-14 cognitive developmental delays. (Wakefield, Julie (June 2002). "Learning the Hard Way". *Environmental Health Perspectives* 110 (6)). There are several schools in the area affected by the proposed change in operations at MCBH in Kaneohe.

The DEIS did not present adequate data on the effect on wildlife
There are 68 endangered/threatened/protected species present in the affected area some of which are monk seals, whales, green sea turtles and blue herons. Studies evaluating noise have shown disturbances of normal behavior including disruptions of feeding and mating.
120-15 http://www.nature.nps.gov/naturalsounds/pdf_docs/wildlifebiblio_Aug2011.pdf

The DEIS minimally addresses these concerns and focuses its analysis of wildlife issues to the effects of bird airstrikes.

In summary, this DEIS should not be approved based on failure to adequately address the effects on the environment, numerous omissions, misleading assessments and erroneous data including but not limited to:

- **The DEIS failed to take a comprehensive look at cumulative impacts**
- **The DEIS failed to satisfy NEPA's requirements to present complete information on alternative locations**
- **The DEIS failed to provide accurate and complete assessments on the effects on human health and the quality of life.**
- **The DEIS did not present adequate assessments on the behavioral and survival impacts on wildlife**
- **The DEIS omitted data on critical flaws in the current and planned wastewater disposal from the MCBH**
- **The DEIS's conclusion that noise impacts would not significantly impact the surrounding community, recreational areas and the environment is based on flawed and incomplete data and measurements**

For the foregoing reasons, the DEIS precludes meaningful analysis. The Navy should revise and resubmit the DEIS which should fully and accurately disclose all impacts and all alternatives associated with the proposed action.

Respectfully submitted
E Hilton MD
Kaneohe Bay Drive
Kaneohe Hi 96744

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121

From: Janice Palma-Glennie [palmtree7@hawaiiantel.net]
Sent: Monday, December 26, 2011 3:12 PM
To: mv22h1eis
Cc: Sen. Josh Green; Office of the Governor; repnakashima@capitol.hawaii.gov
Subject: "NO" to Upolu - Response to the Draft EIS

Naval Facilities Engineering Command, Pacific   December 24, 2011
Attn: EV 21,MV22H-1, EIS Project Manager
258 Makalapapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

Response to the Draft EIS to base V-22 Osprey and Cobra and Huey Aircraft in Hawaii.

I am a resident of Kailua-Kona on Hawai`I Island. I believe that the preferred site (if any in Hawai`i) is Alternate A at Kaneohe on Oahu, at the existing Marine Corps base. At a time of huge budget deficits the Marine Corps is planning to spend $763 million at Kaheohe not including the cost of the aircraft, which makes little sense.
But, from the military's documents, it appears that only Kaneohe met analysis requirements, while others like Upolu definitely did not.

The increased population created by this facility will be huge relative to the Hawai`I Island alternative where as the population on Oahu will be affected much less relatively.

121-1 Upolu also is not apparently equipped for aircraft refueling, the runway is insufficient, and noise studies for the area are lacking. None of this makes sense in light of Upolu being a potential site for the military's stated purposes. In addition, some of the aircraft which would be flying over this populous, windy and mountainous area appear to have a dubious safety record.

121-2 Hawai`I Island has a combination of factors which makes the quality of life for residents much higher than in other places in the United States and Hawai`i, and those factors should be taken into consideration and protected when discussing land use planning (including military). One of the prime reasons Hawai`I Island residents enjoy a higher quality of life is its relatively healthy natural environment, including relatively low noise levels. The area most affected by this proposal is one of the more serene and rural of the island, where agricultural pursuits and lifestyles are far more appropriate than military ones (as, I believe, is the entire island.) Much of the rest of the West side of this island is used for touristic pursuits, one major aspect of the local economy which could be negatively affected by increased military and its operations and development.

Thank you for taking my views into consideration on this most serious matter.

Sincerely,
Janice Palma-Glennie
PO Box 4849
Kailua-Kona, HI 96745

cc: Governor Abercrombie, Senator Green, Rep. Nakashima

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122

From: Deborah Gibson [specialevents@lava.net]
Sent: Tuesday, December 27, 2011 12:41 PM
To: mv22h1eis
Subject: Aircraft activity at KMCB

To whom it may concern:

122-1 I am a homeowner on Kaneohe Bay Drive with a clear view of the base. I understand you are proposing an increase in aircraft activity beginning in 2012. KMCB has been a good neighbor and living with helicopters and occasional jet take offs and landings have been no problem. However, increasing traffic with these high pitched/powered jets and helicopters early AM and late PM with pose a significant impact on my quality of life and my property value.

I oppose this increase.

Deborah Gibson
Homeowner
Yacht Club Knolls

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123

December 14, 2011

Naval Facilities, Engineering Command Pacific
Attn: EV21, MV-22/H-1, EIS Project Manager
258 Makapala Drive, Suite 100
Pearl Harbor HI 96860-3134

Re: Draft EIS for the Basing of MV-22 and H-1 Aircraft in Support of III MEF Elements in Hawai'i

Dear Project Manager:

I'm writing about possible impacts to the Upolu Airport area in North Kohala, Hawai'i Island, as per the above-referenced proposal. I've lived in North Kohala for 13+ years, and although my home is not close to the Airport I do walk along the ocean there and know the landscape, seascape, and significant Hawaiian cultural sites (Mo'okini Heiau and the birthplace of King Kamehameha I). I have friends who live within sight and/or hearing distance of the Airport. My concerns about possible military operations there center on impacts to (1) the quality of life and character of our community, and (2) the local economy.

123-1 People do *live* and, in some cases, *work* within a 1- to 2-mile radius of the Airport on both sides of the highway — a point glossed over in the Draft EIS. Areas of potential impact include but are not limited to the gated Puakea Bay Ranch subdivision, large-lot residences at Koko'iki and along Lincoln and Ho'ea Roads, and the higher density plantation houses along Akoni Pule Highway from Upolu into Hawi. Agricultural operations include Botelho Dairy and Sage Farms, among others. Residents live here and elsewhere in Kohala because of its *quiet rural nature* and *scenic beauty*, two elements that would be threatened by military aircraft flying in and out over as yet unspecified flight paths.

123-2 The larger North Kohala community — the towns of Hawi and Kapa'au plus outlying areas — also is rural residential, and our local economy nowadays is based on *tourism*. Since the demise of the sugar industry, North Kohala has pulled itself up by its proverbial bootstraps and evolved into a unique visitor destination, what people often call the "real Hawai'i," with a diverse mix of shops, restaurants, ecotourist activities, and cultural attractions. The annual Kohala Country Fair draws visitors from all over the island. Nowhere in the Draft EIS did I find mention of economic impacts on tourism. Aircraft flyovers could detrimentally alter the nature of the visitor experience in Kohala, weakening the economic health of our community.

The military already has a large, active facility at Pohakuloa and, as per the Draft EIS, there's been no military presence at Upolu Airport since the 1950s. So why not restrict operations to Pohakuloa? Why bring them into a quiet rural community whose lifeblood is tourism?

I ask that you will seriously consider these concerns when making a final decision. Thank you.

Carol Rosenblum Perry

Carol Rosenblum Perry
POB 8, Kapa'au HI 96755
808/889-0317

124

NEIL ABERCROMBIE
GOVERNOR

KATHRYN S. MATAYOSHI
SUPERINTENDENT

STATE OF HAWAI'I
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAI'I 96804

OFFICE OF THE SUPERINTENDENT

December 19, 2011

Department of the Navy
Naval Facilities Engineering Command, Pacific
258 Makalapa Drive, Suite 100
Pearl Harbor, Hawaii 96860-3134

Attention: EV21, MV-22/H-1 EIS Project Manager

To Whom It May Concern:

Subject: Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of the Third Marine Expeditionary Force (III MEF) Elements at Hawaii Marine Corps Base (MCB) Hawaii Kaneohe Bay

The Department of Education (DOE) has reviewed the Draft Environmental Impact Statement for the above-reference project.

124-1 While it is true that student enrollment for Kailua and Kaneohe public schools have shown general decline, any portion of the additional 234 school-aged children could have an adverse impact on the carrying capacity of several schools. The DOE would appreciate periodic updates as the assignment of personnel moves forward and an opportunity to discuss more details of when schools might see this enrollment impact so that the additional burden can be anticipated and mitigated.

Thank you for the opportunity to provide comments. If you have any questions, please call Roy Ikeda of the Facilities Development Branch at 377-8301.

Very truly yours,

Kathryn S. Matayoshi
Superintendent

KSM:jmb

c: Randolph Moore, Assistant Superintendent, OSFSS

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

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DEPARTMENT OF PLANNING AND PERMITTING

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
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PETER B. CARLISLE
MAYOR

DAVID K. TANOUE
DIRECTOR

JIRO A. SUMADA
DEPUTY DIRECTOR

2011/ELOG-2578(BA)

December 20, 2011

Department of the Navy
Naval Facilities Engineering Command, Pacific
258 Makalapa Drive, Suite 100
Pearl Harbor, Hawaii 96860-3134

To Whom It May Concern:

Subject: Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii
MCB Hawaii Kaneohe Bay
Draft Environmental Impact Statement

We have reviewed the Draft Environmental Impact Statement for the subject proposal. We have no comments to offer at this time.

Thank you for the opportunity to comment. Should you have any questions, please call Bonnie Arakawa of my Community Planning Branch staff at 768-8048.

Very truly yours,

David K. Tanoue, Director
Department of Planning and Permitting

DKT:dj

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OCEAN CONSERVATION SOCIETY

December 16, 2011

Dept. of the Navy
Naval Facilities Engineering Command, Pacific Division
Attn. EV-21, MV 22/H-1 EIS Project Manager
258 Makalapa Dr. Suite 100
Pearl Harbor, HI 96860-3134

To Whom It May Concern:

Recently, we became aware of the proposed project involving the Upolu airport in Hawaii and we are highly concerned about the potential effects that this project will have on Humpback whales. In our review of the EIR associated with the Upolu proposal, we found inadequate consideration of the effects of aircraft noise on the local humpback whale population. This is of particular concern considering: 1) that these animals use the area as a breeding ground and; 2) that the area of proposed operations at Upolu is part of the Hawaiian Islands Humpback Whale National Marine Sanctuary established by Congress in 1992 through the National Atmospheric and Oceanic Administration.

126-1 Humpback whales are an endangered species protected under both the Marine Mammal Protection Act and the Endangered Species Act. The potential impacts of aircraft noise in the area as a result of the proposed use of Osprey and H-1 helicopters may have significant, if not severe, consequences to Humpback conservation and well-being in the area.

We strongly urge you to adopt a precautionary approach to the use of the Upolu facility and postpone any deployment of aircraft at Upolu airport until a new and proper EIR that includes objective studies of the impacts of noise on Humpbacks and other marine mammal species in the area, can be caried out and properly evaluated. We would also suggest that once a new EIR has been prepared, that it be offered for public consideration and comment before any further action is taken toward the deployment of aircraft.

Thank you in advance for your consideration.

Sincerely,

Dr. Maddalena Bearzi
President

Capt. Charles Saylan
Executive Director

P.O. BOX 12860 • MARINA DEL REY, CA 90295 • TEL: 310.822.5205 • FAX: 310.822.5729
WWW.OCEANCONSERVATION.ORG • INFO@OCEANCONSERVATION.ORG

127

From: Carolann Biederman [cabc@lava.net]
Sent: Monday, December 26, 2011 4:52 PM
To: mv22h1eis
Subject: Comments to DEIS regarding Kaneohe Marine Corps Base
Attachments: DEIS Final.doc

December 26, 2011

To: mv22h1eis@beltcollins.com

Department of the Navy
Naval Facilities Engineering Command, Pacific Division
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

Re: Draft Environmental Impact Statement (DEIS) to expand aircraft activity and infrastructure at Kaneohe Marine Corps Base.

Aloha and thank you for the opportunity to comment on the DEIS.

We are writing as concerned residents of Yacht Club Knolls, an 86-unit condo complex on Kaneohe Bay Drive, just minutes away from KMCB.

The peace, quiet and natural beauty of our location overlooking Kaneohe Bay creates an unsurpassed quality of life for our families that we are privileged to share with our neighbors at KMCB.

There has been a respectful and delicate balance of the needs for military training and the needs of our residential community in years past.
We have learned how to live with the current noise from the aircraft at the base, the pollution from aircraft fuel, and to accept the positive and negative aspects of proximity to KMCB.

However, the new proposal to expand aircraft activity is a tipping point for our quality of life. The DEIS is remiss in several critical areas and does not adequately address legitimate concerns related to the lifestyle that we live here on the bay, and the degradation of the environment.

We request that the Navy's plan to increase aircraft traffic to 49% over baseline activity at Kaneohe Bay not move forward without additional studies and assurances that address the environmental and health issues at stake, such as:

127-1 * Increased noise levels. According to the DEIS, a computer model was used to generate the data on noise impact. We believe that actual field measurements that evaluate the current noise impact and establish a baseline will demonstrate the true adverse impact on the people, animals and other living creatures in the vicinity of Kaneohe Bay.

127-2 * The DEIS study suggests low population density in the area of impact, rather than the reality of high density throughout the area. The data appears skewed because it includes the unpopulated mountains. It fails to consider that most of the population is concentrated in the area surrounding the bay, and we are the people who will be the most directly affected by the expansion.

127-3 * The current level of aircraft pollution from unburned jet fuel is barely acceptable. What will the increased impact of the chemicals be when they enter our water supply, groundwater and Kaneohe Bay itself? The DEIS doesn't present adequate data on this environmental concern.

127-4 * There are many endangered, threatened and protected species present in Kaneohe Bay. Studies evaluating noise have shown disturbances to their normal behavior including disruptions of feeding and mating. The DEIS minimally addresses these concerns and limits its analysis to effects on bird air strikes.

127-5 * The DEIS fails to adequately address the effect on property values. Studies have shown that aircraft expansions with associated increase in noise result in a 15-43% (average 27%) decrease in property values.

We sincerely hope that our comments are considered. Thank you again for this window of opportunity to express our concerns.

With aloha,

Carolann Biederman	Inez Hagemann	Karen Hendrickson
44-391 Nilu Street #4	44-397 Nilu Street #2	44-304 Olina Street #8
Kaneohe, HI 96744	Kaneohe, HI 96744	Kaneohe, HI 96744

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128

From: Ellen Akaka [eakaka1@yahoo.com]
Sent: Monday, December 26, 2011 7:36 PM
To: mv22h1eis
Subject: Comments - EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

45-442 Ohaha Street
Kane'ohe, Hawai'i 96744
December 25, 2011

Department of the Navy
Naval Facilities Engineering Command, Pacific
258 Makalapa Dr., Ste. 100
Pearl Harbor, Hawai'i 96860-3134

Attn: EV21, MV-22/H-1 EIS Project Manager

To whom it may concern,

I am writing about the proposed basing of MV-22 and H-1 aircraft at the Kane'ohe Marine Base in Hawai'i. While other obligations prevented our family from attending the public meeting at Castle High School, we have looked through the materials sent us prior to that meeting. Our primary concern is the expected increased noise levels. You have stated that noise will be only "minimally increased", the implication being that present noise levels are acceptable. I can assure you that they are not.

My husband and I purchased our home (new) in the Pikoiloa subdivision in 1964 and, while the Marine Base already existed in Kane'ohe, its noise impact on the community was minimal. There were occasional over flights but we do not recall any night flights or related regularly occurring noises that were particularly bothersome.

Some recent letters to the editor of the Honolulu Star Advertiser have suggested that those people who have complained about the Marine base noise (and the potential for more) are somehow un-American, that we should be grateful because that noise reminds us how "well-off" we are, and that if we didn't want to be subjected to the attendant aircraft noises we should not have purchased a home near a military base. In addition, if we don't like the noise we should consider moving. I would argue that when we purchased our home this was not an issue, and it did not become so until the mid-90s when those aircraft headquartered at Barber's Point were transferred to the Kane'ohe Marine base. I do not recall that those of us on the Windward side had any choice in that decision. Our feeling now is that after living in our home for almost 50 years why should we have to move to another location because some bureaucrats have decided that the Marine base should be expanded. Aside from not wanting to move, it is not a financial option.

In the past few years the noise levels have increased exponentially and, while there are days when there is little noise from Marine base-related activities, those days are relatively few. We are regularly subjected to:

128-1
- helicopter fly-overs (our home is adjacent to and just below Hawaiian Memorial Park and the helicopters often fly along, and across, H3 freeway -- another addition to Kane'ohe which came into being long after our home was purchased),

1

128

a continual and annoying loud droning hum from the flight-line, sometimes beginning as early as 3:00 AM,

- jet take offs (or what sounds like them) until 11 or 12 at night,
- daytime circling of a large aircraft which is, presumably, practicing takeoffs and landings – this sometimes continues for many hours and the noise is loud and continuous.
- evening noise levels from the base that are so loud it's impossible to hear even the television at a normal sound level.

128-1

Couple that with other noise, for which the Marine base is not responsible but which must be considered in the total picture, and the situation is often unbearable. Tour helicopters, which fly almost directly over our home, are flying every day of the week, beginning at 8 or 8:30 AM and continuing until dark. They can range in frequency from every 10 to 25 minutes on some days, and can occur 14-20 times a day; private planes are often in the mix, although not as frequently, but will circle overhead numerous times. Other military helicopters (e.g. Coast Guard) often fly over, sometimes late at night, as well as police or fire helicopters. The only "regular" peace we can count on is when the President is here since we are, thankfully, within the "no fly" zone. That, of course, is only once a year for a relatively few days.

128-2

As a nurse I am well aware of many studies over the years that have shown the detrimental effects of noise on the human health. Noise causes a wide range of health effects, including:

- increased stress levels which affect general health,
- sleep disturbances:
  - the number and duration of awakenings;
  - the number of changes in sleep stage;
  - global changes in total amount of sleep stages or in their time organization
- cardiovascular effects:
  - epidemiological evidence has been accumulated supporting the hypothesis that persistent noise stress increases the risk of cardiovascular disorders including hypertension and ischemic heart disease.
- damage to work and school performance:
  - Noise has negative impacts on cognitive performance, attention and memory. These adverse impacts of noise on cognitive performance can lead to a reduction in the productivity at work and the learning performance at school.
- hearing impairments, including tinnitus.

In our family of four, one member has suffered for several years from severe insomnia which has been exacerbated by the increased Marine base noise levels, and another family member suffers from tinnitus which is severely exacerbated by overflying helicopters. The suggestion of increased noise levels, no matter how "slight" are extremely anxiety-producing for people with those afflictions.

128-3

We realize that a letter from one family is not likely to lead to any change in plans; we can only hope that some consideration will be given to the civilians who will suffer the consequences of any of the suggested actions.

Sincerely,

Mrs. Ellen L. Akaka and family

2

128

Cc: Senator Daniel Inouye
Senator Daniel Akaka
Representative Mazie Hirono
Representative Colleen Hanabusa
State Senator Jill Tokuda
State Representative Ken Ito

Please complete the following information: Name: Ellen L. Akaka: Mailing Address: 45-442 Ohaha St. City: Kaneohe State: Hawaii Zip Code: 96744 Add to Mailing List? (No): Comments:

****

Ellen L. Akaka, MS, RN, FACCE
Email: eakaka1@yahoo.com

e kuahui like i ka hana -- Hawaiian Proverb
"Let everybody pitch in and work together"

****

3

RECEIVED

'12 JAN -3 A11 :13

NAVFAC Pacific

45-442 Ohaha Street
Kane'ohe, Hawai'i 96744
December 25, 2011

Department of the Navy
Naval Facilities Engineering Command, Pacific
258 Makalapa Dr., Ste. 100
Pearl Harbor, Hawai'i 96860-3134

Attn: EV21, MV-22/H-1 EIS Project Manager

To whom it may concern,

I am writing about the proposed basing of MV-22 and H-1 aircraft at the Kane'ohe Marine Base in Hawai'i. While other obligations prevented our family from attending the public meeting at Castle High School, we have looked through the materials sent us prior to that meeting. Our primary concern is the expected increased noise levels. You have stated that noise will be only "minimally increased", the implication being that present noise levels are acceptable. I can assure you that they are not.

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- evening noise levels from the base that are so loud it's impossible to hear even the television at a normal sound level.

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Sincerely,

Ellen L. Akaka

Mrs. Ellen L. Akaka and family

Cc: Senator Daniel Inouye
Senator Daniel Akaka
Representative Mazie Hirono
Representative Colleen Hanabusa
State Senator Jill Tokuda
State Representative Ken Ito
Kane'ohe Neighborhood Board

129

From: Sherree McKellar [mckellars001@hawaii.rr.com]
Sent: Monday, December 26, 2011 7:57 PM
To: mv22h1eis
Subject: aircraft activity

So often you hear the negative voices. I want to be sure my positive opinion is also heard. I lived on the edge of the KMCAS (as it was known then) airstrip on Yarnell Ave in 1967. Now THAT was noisy!!!

I now live a few doors down from where the President is staying.

129-1 I am a First Radio Battalion marine brat.

I don't mind the noise.

I am grateful for the security our aircraft afford us in America.
Thank you for all you do to make us safe,
Sherree McKellar
808-375-9643

1

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December 26, 2011

Department of the Navy
Naval Facilities Engineering Command, Pacific Division
ATTN: EV21, MV22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

Via email to: mv22h1eis@belfcollins.com

Aloha Naval Facilities Engineering Command, Pacific Division;

I am James Dote, a registered voter in the Kaneohe district, residing at 46-260 Kalali Street. I am the third generation of Dotes living in Kaneohe, with my late grandparents moving to Kaneohe sometime in mid 1920s.

With this correspondence I am communicating my displeasure with the additional 49% increase of air traffic over Kaneohe Bay and populated areas because I live here and live close to the turning point of jet aircraft such as tankers and transports as they make their sometimes constant practice landing morning and night. From my front door I see the landing lights of the airfield. And yet, I live across the Kaneohe Bay.

Unfortunately I was not able to attend the early November public meetings on this project, and with the end of the year approaching have been too busy at work to read the draft EIS that is posted.

Let me, however, begin to say that I support the KMCBH because of the strategic military necessity and the existing facilities now there. The KMCBH and its corps has been a supporter of Kaneohe and Kailua events through the decades. I know because I have lived here for over 50 years. I am sure that their successes on the battlefield and their loss have been shared by many here on the Windward side. As a teenager, I lived on the beachfront across the Bay. At 9 pm every night, I could hear the ever-solemn bugler from across the bay as sounds travel very efficiently over the Bay.

I read the local newspaper here sometime in October that the KMCBH will add 49% more aircraft and round the clock air maneuvers. Let me express my serious concern with you as a citizen who supports the KMCBH and also as a lifelong resident, now three generations deep.

As I wrote above, I live almost under the turning radius of these very large jets now that practice some sort of "touch and go" practice. From my front door, with my naked eyes, I can see when the tires touch the tarmac with a puff of smoke. The planes are loud as the streak over our neighborhood. First you hear the shrill whining of the turbines approaching, then the drone of the heavy engines as they turn over our homes, and then

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the exhaust whistling as the jets quickly descend to meet the tarmac. Sometimes over and over with two or three tanker jets in tandem like a merry-go-round.

NOISE AFFECTING SCHOOL STUDENT LEARNING AND ACTIVITIES

130-1 I wish to inform you that the planes nearly fly over Samuel Wilder King Intermediate School with 700 students. The planes make their circle over land almost above the King school property, and ½ mile from the Heeia Elementary School with about 500 students in K-6. I don't know where Mokapu Elementary School is on KMCBH base but it has about 750 students as well. Your jets are already a noise factor. Add 49% more activity and you will likely impact student learning concentration in classrooms, and their on-field activities. Therefore KMCBH planes already may be a noise factor to at least two public schools, King and Heeia, with 1,200 students. Imagine 737 jets added at a 49% more activity level.

On weekends, various sports or community organizations use the King School's open field for events. When planes fly over, the events have to pause until the jet flies over the bay because its noise level drowns out the PA system.

NOISE AFFECTING SENIOR CARE FACILITIES

130-2 I knew there were two or three acute senior care facilities in my hometown that were under of close to the jet flight patterns. I just Googled the query ("Senior care residences in Kaneohe") and found there are five in close proximity (like under the trajectory for the landing field). Therefore your planes and helicopters may bother and affect the temperament of these aged residents who may be sensitive to noise pollution.

NOISE AFFECTING RESIDENTS

130-3 I live very close to the flight pattern of the jets like hundreds of my neighbors. Their current landing trajectory because of sea wind patterns, bring the close to schools and people's homes. I visit neighbors who live on lower Heeia Street and sometimes the jets are low enough that we can't hear our conversation. We can see the undersides of the transports and the wheels. There are times, during the war that just ended, when multiple landing practices were done at 8 or 9 pm. I cannot imagine having a 50% increase in air traffic and many thousands of residents being able to enjoy peaceful lives.

KANEOHE'S KOOLAU MOUNTAIN TERRAIN

130-4 If you use Google Earth you will clearly see that the curvature of the Koolau Mountain Range creates a bowl effect with lots of crevasses. The Koolau is an extremely steep range with a sheer drop to the ground level. Loud sounds effectively reverberate and echo. For instance, if fireworks or a gunshot goes off near the Pali Golf Course, it echoes down to my home and beyond. Firework explosions or a car backfire, that occurs along a 10-mile stretch of the Koolau range can send flocks of birds airborne, car alarms ringing, and dogs barking. You can hear it echo down the communities lining the mountains.

Jet plane noise and the chopping sounds of helicopters will not be absorbed along the terrain; rather, these will be amplified and channeled to all parts of Kaneohe residences.

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SOUND FLOATS OVER THE KANEOHE BAY

As mentioned above, I could hear the KMCBH bugler every night at 9 pm play taps while living across the Bay. During the annual K-Bay Fest in July, from my current home we can hear the muted rock bands. music, and PA announcements of events.

130-5 With more jets and helicopters circling over Kaneohe's many quiet residential neighborhoods, as called for in the KMCBH EIS, the noise pollution will be extremely disconcerting and may cause hypertension in many families. We all have homes designed for the open Windward air and so we can't redesign our homes to put in air-conditioning and soundproof all walls, windows and attics.

SAFETY FACTORS

130-6 With 49% more aircraft and flight activities, you will need to build additional housing, office and hangar support facilities. And maybe fuel storage. There are important surface and infrastructure projects needed to keep aircraft petroleum spillage from reaching the Kaneohe Bay sanctuary, protected wildlife and shellfish populations. And there must be a way to reclaim all the rubber debris and dust on the tarmac from every landing and takeoff. (I can see the smoke of the wheels contacting the tarmac from my Kalali Street home!)

130-7 On the topic of preventing further degradation of our environment and Bay, the Kailua Wastewater facility is operating under a federal consent decree and its studies/construction plans were done before the possibility of the 49% increase so those have to be amended and upgraded. But Hawaii taxpayers will need to pay for the added gravity-feed capacities over decades through obligation bonds for construction.

AIR QUALITY

130-8 In adding 49% more jet and helicopter activities to our Kaneohe Bay area, you will further degrade the air quality from the engine exhaust during landings and takeoffs, and idling. You might think we live too far away to be affected. Once or twice during the just-ended conflict in the Middle East, we could smell the odor of liquid jet fuel (not automotive fuel) from across the Bay. The wind carries the odor and sounds. When certain transport aircraft take off, you see the light trail of vapor or exhaust.

IN CONCLUSION

Please know that while I do support the efforts of our military in protecting and guarding our Nation and State, I think adding nearly 50% more hardware and activity to a compact base juxtaposed on the open ocean and a bay recovering from pollution will negatively impact Kaneohe's extremely rural, bedroom quiet personality. Adding more training planes and helicopters to a base with limited airfield capacity is asking for trouble, safety wise. There isn't the capacity to divert in case of a tarmac mishap. The noise issue will exacerbate our rural lifestyle where roosters and ducks still quack or crow. Noise travels from the base over the Kaneohe Bay efficiently; noise echoes and bounces down the crevasses of the Koolau mountain range setting of dogs, car alarms, etc.

I thank you for enabling my voice to be heard.

130

Respectfully submitted,

/s/ James Dote, 46-260 Kalali Street, Kaneohe, HI 96744

jimdotegraphics@gmail.com

131

From: Kim A. Tomey [kimtomey@aol.com]
Sent: Tuesday, December 13, 2011 3:15 PM
To: mv22h1eis
Subject: DEIS for KMCB expansion

Dear Sir or Madam: I attended the Dec. 8 community scoping meeting at Castle High School and have three requests:

131-1 (1) Would it be possible to get an extension of the Dec. 27 written comment period? With the holidays and family coming to town, 19 days is not enough time to prepare thoughtful comments.

131-2 (2) Would it be possible to obtain copies of any of the posters and other hand outs? In particular, would it be possible to get a copy of the Course Rules on flight paths and altitudes? Would it be possible to get a copy of the sound chart that was used to describe the various aircraft noises?

131-3 (3) Some of the charts used in the DEIS, particularly the one in Appendix D showing flight corridors, contain annotations along the flight paths that are not explained and make no sense to me. Could I call someone who could explain that to me?

Mahalo,

Kim A. Tomey

1

December 26, 2011

Department of the Navy
Naval Facilities Engineering Command
Pacific Division
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
mv22h1eis@beltcollins.com

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE BASING OF MV-22 AND H-1 AIRCRAFT IN SUPPORT OF THE THIRD MARINE EXPEDITIONARY FORCE (III MEF) ELEMENTS IN HAWAI'I

Dear Sir/Madame:

I am a resident of shoreline property on Kaneohe Bay Drive near the north-east terminus of the H-3 (John A. Burns) Freeway. I first wish to express my gratitude and appreciation to the Navy and the Marine Corps and all branches of the armed forces for their outstanding service and sacrifice on behalf of our country. I also wish to express my concerns about the proposed expansion of facilities and operations ("Proposed Action") at Kaneohe Marine Corps Base ("KMCB" or "Base"), including the introduction of the new MV-22 Osprey, AH-1 Cobra, and HI-1 Huey rotary-wing aircraft, (collectively, the "New Rotary-Wing Aircraft ") under the Draft Environmental Impact Statement ("DEIS") dated November 2011. The DEIS appears to be in violation of the National Environmental Policy Act, 42 USC §4321 et. seq. ("NEPA").

NEPA was passed by Congress to protect the environment by requiring that federal agencies *carefully weigh* environmental considerations and consider potential alternatives to the proposed action before the government launches any major federal action. *See The Lands Council v. Powell*, 395 F.3d 1019, 1020 (9th Cir. 2005). "NEPA requires that a federal agency consider every significant aspect of the environmental impact of a proposed action . . .[and] inform the public that it has indeed considered environmental concerns in its decisionmaking process." *Earth Island Inst. v. United States Forest Serv.*, 351 F.3d 1291, 1300 (9th Cir. 2003) (internal quotation marks omitted). "In order to accomplish this, NEPA imposes procedural requirements designed to force agencies to take a 'hard look' at environmental consequences." *Id.* As described below, the DEIS falls short of the legal requirements established by NEPA, its implementing regulations (40 C.F.R. §§1500-1508), and applicable case law.

A. THE DEIS DOES NOT ADEQUATELY DISCLOSE OR ANALYZE ANTICIPATED NOISE IMPACTS ON THE ENVIRONMENT.

131-4 **1. The DEIS does not utilize the full range of available acoustical metrics and relies on imperfect methodology thus providing a distorted view of anticipated noise impacts.**

The DEIS relies upon Day-Night Average Sound Level ("DNL") estimates for predicting noise impacts resulting from the Proposed Action. DNL, which is an average of cumulative noise levels over a 24 hour period, is extensively used by the military yet arguably provides the least meaningful measure of noise impacts to the ordinary citizens whose lives will be most impacted by the Proposed Action. *See*

National Academy of Engineering, TECHNOLOGY FOR A QUIETER AMERICA, p. 23 (2010).[1] ("An often-cited shortcoming of DNL is that the public does not understand what it means."). No one actually "hears" a DNL. *Id.*, p. 21. Additionally, the DNL measure has been criticized for understating the practical effects of noise and its annoyance. *See* Timothy D. Hogan, Ph.D., "An Evaluation of the Potential Loss in West Valley Home Values from Locating F-35 at Luke Air Force Base," p. 12 (May 4, 2010)[2] (citing FAA sources). DNL is also a relatively insensitive measure of sleep disturbance and thus is not an appropriate metric for predicting awakenings in sleep disturbance studies. TECHNOLOGY FOR A QUIETER AMERICA, *supra*, p. 21. In particular, *the DNL measure does not provide a good indication of single event noise*. Hogan, *supra*, p. 12. Thus, for example, 50 noise events with a sound intensity of 98 dBA over a 24-hour period is equivalent to a 65 DNL. *Id*. Accordingly, while the DNL Contours set forth in the DEIS indicate only a 55-60 dBA impact at most Kaneohe Bay points of interest ("POI"), the experience of single noise events at those POI will be dramatically different. *See* DEIS, Vol. 2, p. 203, Figure 1.3-2. The DNL metric dilutes the magnitude of the noise experience presenting a distorted picture of reality and misleading the public into believing that decibel levels along the Kaneohe Bay shoreline will not exceed the dBA specified at that DNL Contour.

Moreover, Kaneohe Bay and environs, including Haiku Plantations which backs against the Ko'olau Mountains,[3] are semi-rural, naturally quiet areas; DNL is inappropriate for measuring noise in such environs. TECHNOLOGY FOR A QUIETER AMERICA, *supra*, p. 27. And sound volume is not the only predictor of whether or not a sound will be perceived as annoying. L.S. Finegold, C.S. Harris, and H.E. von Gierke, "Community Annoyance and Sleep Disturbance: Updated Criteria for Assessing the Impacts of General Transportation Noise on People," *Noise Control Engineering Journal*, Vol. 42, No. 1, Jan.–Feb. 1994. Quality, too, is important. *Id.* In particular, aircraft noise appears to be more annoying at the same DNL than either road or rail noise. *Id.* Despite these, and other,[4] drawbacks, DNL is the sole

[1] http://www.nap.edu/openbook.php?record_id=12928&page=1
[2] http://www.azcentral.com/ic/community/pdf/luke-air-force-base-noise-study-0414.pdf
[3] It is unclear whether the DEIS takes into account the effects of topography on sound. According to one source, NOISEMAP, the computer noise model used by the DEIS (*see infra*), operates under the assumption that the ground is flat, level, and at the same altitude as the Base. Airport Cooperative Research Program, "Effects of Aircraft Noise: Research Update on Selected Topics – A Synthesis of Airport Practice," p. 22 (2008), http://onlinepubs.trb.org/onlinepubs/acrp/acrp_syn_009.pdf. Kaneohe, however, is far from flat; it is hilly and backs up to the 3,000+ foot high sheer-sided Ko'olau Mountains. When an aircraft is directly overhead, the sound experienced by an observer is only affected by meteorology. *Id.* However, as the aircraft passes by or is at lower elevation angles, the sound heard by an observer is both the sound that travels in a straight line from the aircraft plus the sound reflected off the ground. *Id.* Due to the Ko'olau Mountains, residents of Haiku Plantations, approximately four miles from the Base, complain that aircraft noise is greatly amplified. Failure to consider topography and its effects on noise levels in Haiku Plantations and other non-shoreline residential areas would violate NEPA's requirements for the preparation of an EIS. 42 U.S.C. §4332, 102(2)(C).
[4] DNL's inadequacies include:

- DNL is insensitive to the impact of very loud, isolated events.
- Fewer loud events can have the same DNL as many quieter events; thus, the impacts of very different soundscapes are described as equal.
- DNL is insensitive to the time when an event occurs (e.g., noise early in the night causes different sleep disturbance than noise early in the morning).
- Other metrics such as speech interference level and nighttime levels provide a better measure of annoyance with speech interference and conscious awakenings.
- DNL does not take into account other sound characteristics (e.g., tonality and rate of loudness onset) that can influence annoyance and sleep disturbance levels.

National Academy of Engineering, TECHNOLOGY FOR A QUIETER AMERICA, *supra*, p. 26.

metric used by the DEIS in describing noise impacts in the Kaneohe Bay area. The use of the DNL to the exclusion of other noise metrics is particularly disturbing given the number of public comments prior to publication of the DEIS complaining about its use and requesting data using other noise metrics. *See e.g.* DEIS, Vol. 2, Section A-4, pp. 85, 87, 89, and 121. Under these conditions, the exclusive use of DNL violates NEPA by failing to adequately apprise the public of the full impact of future noise events. *See* 40 C.F.R. §1502.8 ("Environmental impact statements shall be written…so that decisionmakers and the public can readily understand them.")

The DEIS identifies two other metrics for measuring noise, Maximum Sound Level ("L_{max}"), and Sound Exposure Level ("SEL"). The DEIS acknowledges that L_{max}, which indicates the maximum sound level occurring during a sound event, "is important in judging the interference caused by a noise event with conversation, TV or radio listening, or other common activities." DEIS, Vol. 1, p. 166:19-22. In other words, L_{max} is useful for a layman's understanding of noise impacts on every-day life. As such, it provides meaningful information for area residents concerned about potential noise interference from Base activities. Furthermore, several studies suggest that L_{max} provides a better predictor of sleep disturbance than DNL. *See* Airport Cooperative Research Program, "Effects of Aircraft Noise: Research Update on Selected Topics – A Synthesis of Airport Practice," *supra*, p. 12. Despite the recognized importance and arguable superiority of L_{max}, the DEIS provides no information as to potential maximum sound levels in and around Kaneohe Bay resulting from the Proposed Action. This deficiency should be corrected so as to provide ordinary citizens with a meaningful yardstick by which to evaluate the potential noise impacts on everyday activities.

SEL, which is a composite metric of both the intensity of a sound and its duration, is a mathematical representation of the sound level of a constant sound that would, in one second, generate the same acoustic energy as the actual time-varying noise event. DEIS, Vol. 1, p. 166:25-26; 33-34. SELs of individual noise intrusions have been shown to be more closely associated with night-time awakenings than long-term noise exposures, thus providing a superior metric to DNL. *See* Airport Cooperative Research Program, "Effects of Aircraft Noise: Research Update on Selected Topics – A Synthesis of Airport Practice," *supra,* p. 12. Even the DEIS concedes that "SEL represents *the best metric* to compare noise levels from overflights." DEIS, Vol. 1, p. 167:1-4 (emphasis added). Based on public comments set forth in Section A-4 of DEIS Vol. 2 as well as those voiced at the December 8, 2011 scoping meeting in Kaneohe, aircraft overflights are one of the most frequent complaints of area residents. Although the Navy's noise model purports to have calculated both DNL and SEL at six POI along Kaneohe Bay, the DEIS reports no SEL results for Kaneohe Bay. The DEIS's only discussion of SEL impacts deals with Terrain Flight ("TERF") and Low Altitude Training ("LAT") operations in the areas of Kahuku, Kawailoa Training Area and Schofield Barracks on the island of Oahu, and Pohakuloa Training Area on the Big Island. Yet these TERF and LAT operations are qualitatively the same types of aircraft events that regularly occur above the Kaneohe Bay shoreline and its environs.

The ground level SEL from a CH-53 conducting operations at an altitude of 500 ft above ground level ("AGL") is estimated by the DEIS to be approximately 99 dB. *See* DEIS, Vol. 1, p. 342:1-3. Yet the Base authorizes aircraft to operate at 500 ft above mean sea level ("MSL")[5] in and around the Base and

[5] Many of the homes around Kaneohe, including those on or near the water, are on hillsides. Thus, an aircraft operating at 500 ft ASL will be closer to residence rooftops than measured by AGL.

such operations routinely occur directly over residential areas.[6] SEL data is important information for Kaneohe residents yet it is arbitrarily omitted from the Navy's noise analysis.

Low-frequency noise ("LFN") represents a special issue because outdoor A-weighted noise measurements such as DNL may not appropriately reflect LFN levels. *See* "Effects of Aircraft Noise: Research Update on Selected Topics – A Synthesis of Airport Practice," *supra*, p. 18. LFN is not absorbed by the atmosphere or blocked by terrain and buildings as well as higher frequencies. Therefore, LFN can sometimes be audible at farther distances than higher frequency noise. *Id.* LFN can induce structural building response that may cause rattle of windows, fixtures, pictures, etc. *Id.* Many participants at the Castle High School scoping meeting reported experiencing these types of noise impacts in their homes. Yet the DEIS is silent on any potential LFN impacts from the Proposed Action.

Finally, a recent FAA report noted that "metrics developed for airplane noise are not completely adequate for helicopters." Federal Aviation Association, "Report to Congress: Nonmilitary Helicopter Urban Noise Study," p. 6-13, § 6.2.10 (2004). "Civil helicopter annoyance assessments utilize the same acoustic methodology adopted for airplanes with no distinction for helicopter's unique noise character. As a result, the annoyance of unaccustomed, impulsive helicopter noise has not been fully substantiated by a well-correlated metric." *Id.*

"Most [noise metric professionals] advocate using a group of metrics to give a fuller picture of the potential impact of the exposure and explaining that these measures supplement metrics such as DNL." TECHNOLOGY FOR A QUIETER AMERICA, *supra*, p. 23. Accordingly, additional studies using meaningful acoustical methodology, including L_{max}, SEL, LFN and methodology specific to rotary-wing aircraft, must be undertaken to develop a more accurate and understandable analysis of noise impacts from the Proposed Action in accordance with NEPA's requirements that an EIS provide meaningful information that is understandable to ordinary citizens. 40 C.F.R. §1502.8.

131-5

2. __The Navy should utilize actual noise data, not computer modeling, to provide a more reliable estimate of anticipated noise impacts resulting from the Proposed Action.__

Both with respect to current and anticipated noise levels, the DEIS relies on the Department of Defense ("DoD") computer NOISEMAP suite of computer programs (Wyle 1998) with the Rotorcraft Noise Model (RNM) Version 7.2.2 (Wyle 6 2007a). DEIS, Vol. 1, p. 168:4-6. The DEIS frankly acknowledges that "[t]he models allow noise predictions for such proposed actions *without the actual implementation or noise monitoring for those actions*." *Id.*, lines 9-10 (emphasis added). In other words, although actual noise data could be obtained from noise monitoring equipment if such were stationed either at the identified POI along the Kaneohe Bay shoreline or elsewhere, the Navy has elected to use a computer construct rather than actual noise data.

Citizen complaints regarding aircraft noise out of the Base have been an issue for years and the need for noise studies has previously been brought to the Navy's attention. *See e.g.* DEIS, Vol. 2, Section A-4; *see also* "Introduction of the P-8A MMA into the U.S. Navy Fleet, To Provide Facilities and Functions that Support the Homebasing of 12 P-8A Multi-Mission Maritime Aircraft (MMA) Fleet Squadrons (72 Aircraft) and one Fleet Replacement Squadron (FRS), which include the Following Installations: Naval Air

[6] For example, on Wednesday, December 13, 2011, multiple such events occurred near my residence, three of which were time recorded: 17:25 (CH-53 Sea Stallion), 20:12 (too dark to visualize) and 22:28 (ditto).

Station Jacksonville, FL; Naval Air Station Whidbey Island, WA; Naval Air Station North Island, CA; Marine Corps Base HI and Kaneohe Bay, HI," EIS 20080079 (2008) (the "2008 EIS"). Accordingly, despite ample time, notice, and opportunity to collect noise data from the Kaneohe Bay area, the Navy has elected to remain ignorant of actual noise measurements and their impact on KMCB's neighbors.

Noise monitoring stations are often used by neighborhood-friendly airports, for example, San Francisco International Airport, San Diego International Airport, and the Metropolitan Washington Airports Authority, to track noise level increases in the surrounding communities. The cost of such monitoring stations around Kaneohe Bay and other noise-affected areas would negligible in comparison with the cost, for example, of a single P-8A Poseidon aircraft ($200+ million[7]) or a V-22 Osprey ($70 million[8]). Such stations could provide actual, as opposed to theoretical, noise values that could be useful in evaluating existing noise conditions at various locations throughout Kaneohe and other noise-impact areas. For example according to the DEIS, the 2009 baseline DNL at my location is approximately 55dBA. *See* DEIS, Vol. 2, p. 202, Figure 1.3-1. But, at 16:10 on December 20, 2011, a hand-held decibel meter on my back porch recorded a 75 dB noise event from a CH-53 Sea Stallion hovering over Runway 4 and then moving out of sight – but not sound. At approximately 16:57, it was joined by two other Sea Stallions. At 17:05 another Sea Stallion flew overhead and another at 17:13 both registering approximately 85 dB. Rotary-wing aircraft activity and overall noise continued until almost 20:00 maintaining a 60-70 dB average. Clearly, these dB readings reveal a different picture of reality than painted by the DEIS.

Existing conditions data such as the foregoing could better inform the future noise level predictions. The DEIS makes no mention of any actual attempts to monitor noise in the communities surrounding the Base or in any other area impacted by the Proposed Action. Thus, the Navy is able to under-report noise impacts. Noise monitoring efforts should be undertaken and used to measure and predict actual noise impacts.

131-6

3. <u>The Navy's noise impact estimates are incomplete and under-report several categories of aircraft noise producing events in violation of NEPA's requirement that *all* environmental impacts be disclosed.</u>

NEPA requires that an EIS disclose ***all*** environmental impacts, not just a select few. *See* 42 U.S.C. §4332, 102(2)(C). In this case, and as explained further below, the DEIS identification of regions of impact ("ROI") and DNL Contours is flawed in that it ignores certain noise-producing aircraft operations. *See* DEIS, Vol. 1, p. 173, Figure 3-4. Also excluded from review are certain landing zones ("LZs") because, according to the Navy, traffic from those LZs "often becom[es] indistinguishable from the ambient noise." *Id.*, Vol. 1, p. 168:14.

[7] AeroNews Network, "Navy Ups Production Of P-8A Poseidon Aircraft," (Nov. 11, 2011), http://www.aero-news.net/index.cfm?do=main.textpost&id=57f7115a-79f7-4179-adbc-258799becc4a (announcing a $1.7 billion Navy contract award to Boeing to build seven 737-based P-8A anti-submarine warfare, anti-surface warfare, intelligence, surveillance and reconnaissance aircraft and plans to purchase 117 additional P-8A aircraft).
[8] New York Times, "The Next War: Costly Aircraft Suggests Cuts Won't Be Easy," (Nov. 20, 2011).

There is no legal basis for the Navy's decision to exclude certain noise-producing events from its reporting. [9] NEPA's implementing regulations require an EIS to discuss all environmental impacts and provide an assessment of each impact's significance. 40 C.F.R. § 1502.16(d); *see also id.* § 1502.16(a), (b) and § 1508.8. The Navy cannot exclude potential impacts from review based on its assumption that they are not likely to be significant. *Klamath-Siskiyou Wilderness Center v. Bureau of Land Mgmt*, 387 F.3d 989, 996 (9th Cir. 2004) ("generalized conclusory statements that effects are not significant" do not pass legal muster). The foregoing errors must be corrected to bring the DEIS into compliance with NEPA.

131-7

4. <u>The Navy's noise impact estimates violate NEPA by ignoring real-world KMCB aviation practices and significant aircraft noise events.</u>

(a) <u>The Navy's noise model presumes, incorrectly, that military aviators do not depart from designated flight corridors.</u>

The DEIS noise modeling is based on the designated flight tracks depicted in the maps in Section D.1-2, pp. 199-201 of Vol. 2. Accordingly, the noise study is flawed in that it overlooks existing aircraft noise conditions occurring outside those designated flight tracks. As a result, the DEIS underestimates both existing and future noise events in violation of NEPA's reporting requirements. *See* 42 U.S.C. §4332, 102(2)(C). Military aviators frequently ignore the Base's Course Rules regarding departure and arrival flight paths and altitudes. Deviating from designated flight corridors, aircraft often fly directly over residential areas at altitudes below the 800 foot and 600 foot MSL Course Rule requirements for departures and arrivals, respectively.[10]

For example, on December 19, 2011, the following flight events were recorded by a resident along Kaneohe Bay shoreline approximately 500 yards south of Puu Papa'a point:

Table 1

TIME	INCIDENT	dB
09:18	Helicopter over residential area	105
10:14	Helicopter over residential area	80
12:29	Helicopter over residential area	90

To make matters worse, the Base has no systematic enforcement mechanism in place to ensure that military aviators obey Course Rules with respect to departure and arrival altitudes and corridors. According to military feedback obtained at the Kaneohe public scoping meeting on December 8, 2011,

[9] The DEIS also violates NEPA's requirement that it be written in "plain language…so that the public can readily understand [it]," in that, among other things, the flight tracks depicted on pp. 199-202 of Vol. 2, contain unexplained acronyms and fail to explain which aircraft utilize specific corridors. 40 C.F.R. §1502.8.
[10] As a geographical point of reference, a scrub-covered hill above the onramp from Kaneohe Bay Drive to H-3 is approximately 500 feet in altitude. See http://weather.gladstonefamily.net/site/PHNG. Accordingly, civilians have a reliable point of reference for determining the altitude of aircraft operating in the Puu Papa'a vicinity. (As this is being written, a Navy CH-53D Sea Stallion can be seen flying well below this altitude on a flight path from Nu'upia Pond towards Moku o Lo'e (Coconut Island)).

the Base appears to rely almost exclusively[11] on civilian complaints to identify Course Rule violations. Concerned residents are advised that, for complaints to be effective, residents must be able to identify the specific type of aircraft involved (e.g. Navy CH-53, Army Chinook etc.) along with the date and time of the infraction as well as specifics as to location and altitude. This requirement ignores practical realities such as, for example, reporting night time infractions when aircraft type cannot be identified. Additionally, reliance on civilian reporting presumes that residents are not engaged in activities that would preclude or impede accurate reporting (e.g. driving, swimming, showering etc.). Adding to these drawbacks, many residents are ignorant of the Course Rules on altitudes and flight corridors and therefore neither perceive nor report violations. As a result, only a fraction of the Course Rules violations are ever reported, and those that are reported are often discounted. Without an official reporting and enforcement mechanism in place, airspace restrictions on residential overflights are largely precatory and military aviators have little incentive to obey them. Further, the lack of reporting protocols leaves KMCB with insufficient data to evaluate actual noise events experienced by their civilian neighbors. The failure to account for aircraft deviations from the designated flight tracks in the Course Rules renders the Navy's prediction of future noise impacts unreliable. This failure should be corrected and an effective reporting and enforcement mechanism should be outlined, implemented, enforced and used to generate reliable noise data for use in predicting future noise events.

131-8

(b) <u>The Navy's noise model omits aircraft noise events such as hovering and engine "run ups" that are outside the meaning of "Aircraft Operations."</u>

According to the DEIS, aircraft activity at KMCB is expected to rise from 52,669 Aircraft Operations in 2009 to 78,725 Aircraft Operations in 2018, for an average of 215 Aircraft Operations *per day* (if Sundays are excluded, the figure rises to 252 per day). DEIS, Vol. 2, p. 198, Figure 1.1-2. Despite this statistically overwhelming 49% increase in noise events, the DEIS concludes that future "baseline aircraft noise levels [will] not exceed the [Air Installation Compatibility Use Zone] land use compatibility criteria of 65 DNL in the communities along the shoreline of Kaneohe Bay." *Id.*, Vol. 1, p. 170:5-6. This conclusion is preposterous on its face and is made possible only by relying on hypothetical computer-generated constructs, exclusive reliance on DNL noise metrics, ignoring the aviator airspace violations described above, and by omitting certain categories of aircraft noise-producing events described below. Such exclusion is in explicit violation of NEPA.

The DEIS noise predictions for 2018 are based on only limited aircraft acoustical events within the definition of "Aircraft Operations."[12] Aircraft Operations are limited to six specific types of events that can be generally categorized as departures and arrivals. *See* footnote 12 below. However, not all arrivals and departures are included as "Aircraft Operations." Arrivals and departures at certain LZs are specifically excluded. *See id*, Vol. 1, p. 168:13-19. Likewise, aircraft operations from some types of aircraft were not modeled for sound. *See id.*, Vol. 2, p. 198, Table 1.1-2 (noting that certain Medium Jet aircraft and the 4th Force Reconnaissance aircraft were not modeled for sound). Additionally, 'Aircraft

[11] At the December 8, 2011 Kaneohe scoping meeting, two military sources gave conflicting accounts of the existence of an honor system for reporting violations. One source said there was no such system, another claimed there was. One can conclude from these discrepancies that, if an honor system exists, it is not universally known or implemented.

[12] The DEIS states: "Figure 3-4 depicts the forecasted 55 to 85 dB aircraft DNL contours, in 5 dB increments, for 2018 aircraft operations under the proposed action." Vol. 1, p. 172:17-18. "Aircraft Operations" for year 2018 are itemized as (1) Departures, (2) Non-Break Visual Arrivals, (3) Instrument Arrivals, (4) Overhead Break Arrivals, (5) Touch and Go, and (6) Ground Controlled Approach ("GCA") Box. *Id.*, Vol. 2, p. 198, Table 1.1-2.

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Operations' do not include hovering after take-off or stationary engine revving and idling (called "run-ups." *See* DEIS, Vol. 1, p. 152, Table 3.1; p. 153:13-24. Yet hovering and run-ups are some of the loudest noise events due to the fact that they are carried out at low altitudes. Again, there is no legal justification for excluding these sound producing events from the DEIS. *See* 40 C.F.R. § 1502.16(d); *see also id*. § 1502.16(a), (b) and § 1508.8. *See also, Lands Council*, 395 F.3d at 1020 and *Klamath Siskiyo*, 387 F.3d at 996, *supra.*

The omission of engine run-ups (maintenance operations) in the noise modeling is particularly disturbing. As indicated by the Scoping Comments in Section A-4, Vol. 2 of the DEIS, run-ups continue to be the subject of numerous civilian complaints and are a well-known contributor to noise levels. Not only are they noisy, run-ups can last for prolonged periods, even hours. For example, on the night of December 8, 2011 (during and after the Kaneohe scoping meeting), what sounded like multiple aircraft engines in the vicinity of Runway 4 were heard revving for approximately 90 minutes extending past 22:00 hours.[13] Similar activity occurred on the morning of December 9, 2011 beginning at approximately 04:45. Yet run-ups are not categorized as "Aircraft Operations" and are excluded from the Navy's 2018 projected acoustical activity. Accordingly, the DEIS noise analysis vastly under-reports actual noise events in violation of NEPA. The noise analysis should be corrected to include aviator departures from designated flight tracks as well as ***all*** aircraft noise producing events from all runways and LZs.

131-9

5. <u>The DEIS is flawed in that it fails to address the deleterious effects of noise pollution on human health and behavior.</u>

As set forth in the contemporaneous comment letter from Eileen Hilton, M.D., noise levels, even as low as 50 dB, are associated with increased cardiac disease. Elevated noise levels are also associated with increased birth defects. *See* E. A. Franssen EA, C. M. van Wiechen, N. J. Nagelkerke, E. Lebret E., "Aircraft Noise Around a Large International Airport and Its Impact on General Health and Medication Use," *Occupational Environmental Medicine*, 61 (5): pp. 405–13, (2004);[14] *and see* Karl D. Kryter, THE HANDBOOK OF HEARING AND THE EFFECTS OF NOISE: PHYSIOLOGY, PSYCHOLOGY, AND PUBLIC HEALTH, p. 673 (Nov. 18, 1994). Evidence has shown that when children learn in noisier classrooms, they have a more difficult time understanding speech than those who learn in quieter settings. *See* Peggy B. Nelson, "Sound in the Classroom," *ASHRAE Journal*, 45 (2), pp. 22–25 (1959). Several studies have shown that children's cognitive development is affected by aircraft noise. Center for Hearing and Communication, "Noise & Its Effects on Children's Health," (2011).[15] One landmark study examined reading scores of children in a school where classes were located adjacent to elevated train tracks and compared them with reading scores of students on the quiet side of the school. The researchers found that by sixth grade, the students on the noisy side of school tested one year behind those on the quiet side of the school. *Id., citing* Arline Bronzaft, Ph.D. and Dennis McCarthy, Ph.D., "The Effect of Elevated Train Noise on Reading Ability," *Journal of Environment and Behavior*, 5, pp. 517-528 (1975). *See* also, Arline Bronzaft, Ph.D., "A Quieter School: An Enriched Learning Environment," (Jan. 22, 2007);[16] *and see* DEIS, Vol. 2, Section A-4, p. 40 (public comment that "[n]oise from the jets makes it difficult for teachers teaching in the

[13] The noise started sometime prior to 17:00 but, because I was at the scoping meeting, I cannot pinpoint its exact start. However, the noise continued from the time I got home to almost 22:30.

[14] http://www.pubmedcentral.nih.gov/articlerender.fcgi?tool=pmcentrez&artid=1740783

[15] http://www.chchearing.org/noise-center-home/children-and-noise/noise-childrens-health-learning-and-behavior

[16] http://www.musicmotion.com/content/mim/pdfs/quieter%20school.pdf

classroom"). The DEIS identifies thirteen *public* schools in the Kaneohe Bay noise-impact area. *See* DEIS, Vol. 1, p. 170, Figure 3-3. In fact, there are seventeen (both public and private) schools in Kaneohe alone,[17] and twenty in Kailua.[18] The DEIS undertakes no analysis of school performance or surveys of health conditions in the Kaneohe Bay thereby failing to analyze noise impacts on school children in violation of NEPA. *See The Lands Council*, 395 F.3d at 1027 ("NEPA imposes procedural requirements designed to force agencies to take a 'hard look' at environmental consequences"). The Navy must first analyze the impacts of its Proposed Action before it can take NEPA's requisite "hard look".

131-10

6. **The DEIS fails to undertake an analysis of the noise impacts on wildlife including threatened, endangered and protected species.**

Kaneohe Bay and the surrounding ocean and wetlands are host to thousands of birds and animals, including 68 that are listed as endangered, threatened or protected species under the Endangered Species Act ("ESA") and/or the Migratory Bird Treaty Act ("MBTA").[19] A few of the more notable of such species include the Hawaiian Monk Seal (*Monachus Schauinslandi*), the Sperm Whale (*Physeter Catodon*), the Humpback Whale (*Megaptera Novaeangliae*), the Hawaiian Duck (*Anas Wyvilliana*), the Laysan Albatross (*Phoebastria Immutabilis*), the Green Sea Turtle (*Chelonia Mydas*), the Great Blue Herron (*Ardea Herodios*), and the Scalloped Hammerhead Shark (*Sphyrna Lewini*).[20] The Hawai'i Institute of Marine Biology's ("HIMB") Marine Laboratory Refuge, which studies the hammerhead and other marine species, is directly beneath KMCB's flight path for both fixed and rotary-wing aircraft.

In addition, the area in the vicinity of the Base is rich with lagoons and wetlands including Enchanted Lake, the He'eia Wetlands, Ka'elepulu Pond Wetlands, Hamakua Wetlands, and Kawai'nui Marsh, the largest wetlands in the Hawaiian Islands. On the Base itself are two Wildlife Management Areas ("WMA") that provide habitat for both ESA- and MBTA-listed waterfowl and seabirds. DEIS, Vol. 1, p. 186:6-8. Indeed, the Nu'upia WMA is directly beneath departure and arrival flight paths for Helipad 101 and Runway 4. *Id.*, Vol. 2, p. 200.

The significant negative effects of noise on birds, sea animals and wildlife have been well-recognized. *See e.g.* U. S. Dept. of Transportation, Office of Planning, Environment and Realty, Noise Effect on Wildlife, (July 14, 2001);[21] Paul A. Kaseloo, "Synthesis of Noise Effects on Wildlife Populations," p. 1, (Aug. 29, 2005);[22] U.S. Air Force/U.S. Fish & Wildlife, "Effects of Aircraft Noise and Sonic Booms on Domestic Animals and Wildlife: A Literature Synthesis," p. 9, (Nov. 8, 1988).[23] U.S. Air Force sponsored studies have revealed that the effects are highly species dependent and that the

[17] http://www.homefair.com/real-estate/school-reports/results-school-list.asp?City=5212
[18] http://www.homefair.com/real-estate/school-reports/results-school-list.asp?City=16667
[19] Specifically, the DEIS notes the presence 68 MBTA protected species, 11 of which are also either ESA threatened or endangered. DEIS, Vol. 1, p. 186, Table 3-9; pp. 187-189, Table 3-10.
[20] In late November 2011, the National Marine Fisheries Service announced a positive preliminary finding on a petition by WildEarth Guardians and Friends of Animals submitted to list scalloped hammerhead sharks as "threatened" or "endangered" under the Endangered Species Act ("ESA"). *See* Friends of Wildlife, "Imperiled Hammerhead Sharks Will Be Considered for Endangered Species Act Protection," (Nov. 29, 2011), http://www.friendsofanimals.org/news/2011/november/imperiled-hammerhead.html. The International Union for Conservation of Nature ("IUCN") lists the scalloped hammerhead species as "endangered" on its Red List. *Id.*
[21] http://www.fhwa.dot.gov/environment/noise/noise_effect_on_wildlife/effects/wild06.cfm
[22] http://escholarship.org/uc/item/9fz3s9x0;jsessionid=30F194E5BFFA42E0F3DC63763596BDFC
[23] http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA201966&Location=U2&doc=GetTRDoc.pdf

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degree of the effect may vary widely. *See* Airport Cooperative Research Program, "Effects of Aircraft Noise: Research Update on Selected Topics – A Synthesis of Airport Practice," *supra*, p. 19. Researchers at the HIMB on Coconut island report that they cannot conduct research when aircraft are flying overhead. *See* DEIS, Vol. 2, Section A-3, p. 40. Staff also report that noise and vibrations from the aircraft disturbs the marine life. *Id.*

Volume 2 of the DEIS discusses the impacts noise has on wildlife. Among other things, the DEIS recognizes the following impacts of noise on wildlife:

> Hearing is critical to an animal's ability to react, compete, reproduce, hunt, forage, and survive in its environment…The abilities to hear sounds and noise and to communicate assist wildlife in maintaining group cohesiveness and survivorship. Social species communicate by transmitting calls of warning, introduction, and other types that are subsequently related to an individual's or group's responsiveness…Primary effects are direct, physiological changes to the auditory system, and most likely include the masking of auditory signals. Masking is defined as the inability of an individual to hear important environmental signals that may arise from mates, predators, or prey. There is some potential that noise could disrupt a species' ability to communicate or could interfere with behavioral patterns. Although the effects are likely temporal, aircraft noise may cause masking of auditory signals within exposed faunal communities. Animals rely on hearing to avoid predators, obtain food, and communicate with, and attract, other members of their species. Aircraft noise may mask or interfere with these functions. Other primary effects, such as ear drum rupture or temporary and permanent hearing threshold shifts, are not as likely given the subsonic noise levels produced by aircraft overflights. Secondary effects may include non-auditory effects such as stress and hypertension; behavioral modifications; interference with mating or reproduction; and impaired ability to obtain adequate food, cover, or water. Tertiary effects are the direct result of primary and secondary effects, and include population decline and habitat loss. Most of the effects of noise are mild enough that they may never be detectable as variables of change in population size or population growth against the background of normal variation. Other environmental variables (e.g., predators, weather, changing prey base, ground-based disturbance) also influence secondary and tertiary effects, and confound the ability to identify the ultimate factor in limiting productivity of a certain nest, area, or region.

DEIS, Vol. 2, p. 322, §D.3.8 (citations omitted). Yet, the Navy undertakes, at best, a cursory analysis of noise impacts on only a few of the 68 endangered, threatened and protected species identified as residents or visitors of the impacted areas. The DEIS makes no attempt to survey habitat conditions, record mating or nesting activity, undertake populations counts, or quantify any degradation or improvement of same in the Kaneohe Bay area over any period of time.[24] Such evidence is relevant in analyzing and determining what, if any, impact the Proposed Action will have on these species. *See The Lands Council*, 395 F.3d 1019, *supra*. In fact, it is unclear whether the Navy has delegated the impact

[24] *See* DEIS, Vol. 2, p. 409 explaining that resource surveys focused on species protected under the ESA and MBTA were conducted "at selected landing zones (LZ) and drop zones (DZ) within the P'hakuloa Training Area (PTA) on the Island of Hawai'i [and] additional studies *specifically limited to the Hawaiian hoary bat* (*Lasiurus cinereus semotus*) were conducted within the Kawailoa and Kahuku Terrain Following Terrain Avoidance Areas (TFTA) on the Island of O'ahu." (Emphasis added).

analysis to a separate EIS. *See* DEIS, Vol. 2, p. 544 ("NAVFAC Pacific is developing an Environmental Impact Statement (EIS) to evaluate the potential environmental effects of the proposed basing of the aircraft in Hawaii, as well as proposed training operations involving these aircraft.") This action violates NEPA and must be corrected.

131-11 7. **The Proposed Action will cause significant negative socio-economic impacts by depressing home values.**

The negative effect of airport/aircraft noise on property values is well researched and documented. There are dozens of published studies on that conclude that property under or nearby the flight corridors of airports experiences diminution in market value. *See e.g.* Hogan, *supra*. Combined studies have shown a loss in values range from 15 to 43 percent – averaging a 27 percent loss in market value. *Id.* p. 6. These studies also included analysis of the impact on non-residential property and found significant negative effects on commercial space. *Id.*, *see also* Airport Cooperative Research Program, "Effects of Aircraft Noise: Research Update on Selected Topics – A Synthesis of Airport Practice," *supra*.

131-12 B. **THE DEIS FAILS TO CONSIDER SUFFICIENT ACTION ALTERNATIVES.**

The scope of reasonable alternatives that an agency must consider is shaped by the purpose and need statement articulated by that agency. *Nw. Coalition for Alternatives to Pesticides (NCAP) v. Lyng*, 844 F.2d 588, 592 (9th Cir.1988) ("[I]t is the scope of the program that influences any determination of what alternatives are viable and reasonable."). The existence of reasonable but unexamined alternatives renders an EIS inadequate. *Ilio'ulaokalani Coalition v. Rumsfeld*, 464 F3d 1083 (9th Cir. 2006). While the Navy has the discretion to define the purpose and need of a project, it may not "define its objectives in unreasonably narrow terms." *City of Carmel-By-The-Sea v. U.S. Dep't of Transp.*, 123 F.3d 1142, 1155. (9th Cir. 1997). Here, the DEIS Purpose and Need is so narrowly stated that other reasonable alternatives outside Hawai'i were automatically excluded from consideration. Yet, nothing in the record distinguishes Hawaii from any other location. Accordingly, the DEIS fails to comply with NEPA.

The DEIS's Purpose and Need states that rotary-wing light-lift and attack aircraft are needed for the aviation combat element ("ACE") of Marine Expeditionary Force III ("MEF III") and, at present, no such aircraft exist at KMCB. *See* DEIS, Vol. 1, p. 58:24-25. The Marine Corps has three standing MEFs. MEF I is headquartered at Camp Pendleton, California. MEF II is headquartered at Camp Lejeune, South Carolina, and MEF III is headquartered in Okinawa, Japan. Yet none of these locations were considered as Action Alternatives. Rather than extensive refurbishing of KMCB's facilities and relocating Camp Pendleton's Marine Light Attack Helicopters ("HMLA") squadron to KMCB, the Navy should present an Action Alternative that involves relocating the other core elements of KMCB's Marie Air-Ground Attack Force ("MAGTAF") to one of the three MEF headquarters, or other location, with adequate existing facilities and aircraft. Alternately, the Navy should consider expanding other facilities in the state of Hawai'i that are not adjacent to densely[25] populated areas. In *Ilio'ulaokalani Coalition v. Rumsfeld*, the Ninth Circuit Court of Appeals held that the Army violated NEPA when it decided to convert the 2nd Brigade of the 25th Infantry Division into a Stryker Brigade Combat Team without considering alternatives including transformation of that brigade outside of Hawai'i. Here, the Navy has committed the same error.

[25] The DEIS characterizes Kaneohe and Kailua as low density areas. This conclusion is only possible by including uninhabitable wetlands and hillsides.

In addition, the DEIS contains only one Action Alternative, Alternative B. And, with respect to noise -- the single most important impact to area residents -- Alternative B will have exactly the same impact as the Proposed Action. *See* DEIS, Vol. 1, 165:15-16 ("Alternatives A and B would involve the same aviation activities and, hence, the same aviation noise impacts"). An Action Alternative with essentially the same detrimental environmental impacts is essentially no alternative at all and thus violates the spirit, if not the letter of NEPA. *See* 42 U.S.C. §4332 102(2)(C)(iii).

131-13 C. **THE DEIS DOES NOT ANALYZE CUMULATIVE IMPACTS OF PAST, PRESENT AND FUTURE PROJECTS.**

The general rule under NEPA is that, in assessing cumulative effects, an EIS must give a sufficiently detailed catalogue of past, present, and future projects, and provide adequate analysis about how these projects, and differences between the projects, are thought to have impacted the environment. *See Neighbors of Cuddy Mountain v. United States Forest Serv*., 137 F.3d 1372, 1379-80 (9th Cir. 1998); *City of Carmel-By-The-Sea v. United States Dept. of Transp*., 123 F.3d at 1160-61. Here, the DEIS catalogues some past,[26] present and future projects, but provides no analysis of how those projects have or will impact the environment. This failure violates NEPA and must be corrected.

131-14 D. **THE NAVY SHOULD HAVE PROVIDED MORE NOTICE AND TIME FOR PUBLIC COMMENT.**

I am disappointed in the Navy's refusal to allow additional time to offer comment on the DEIS. I am aware of several other citizens whose similar requests were also refused. Whether or not the Navy complied with the technical requirements for notice and comment, many citizens in the Kaneohe and Kailua area are completely ignorant of the Proposed Action and/or the opportunity to comment on it. Significantly, the public scoping meeting for the most impacted neighborhood, Kaneohe, was the last to be held. That meeting took place on December 8, 2011, little more than two weeks before Christmas and less than three weeks before the comment deadline. Many residents are off-island, entertaining out-of-town guests, or otherwise engaged in holiday preparations during that time. The Navy's refusal to grant a short extension of the comment period does not comport with a genuine interest in public input.

Kaneohe Bay is one of the most, if not *the* most, magnificent shoreline vistas in the United States. Yet the growing military presence at the Base seriously undermines the tranquility of this unique and idyllic environment which should be preserved for generations to come. In securing our national safety, we should be careful to preserve those things that make our nation so beautiful. Please consider another location for the Navy's expanded aircraft operations.

Sincerely,

Kim A. Tomey

[26] To the extent identified in the DEIS, only projects from 2007 are catalogued. Thus, no long-term impacts from earlier projects can be ascertained.

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From: James & Laurie Moore [jamesandlaurie@hawaiiantel.net]
Sent: Tuesday, December 27, 2011 9:42 AM
To: mv22h1eis
Subject: DEIS to expand aircraft and infrastructure at K'Bay

Aloha,

132-1 We are Kailua residents in Aikahi Park (by back gate) and we fully support the expansion of aircraft activity and infrastructure at MCBH.

We did not agree with any of the weak points made by the Kaneohe Bay Residents Initiative in the rebuttal of the DEIS.

Mahalo,
James and Laurie Moore
212 Aiokoa St
Kailua, HI 96734
808-286-3426

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133

From: Paul de Vos [paul.devos@hawaiiantel.net]
Sent: Tuesday, December 27, 2011 9:51 AM
To: mv22h1eis
Subject: Defense Upgrades at MCBH, MCAS Kaneohe Bay

Department of the Navy
Naval Facilities Engineering Command, Pacific Division
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

I support the upgrades being planned by the Marine Corp at Kaneohe Bay. I live very close to the Base and will be directly affected by the planned defense system improvements. I would have preferred to deliver this testimony publicly a few weeks ago but my other duties prevented my attending the events. Proper Engineering and planning can overcome the real and made up environmental issues that many undoubtedly will present as reasons for cancelling the plans or delaying the projects until the cost estimates escalate to the point that cause the project to go back to the drawing board.

The current Flight Operations (C-17 touch and goes and P3 Operations) do not bother me and neither do the occasional helicopter operations. The low level noise that we experience in the 300 block is simply attributed to the Sounds of Freedom. I would think that the environmentalists would welcome the introduction of quieter and more fuel efficient aircraft being put into service at the MCAS. I understand that in years past there was a fighter wing based at MCAS Kaneohe – I imagine that was a bit louder than what we experience today. When I hear Flight OPS at night all I can really say is Welcome Home Marines !

Quite frankly I am constantly amazed at the folks who choose to live next to a MCAS and then complain about the noise. My sister in law has a place on Lilipuna and the air operations are much more noticeable there , but the Base was there for twenty years before those places were built. They never complained about the P3.

My home is on Kaneohe Bay Drive and I directly experience the automobile and truck traffic related to the base. Since Kaneohe Bay Drive is posted at 25 mph and limited to GVW of 14000 lbs or less all I ask is that is that the regulations be enforced. Perhaps MCBH could establish a liaison with HPD to help them control compliance with traffic regulations through some kind of site specific grant to HPD.

133-1 MCBH has the power to control the Base related traffic on Kaneohe Bay Drive using the base access passes for vehicles. Should the MCBH Base Commander require MCBH military police to periodically observe their personnel or civilian employees speeding or driving aggressively (they would be identified by their DOD stickers) these motorists could be contacted by military authorities and be reminded that the vehicle pass they enjoy is granted at the pleasure of the Commander and that it can be revoked at any time and for any reason, including embarrassing the Base Commander for being a lousy neighbor whose employees and guests refuse to drive with Aloha and be good neighbors.

The MCBH welcoming committee could also be instructed to remind new personnel and dependents of their responsibilities as good neighbors insofar as their use of the local roads, encouraging them to use the main arteries whenever practicable.

133-2 For Construction Traffic , my suggestion is that NAVFAC/ROICC require that all new construction contractors , their subcontractors and vendors, be contractually obligated to limit their truck activities to Kamehameha Highway and H3, and that the Base enforce this requirement through periodic direct observation. Kaneohe Bay Drive has a GVW of 14000 pounds for much of it, so any trucks choosing to use the road have already chosen to not honor their driving privilege and to be a bad neighbor.

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133-2 I would hope that a similar agreement is in place for MCBH Commissary vendors and moving companies.

Another source of traffic due to the expansion will be the construction workers that (traditionally) speed up and down KBAY Drive every day (I work in the Construction industry) in their effort to take advantage of the limited parking on Kaneohe Bay Drive and Aikahi Park Shopping Center or on their MCBH jobsite. NAVFAC should require that the individual contract holders require that each contractor submit a plan establishing how they intend to eliminate the

133-3 impact of their workers (and their subcontractors) on the neighborhoods surrounding the base. NAVFAC should further require that each contractor be required to add a "MCBH specific vehicle policy" to the already required new employee jobsite safety orientation. Temporary Construction employees could then be reminded of their obligations to the surrounding community, Mokapu, Aikahi, Kaneohe Bay Drive and Puohala neighborhoods and the promises the individual motorists made when they accepted their driving privilege and license.

Thank you very much for the opportunity to voice my support for the upgrades at MCBH and MCAS Kaneohe Bay.

Sincerely,
Paul F. de Vos
44-398 Kaneohe Bay Drive
Kaneohe, Hawaii 96744

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134

RALPH NEIL LOGAN, III
MOHALA LEHUA FARMS, LLC
PO BOX 55714, KAPAAU, HI 96755 • (808) 640-3588

PEARL HARBOR MAIL CENTER
DEC 24 2011
PEARL HARBOR HI 96860

12/22/11

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

Attn: EV21, MV-22/H-1 EIS Project Manager

Dear Project Manager:

I am writing to you regarding the proposed basing and operation of MV-22 Osprey tiltrotor aircraft and H-1 helicopters in Hawaii and specifically the impacts related to the use of Upolu airport located in the district of North Kohala in the county of Hawaii.

I have thoroughly read your EIS report and was very disappointed with the quality and quantity of information. The research is inadequate and not current to support the stated conclusions. I will outline a few of the issues I have found with your report:

Unconvincing Source #1 is found in Section 4.9.3.4 that states:

> ***4.9.3.4 Upolu Airport, Island of Hawaii***
>
> *Operational Impacts*
>
> *Based upon two archaeological surveys conducted in the immediate vicinity of Upolu Airport, there are no archaeological resources of any significance within and adjacent to the facility. There would be no operational impacts on cultural resources due to the proposed action. No mitigation is required.*

The source for this claim is not footnoted and a review of the references

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listed in Chapter 9 of the report indicates that there was only one "Archaeological Inventory" conducted of the site in 1999. The inventory survey was conducted for 28 acres of land and yet it included only "six backhoe trenches on the inland side of the airport buildings" (a space smaller than 1 acre) to test for subsurface cultural deposits. Given the huge archaeological and cultural significance of the adjacent Kamaehameha Birthsite and the equally significant Mookini heiau located less than 4,572 feet away this circumscribed study calls into question its relevance.
134-1 Additionally, a 12-year-old study that used only six trenches located in the place where the proposed aircraft would likely have little or no impact is also irrelevant. Moreover, the MV-22 Osprey was not fielded until 2007 or used for Marine Corps training until the year 2000. (Wikipedia) This information clearly points to the obsolescence of the source data. Furthermore, . . .

Unconvincing Source #2 is found in Section 4.9.2.4 that states:

4.9.2.4 Upolu Airport, Island of Hawaii

Areas of Potential Effect

(Fornander 1969:II 33 36; Kamakau 1991:100). Construction of the luakini (sacrificial) heiau

Mookini, located 1.6 mi (2.6 km) south of the airport, is attributed to Paao (Kamakau1991:100).

and

The event is commemorated at a place called Kamehameha Birthsite, located two mi (3 km) south of the airport.

The distance measurements cited above are inaccurate and thereby call
134-2 into question the attention to detail of behalf author. The actual distances

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134-2 are 1.1 miles to Mookini and 1.2 miles to Kamehameha birth site. Attached here is a link to a Google map that precisely shows the distances:

http://maps.google.com/maps/ms?msid=218128554696168788292.0004b49bba0e60edbe20c&msa=0&ll=20.260063,-155.869453&spn=0.015943,0.028045

Unconvincing Source #3: The next source error is absurd and clearly based on outdated and a lack of accurate information about the fragile ecosystem in the surrounding area. Section 4.8.2.4 states:

4.8.2.4 Upolu Airport, Island of Hawaii

Information about natural resources at Upolu Airport is derived from the Upolu Airport Final Environmental Assessment prepared for DOT Airports Division (DOT 1999).

And on pages 4-91:

No important coral reef ecosystems are known to exist in waters offshore from Upolu Airport. The ocean bottom consists of hard basalt pavement, boulders, a few sand channels, and sparse coral cover.

And footnote 28 states

28 Tribble, Gordon. Personal communication. June 24, 2011. Mr. Tribble made a large number of dives in the waters off Upolu Point 20+ years ago. He recalled that there was not much coral and concluded that the low abundance was due to big winter surf that pounds the coastline.

The boldness of including the 20-year-old diving experience from a single
134-3 individual as evidence that there are no important "coral reef ecosystems" is insulting to our community! Moreover, Gordon Tribble is not cited in the list of reference (EIS Chapter 9), nor are his credentials listed in the

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footnote above, nor are the exact locations of the dives listed, nor are the exact numbers of dives cited from his recollections. I assume that if Mr. Tribble's 20-year-old recollections are valid then my diving experience from 2011 ought to be as well. As both a SCUBA and free diver with over 28 years of diving experience, I and many others in the community, would be
134-3 happy to prepare a detailed map of the underwater terrain adjacent to Upolu airport. On that map we are willing to document, in a much more professional manner, not only coral reef ecosystems, but Green Sea Turtle (Chelonia mydas) cleaning stations, known locations of Hawaiian Monk seals (Monachus schauinslandi) sightings, as well as Humpback Whale (Megaptera novaeangliae) birthing sites complete with date stamped video.

Myself and many other community members, would be happy to continue doing your research for you, except for the fact that unlike Belt Collins, we are not being paid for our efforts, nor would the results of our research support the conclusions contained in the EIS. There are many more deficiencies with the report that I have not cited in this letter due to the fact that it seems obvious that contemporary and scholarly studies are necessary before any attempt is made to use Upolu Airport for the proposed operations.

Finally, our small town of Hawi is completely built around a quasi-agricultural and tourist centered economy. We depend on our calm and
134-4 quiet surroundings for our livelihood as well peace of mind. The noise and even the very presence of war machines and training operations are completely inconsistent with the visions we hold for our community.

At the November 30th informational meeting that was conducted in Waimea regarding the proposed use of Upolu Airport, a question was asked to the assembled military staff and EIA contractors that numbered at least 15 people. Among the military representatives were the archeologist and biologist who studied the Upolu region for this report. The question, which was recorded on video was, "how many of you have been to North Kohala?" Only one person raised their hand and stated that she had lived here 10 years ago. It is very insulting to our community that our peaceful

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quiet home could be tainted by an effort that includes little or no social contact and studies that do not even meet the most basic of scholarly requirements. I hereby request that the department of the Navy reevaluated the impacts of using Upolu Airport for military operations in a manner that is more precise and accurate concerning the actual impacts of such operations.

Cc: Sen. Dan Inouye, Sen. Daniel Kahikina Akaka, Sen. Josh Green, Rep. Mazie Hirono, Rep. Colleen Hanabusa, Rep. Mark M. Nakashima

Sincerely,

Ralph Neil Logan III

Ralph Neil Logan III
Mohala Lehua Farms, LLC
808-889-0917

135

From: Otto Gibson Gebauer [ottogg@earthlink.net]
Sent: Tuesday, December 27, 2011 12:52 PM
To: mv22h1eis
Subject: Proposed changes to aircraft traffic increase at the MCB Kaneohe

To whom it may concern,

135-1 I oppose the proposed changes to the aircraft traffic increase at the MCB Kaneohe. I am a home owner on Kaneohe Bay Drive and the proposed increase on aircraft traffic and replacing the current helicopter with the jets (P8 modified 737) will significantly increase the noise level and lower the value of my home. Submitted (DEIS) does not represent accurate analysis and impact on the population living along the Kaneohe Bay, Kaneohe and Kailua.

Sincerely,

Otto Gibson Gebauer
Home Owner Yacht Club Knolls

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Amy Kepilino

From: David Cunningham [david.himb@gmail.com]
Sent: Tuesday, December 27, 2011 2:29 PM
To: mv22h1eis
Subject: Kaneohe Marine Base EIS

136-1 As a Kaneohe Bay resident affected by the proposed changes to base activities and associated EIS, I have several concerns. Has the high population density on the coast surrounding the base been accounted for. Working on Coconut Island, I know how loud existing overflights can be. It is impossible to hear people talking, and often we have to cover our ears to avoid ear pain and tinnitus. While myself and my neighbors support our troups, and value our military in protecting our homes, high noise levels are highly disruptive. Have test flights and noise measurements been made? If the noise level becomes too high does the EIS call for curtailment of expansion and flights until the problem can be fixed? Another issue is light pollution,
136-2 Endangered animals, including Shear-water, are attracted to lights often causing extensive losses. Does the plan reduce light pollution? As a community member and tax payer a through EIS is very important to me. The costs of improper or incomplete EIS can be significant, consider the inter island ferry. I would not like to see tax dollars wasted on issues associated with a challenged EIS, or a drop in our financed property values. It is important that the EIS be based on hard data, and that it account for responses to actual performance measures.

Thank you,

David Cunningham

44-277 Mikiola Dr.
Kaneohe, HI 96744

--

Dr. David Cunningham
Thomas Lab
Hawaii Institute of Marine Biology
46-007 Lilipuna Rd
Kaneohe, HI 96744

808-291-8868 (cell)

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William P. Kenoi
Mayor

West Hawai'i Office
74-5044 Ane Keohokalole Hwy
Kailua-Kona, Hawai'i 96740
Phone (808) 323-4770
Fax (808) 327-3563

County of Hawai'i
PLANNING DEPARTMENT

BJ Leithead Todd
Director

Margaret K. Masunaga
Deputy

East Hawai'i Office
101 Pauahi Street, Suite 3
Hilo, Hawai'i 96720
Phone (808) 961-8288
Fax (808) 961-8742

December 27, 2011

Department of the Navy
Naval Facilities Engineering Command, Pacific
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

Dear EIS Project Manager - EV21, M-22/H-1:

Subject: **Request for Comments**
EIS for the Basing of MV-22 and H-1 Aircraft in Support of
Third Marine Expeditionary Force Elements in Hawaii
Pohakuloa Training Area and Upolu Point Airport, Island of Hawai'i

This is to acknowledge receipt of your letter on November 10, 2011, requesting our comments on the above referenced project.

Proposed is basing and operating up to two Marine Medium Tiltrotor squadrons and one Marine Light Attack helicopter squadron to service US Marine Corps operations in the State of Hawai'i, conducting aviation training, readiness, and special exercise operations to attain and maintain proficiency in the employment of the NV-22 and H-1 aircraft at training facilities statewide. Included will be associated construction and renovation of facilities, personnel changes, and training and aviation operations at existing training areas.

Although no construction is planned for Upolu Airport, we have the following comments on the use of Upolu Airport based upon the North Kohala Community Development Plan adopted on November 5, 2008:

Department of the Navy
Naval Facilities Engineering Command, Pacific
December 27, 2011
Page 2

1. According to the EIS, Chapter 4.2.2.4, Upolu Airport, Island of Hawai'i, Public Access, states that:

   "The active portion of the airport property – 50.259 ac [20.34 ha] – is located within a perimeter chain link fence. The remaining land outside the fence to the west and north is vacant and used principally by fishermen who traverse dirt roads and trails to reach the cliffs along the seaward edge of the airport property. Access to the active portion of the airport is controlled; access to the state-owned land outside the perimeter fence is uncontrolled."

   According to the North Kohala CDP, adopted November 5, 2008, the following was stated in Action Programs, Chapter 4.2 Public Access:

   The Goal is to *"Provide for adequate drivable (mauka-makai) (4 wheel vehicles) public access to coastal (along the tops of cliffs) and mountain areas in North Kohala, including provision of: a continuous coastal path from Pololu to Kawaihae Harbor"*, and *"adequate mauka-makai access easements between the coastal path and Akoni Pule Highway, adequate mauka-makai access easement from Akoni Pule Highway and the Kohala Mountain Road into the Kohala mountains, and a lateral mountain road (Wylie Blvd) from Polulu to Taga Pond"*.

   Strategy 2.4 is to *"Encourage increased cooperation and coordination among federal, state, and county agencies and departments regarding public access to coastal and mauka lands"*.

137-1 Public access to the coast must remain open at Upolu Point where there is a paved government road to the airport and also to the coast.

2. According to Chapter 4.5.2.4 Upolu Airport, Island of Hawai'i, *"Aircraft operations are not in proximity to residential or other noise sensitive land uses to warrant noise modeling and analysis, i.e., noise impacts are not anticipated. Hence, no evaluation of existing conditions for aircraft noise was conducted at Upolu Airport."*

137-2 There are dwellings about a mile away from the airport and other more populated residential areas are approximately two miles from the airport. With 23% more flights due to aviation training, we anticipate that there will be potential noise impacts and this should be addressed.

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Department of the Navy
Naval Facilities Engineering Command, Pacific
December 27, 2011
Page 3

Thank you for the opportunity to comment on the proposed project. Should you have questions, please contact Esther Imamura of my staff at (808) 961-8139.

Sincerely,

BJ LEITHEAD TODD
Planning Director

ETI:cs
P:\Wpwin60\ETI\EIS RESPONSES\Dept Of Navy - Basing Of MV-22 & H-1at Pohakuloa & Upolu.Doc

cc: Planning Department, Kona
Ms. Rosalind Newlon, Kona Planning Department

138

From: Jan Shima [info@janshima.com]
Sent: Tuesday, December 27, 2011 3:53 PM
To: mv22h1eis
Subject: expanded aircraft activity

Dept. of Navy MV22/H1 EIS Project Manager,

138-1 I'm an Aikahi Park resident on the border of the Marine Base. Today 12/27/2011 I received a letter describing the proposal for increased aircraft activity at Kaneohe Marine Base. It informed me that the deadline to respond is today 12/27/2011. The response time is unacceptable, the proposal is unacceptable to residents, and the DEIS analysis is unacceptable. It does not reflect the real impact upon residents regarding noise, health, wastewater, property values, quality of life, children&education, and wildlife. The military will have lots of problems from residents if they try to implement it. It will cost a lot of unnecessary money, headaches, and waste a lot of time.

Please consider your neighbors, the taxpayers who pay your salaries when planning such things. We should be contacted personally and given several months to respond. This should not be during the Holidays when many people are out of town. The current plan and how it was presented is not acceptable to Kailua and Kaneohe residents. Please retract it today.

Jan Shima
info@janshima.com
www.janshima.com

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139

From: Richard Dunn [drichr2d2@gmail.com]
Sent: Tuesday, December 27, 2011 4:05 PM
To: mv22h1eis
Subject: Expanded Aircraft Activity and Infrastruction Kaneohe Marine Base

139-1 As a resident who lives on the bay, I believe that the Base until now has been a very considerate neighbor. I am very supportive of the military and all it does for our Country. Unfortunately in this particular circumstance, I believe the increased aircraft traffic (49% over baseline activity) with louder aircraft will lead to additional noise that it will be detrimental not only the quiet enjoyment of my residence but my property value as well. I cannot support this action. I am hopeful that as a good neighbor you will come up with another alternative that will be more pallatable to the residents.

Sincerely,

Richard Dunn
45-155A Ka Hanahou Cir.
Kaneohe, HI 96744

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From: Bert Werjefelt [polytech@att.net]
Sent: Tuesday, December 27, 2011 5:09 PM
To: mv22h1eis
Cc: K Bay residents
Subject: Proposed expansion of aviation activities at Kaneohe MCBH

To whom it may concern,

140-1 I am very concerned about the proposal to increase aircraft activity at KMCBH. The level of activity is already at a near unbearable level for the surrounding community and an increase will be irresponsible and indicate a clear lack of concern for the surrounding civilian communities and wildlife in the area.

140-2 The DEIS which was made is inadequate and does not accurately reflect the true repercussions of this action. The deficiencies, among other things, include:

Inadequate and incorrect analysis of:
-noise pollution
-effects of surrounding community
-effects of quality of life
-analysis of wastewater treatment facility
-human health effects
-wildlife and conservation area surrounding the base

The current level of activity on the base already is too much. There are endless jets running their engines sitting on the runway, endless touch and go's, helicopters flying over the community. It is unacceptable that the community is not more aware of the proposed increase in activity which is just around the corner. 140-3 The military base has endlessly disregarded community requests to stop having the helicopters buzz the surrounding community. One helicopter crashed within the last year. Luckily it was over Kaneohe Bay and not the residential area. An increase in activity will increase the chances of these incidents/accidents. Furthermore, the quality of life for residents and wildlife will be substantially negatively impacted - as will property values.

What is the need for such an increase in our backyard on such a small island???

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140

140-4 There must be military bases in more remote areas which could handle this type of activity.

Sincerely,

Bertil Werjefelt

Phone: residence: 254 5902; cellular 220-9299

141

K O ` O L A U P O K O H A W A I I A N C I V I C C L U B

December 27, 2011

Naval Facilities Engineering Command, Pacific Division
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, suite 100
Pearl Harbor, HI 96860-3134

Re: Basing of MV-22 and H-1 Aircraft in Support of HI MEF Elements in Hawai`i
DRAFT Environmental Impact Statement – Comments and Concerns

Aloha mai kakou!

The Ko`olaupoko Hawaiian Civic Club wishes to offer our mana`o (comments and concerns) regarding your proposal to base MV-22 and H-1 Aircraft at Marine Corps Base Hawai`i, Kane`ohe Bay, located here in our community.

First of all, however, we wish to extend to the U.S. Department of Defense our sincere mahalo and aloha for the efforts made over the past 140 years or so to protect our islands, and for your service in defense of the United States. We know that our islands offer a key strategic defense location for the Pacific Basin, and that we could be vulnerable to hostile elements at any time.

The expansion of your military forces at the Marine Base here on Mokapu Peninsula, however, raises significant concerns. They are as follows:

Purpose and Need

In your Draft EIS, you state that "Operational training for ground troops in Hawaii is currently limited by the lack of specific aviation assets for troop transport and offensive air supports."

In our view, this statement indicates a posture that the base at Mokapu has become critical to launching offensive actions against other countries.

Our concern is that this then makes Mokapu a prime target on which potential enemy forces may focus long-range missiles. We believe this places our community at greater risk because the base would not be considered a valued defensive facility, but actually will become an important
141-1 offensive facility.

Suggested mitigation: we ask that you consider basing these aircraft and troops in another location that will not place civilian populations in jeopardy.

Socio-Economic Impacts

With the basing of these aircraft at the Marine Base in Kane`ohe Bay, the plan is to bring in thousands of military personnel, their families, and support staff.

Our concern is that, with the introduction of large numbers of people on this base, there will be a significant impact on the surrounding communities. While local businesses may laud the benefit of potential customers, island families have experienced increasing challenges in our communities around Kane`ohe bay finding affordable rentals. With the housing allowances provided both to single and married military personnel, they are able to afford higher rents in the limited housing market for our communities, forcing local families to live in extended households, move to other neighborhoods (away from their `ohana and familiar surroundings), or
141-2 even to become homeless due to the lack of rentals that are affordable.

The presence of military personnel and families living in our communities has driven the price of affordable rentals higher, and has made it much more difficult for local families to find affordable rentals within their price range.

Suggested mitigation: provide more "on-base" housing for all new personnel and their families who would be stationed with these new units at Mokapu, perhaps by making more efficient use of the land area set aside for housing on the base; or, provide a mechanism for subsidizing rentals for Kane`ohe bay area families to enable them to compete with military personnel for shelter rentals in the 96744 or 96734 zip codes.

Environmental Impacts

The environmental concerns that arise from this proposal include adverse impacts to air quality, greater intrusion of noises caused by aircraft over Kane`ohe bay (and homes/schools/businesses
141-3 located under the flight plan), wind drift of exhaust fuels dropped by aircraft in test flights or landing/take-off from the base, increased demand for water resources and wastewater disposal.

Suggested mitigations:

1) Shift the runway 5- to 10-degrees to the right, which will enable the aircraft to take off and land while avoiding most of the communities around Kane`ohe bay. This would mitigate noise
141-4 and exhaust fuel drifting over the people of our communities. It would also mitigate the very serious adverse impact of noise on schools, homes and businesses affected by current training flights.

141-5 2) Install air-conditioners in classrooms of the schools around Kane`ohe bay that are affected by training flight noises.

141-6 3) Repair the Aikahi Wastewater Treatment Plant, which has a serious odor problem and requires significant attention to alleviate this problem for area residents, schools and businesses.

4) Develop a water-conservation program for all base personnel to ensure minimizing of water
141-7 waste on the base; consider establishing a local desalination facility on base to address growing water needs.

Cultural Impacts

Since the first contingent of U.S. Marines marched up to the steps of `Iolani Palace in 1893, Native Hawaiians have had to deal with challenges imposed by the U.S. military upon our culture, our lands, and our people.

The Marine Base has long been a source of concern for Native Hawaiians who wish to honor and protect the `iwi kupuna (ancestral remains) and sacred heiau (temples) of Mokapu. Despite the long history of Hawaiian reverence for and presence on the peninsula, with the construction of
141-8 the base in the early 1900s these cultural resources have been disturbed and access has been severely limited. This pattern of interference with cultural access is a long-standing concern and mitigation thus far by military representatives has been spotty and inadequate.

In addition, Native Hawaiians fish within the waters of Kane`ohe bay, or gather for cultural ceremonies or retreats in and around the bay; the noise from the aircraft has greatly disturbed
141-9 many of these activities (although we must commend a recent decision by the Base Commander to suspend the flights during a cultural retreat in July on Moku o Lo`e – Coconut Island).

Suggested mitigation: for short-term mitigation, we suggest expediting the repatriation of `iwi kupuna that have been removed from Mokapu and are awaiting reburial – including covering the cost of this reburial. It should not be the kuleana (responsibility) of the descendants to pay for reburial of remains that were disturbed by military developments. For long-term mitigation,
141-10 establishment of a cultural advisory council, to include representatives of the descendant group and Native Hawaiian organizations such as our civic club and others, should become a part of the policy-making body to assist with decisions on current and future plans for use/expansion of presence on Mokapu and/or within Kane`ohe bay.

Summary

In closing, we offer this mana`o and suggested mitigations with sincerity and respect for the task you have before you, and urge that you take seriously the matters we have raised.

If you require additional consultation with our civic club, we would be happy to meet with you and your staff.

Again, mahalo nui loa for your kokua all these years, and for this opportunity to offer our mana`o.

Me kealoha pumehana,

Alice P Hewett

ALICE P. HEWETT
President

P. O. Box 664
Kaneohe, HI 96744
Ph. (808) 235-8111
www.koolaupokohcc.org

142

Amy Kepilino

From:	htf@lava.net
Sent:	Tuesday, December 27, 2011 8:07 PM
To:	mv22h1eis
Subject:	Military DEIS
Attachments:	Military DEIS Nov 2011 HTF.pdf; ATT3045790.htm

Hawaii's Thousand Friends comments on the DEIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii are attached.

Donna Wong
Executive Director
Hawaii's Thousand Friends
Phone/fax: 808-262-0682
www.hawaiis1000friends.org

If the people lead, the leaders will follow. -- Mahatma Gandhi

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142

Hawaii's Thousand Friends

25 Maluniu Ave., Suite 102., PMB 282 • Kailua, HI 96734 • Phone/Fax: (808) 262-0682 E-mail: htf@lava.net

December 27, 2011

Emailed: mv22h1eis@beltcollins.com

Department of the Navy
Naval Facilities Engineering Command
Pacific Division
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive
Suite 100
Pearl Harbor, Hi 96860-3134

Draft Environmental Statement for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawai`i

Hawaii's Thousand Friends, a state wide non-profit organization dedicated to ensuring that growth is reasonable and responsible and that decisions are made and proposals are implemented in conformity with the law, has the following comments, questions and concerns.

142-1 In evaluating only two alternatives, A and B, the DEIS fails to thoroughly analyze other alternatives that might have less noise and vibration impacts on neighboring, the land and ocean environment, migratory, threatened and endangered birds and historical and archaeological sites.

142-2 The DEIS does not sufficiently evaluate the connection between individual projects nor does it evaluate cumulative impacts from the various projects.

142-3 Table 2-8 Screening of Issues and Resources under Infrastructure Wastewater treatment rates Wastewater Treatment at MCBH KB as FA = Further analysis required; carried forward for more study.

- What further study is required at the wastewater plant?
- Is further study required for the on and off base sewage pipe delivery system?
- Is further study required for the on base treatment plant and/or the off base Kailua Wastewater Treatment Plant?
- Why weren't these studies conducted before hand so that they could be included in this DEIS?
- Will the new required studies be included in a supplemental EIS? If not, please explain how they will be issued and identify the public's opportunities to respond.

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142-3 As a signature to the Kailua Wastewater Treatment Plan Federal Consent Decree for repeated violations to the Clean Water Act we are well aware of the inadequacies and deficiencies of the treatment plant. The DEIS does not include information on those deficiencies nor does it consider cumulative impacts from the City's proposed Kaneohe-Kailua Conveyance tunnel proposed to go through Oneawa Hill and increased sewage from increased personnel on the Marine Base. The DEIS does not consider cumulative impacts on the environment from increasing the amount of sewage running through broken ultraviolet equipment at the Kailua Plant.

- Information on the cumulative impact to the land and ocean environment from increased sewage added to an already broken system must be provided in the FEIS.
- The DEIS failed to provide information on cumulative impacts to the water quality of Kaneohe Bay that is used for subsistence activities such as gathering limu and fishing which are protected under the Hawai`i Constitution Article XII, 7.

Table 2-8

142-4 **Kalaupapa Airport**. The DEIS stated purpose is to use the runway for night vision training. Table 2-8 rates Land Use, Airspace, Air Quality, Threatened, endangered, candidate species, Migratory birds, Archaeological resources, Cultural Sites, Natural hazards, Aircraft safety, Ordnance safety, Demographic, Environmental justice, Protection of children and Energy **use FA – Further analysis required; carried forward for more study.** Under NEPA analysis of impacts on all issues must be done in this document so that alternatives and cumulative impacts can be known and evaluated.

- Why is such extensive *further analysis* still being required?
- Why weren't **all** necessary and/or required analysis conducted for inclusion into this disclosure document?
- Will a supplemental EIS be written to include all the required analysis and studies?

4.2 Land Use
4.2.1 Introduction

142-5 In this disclosure document it is insufficient to state:

> *Land use compatibility with respect to noise was not evaluated for the Kahuku Training Area (KTA) on the island of Oahu, PTA on the island of Hawaii, PMRF on the island of Kauai, Kaula Island, MTSF on the island of Molokai, and the HIARNG Facility on the island of Maui. These areas are not in proximity to noise sensitive* ***receptors*** *to warrant* ***further noise analysis (noise modeling)*** *for the Environmental Impact Statement (EIS), i.e., noise impacts are not anticipated for these areas.* (Emphasis added)
> - How was the conclusion reached that no further noise analysis was warranted for these areas?
> - Does the definition of "noise sensitive receptors" include people? If so, what modeling and analysis was used to determine that people living around or near the above identified areas would not be impacted by noise, vibrations etc?

4.2.2.6 Training Areas on the Islands of Molokai and Maui

142-6 The DEIS only provides a brief two paragraph description of the use of Kalaupapa as a Hansen Disease colony. It neither details the historic and sacred significance of the place nor describes the despair, struggle to survive, loss of lives, isolation from families and heroic devotion to the inhabitants by Father Damien now Saint Damien of Molokai and many others.

To many in Hawai`i and around the world Kalaupapa is a sacred place and escalating military

142-6 use defiles this special place and diminishes the sanctity and memory of those who lived and died in isolation. Some areas must never be exploited and Kalaupapa is one of those areas.

- What other areas were considered for night training?
- Why weren't they considered instead of Kalaupapa?

4.8.2 Affected Environment
4.8.2.1 Marine Corps Training Area Bellows
Terrestrial and Marine Fauna

142-7 The DEIS does not provide adequate data on effects on wildlife for any of the proposed sites. It is unacceptable to state that while the Kawailoa Training Area and Schofield Barracks East Range are designated critical habitat for the Oahu elepaio the critical habitat will not be impacted. It may be true that their habitat may not be impacted but elepaio fly and there is no discussion in this DEIS regarding possible almost inevitable collisions between training flight patterns and the elepaio flight patterns.

As Hawaii's endangered species struggle to survive it is critical that information on aircraft and elepaio flight patterns be identified, analyzed and flight patterns selected that will avoid collisions in order to give our endangered species a chance to thrive.

This critical information must be provided **before** this DEIS can be accepted.

142-8 It is unacceptable to state under **Migratory bird management** that the Army will *document and report birds "taken" as a result of military readiness activities…but does not consider current Army training at the Oahu training areas as significantly impacting migratory birds.*

- What does *significantly impacting migratory birds* mean? Is it some sort of a quota on the number of birds that can be killed during flights, cumulatively and sedately?
- This disclosure document should have provided information on migratory, endangered and threatened bird flight patterns in relation to training flight patterns and the anticipated "take" at each area for each training exercise.
- How many "takes" are anticipated during each aircraft flight at each site?
- As Hawai`i struggles to create habitat and increase the number of migratory, endangered and threatened bird species it is critical that all aircraft and migratory bird flight patterns are identified, analyzed and aircraft flight patterns selected that will avoid collisions

This critical information must be provided **before** this DEIS can be accepted.

142-9 It is equally unsatisfactory to state under Habitat "*Two areas at PTA in the Saddle Road vicinity are designated as palila critical habitat* but *No documented populations of palila occur in critical habitat on the installation, but there could be incidental usage, as these birds are found on adjacent state lands.*

- What does "incidental usage" mean? Is the meaning the same as "incidental take"? If so how many "takes" are anticipated during each aircraft flight?
- To avoid "*incidental usage*" of the palila aircraft and palila flight patterns must be identified, analyzed and flight patterns selected that will avoid collisions in order to give our endangered species a chance to thrive.

142-10 It is unacceptable to state *Impacts on the endangered Hawaiian hoary bat at the Army training areas on Oahu and at Pohakuloa Training Area (may effect but not likely to adversely affect:….*

- What does *may effect but not likely to adversely affect* mean?
- Why wasn't Endangered Species Act Section 7 consultation with the US Fish and Wildlife Service conducted in time for inclusion into this DEIS?
- When will the findings of the "consultation" be completed and made available to the public?

142-11 As Hawaii's endangered species struggle to survive it is critical that information on aircraft and elepaio flight patterns be identified, analyzed and flight patterns selected that will avoid collisions in order to give our endangered species a chance to thrive.

This critical information must be provided **before** this DEIS can be accepted.

5.3.7 Biological Resources

142-12

- We are pleased to learn that the marine Corps is conducting information consultation on specific species but a review of Appendix J only consisted of a letter to USFWS with no response included.
- Did the USFWS response? What was the response and why wasn't it included in this DEIS?

Table 2-8 Screening of issues and Resources
Cultural Resources
Historic Buildings (listed or Eligible for listing on NRHP) is rated FA – further analysis required.

142-13

- What new analysis is required for historic buildings?
- Why wasn't more analysis done before this DEIS was released?
- Haven't all buildings listed or eligible for listing been identified and selected for extensive renovation or demolition?
- Why is *further analysis required for archaeological resources and cultural sites* at all ten identified military installations?
- Why weren't comprehensive investigations of archaeological and cultural sites conducted prior to the issuance of this DEIS so that the reader can evaluate the singular and cumulative impacts?

142-14 This DEIS cannot be accepted until all analysis of areas defined in **Table 2-8 Screening of Issues and Resources ranked FA = Further analysis required;** are completed and included in a supplemental EIS for public and agency review.

According to Table 2-8 this DEIS is very deficient. Agencies and the public are reviewing a partial disclosure document since much investigation remains to be done.

142-15 It is obvious from the number of buildings eligible for listing or listed on the National Register of Historic Places slated for demolition, 27 under alternative A and 32 under Alternative B, and the high number of buildings that will be adversely effected that there must be another alternative not yet considered or evaluated that will drastically reduce the number of historic buildings lost to demolition or adversely effected.

142-16 Hawaii's Thousand Friends requests to be a consulting party under the NHPA Section 106 process.

- Were area Neighborhood Boards such as Kaneohe, Waimanalo and Kailua notified of the opportunity to be Consulted Parties in accordance with Section 106 of the National Historic Preservation Act of 1966?
- If area Neighborhood Boards were not notified of this opportunity explain why they were not notified?

142-17 Is the management plan for specific ESA-listed species Implementation Plan available for public review? If so, how can we obtain a copy?

In conclusion, this DEIS cannot be approved because it only provides partial information and fails to consider alternatives that would be less destructive to the environment, migratory, endangered and threatened birds, and historic properties.

This DEIS cannot be approved because it does not consider cumulative impacts to the environment and air quality from projects and construction at each site. Nor does the DEIS consider cumulative impacts to Kailua Wastewater Treatment Plant from additional base personnel and proposed projects City projects and increased impacts on Kailua Bay from an already deficient wastewater treatment plan.

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From: katie doyle [kdoyle@hawaii.rr.com]
Sent: Tuesday, December 27, 2011 8:16 PM
To: mv22h1eis
Cc: kbresidentsinitiative@gmail.com; Keoki Kerr; James Dooley
Subject: Plans for increased aircraft activity at Kaneohe Marine Corps Base

To Whom It May Concern:

In consideration of the following:

143-1
* Aircraft traffic will increase 49% over baseline activity.
* Current planes and helicopters will be changed out for jets and additional helicopters and the hybrid Ospreys.
* The overall effect will be significantly more activity with louder aircraft.
* The DEIS noise analysis is based on a computer generated model which does not reflect actual conditions in the Bay area and the surrounding mountains. This model skews the analysis in favor of lower proposed noise levels.
* No actual measurements of existing noise levels.
* There was no mention of measurements from different points in the surrounding communities.
* The model did not address prolonged revving of the engines or hovering activity which is happening now and will increase if proposed aircraft arrive.
* The model used calculated sound generated from one runway rather than several other areas including helipads which may be used simultaneously with the runways.

143-2
* The DEIS fails to address the increase in waste water issues adequately.

143-3
* The DEAIS fails to adequately address the effect on property values.

143-4
* The DEIS describes the area as "low population density of residential areas" . It fails to consider that most of the population is concentrated in the area surrounding the Bay and thus will be the most adversely affected by the expansion.

143-5
* The DEIS does not adequately address human health effects (cardiac events and sleep deprivation)
* The DEIS does not adequately address effects on quality of life of surrounding residents (interference with daily life and irritation).
* The DEIS does not adequately address effects on children health and educational impact.

143-6
* The DEIS did not present adequate data on the effect on wildlife.

we strongly oppose the expansion of aircraft activity and infrastructure at the Kaneohe Marine Corps Base.

Sincerely,

WIlliam and Kathleen Hummel

46-264 Ikiiki Street
Kaneohe, HI 96744
808.258.7185
kdoyle@hawaii.rr.com
hummelw001@hawaii.rr.com

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From: Sherrie Ching [sherrie_hi@yahoo.com]
Sent: Tuesday, December 27, 2011 11:20 PM
To: mv22h1eis
Subject: Regarding plan to expand aircraft activity and infrastructure at the Kaneohe Marine Corps Base

Follow Up Flag: Follow up
Flag Status: Completed

144-1
Do not increase aircraft activity at Kaneohe Marine Corps Base. It will be too noisy. When the helicopters fly over Kaneohe, they are noisy. It has come to my attention that you are planning to fly jets in Kaneohe. Don't. They are noisy. When the Blue Angels were here and they are not welcome because they are noisy. My ears hurt. The house shook. Let alone, you can't hear yourself think or what anyone else is saying. The jets were noisy, then. I expect they are still NOISY! They even flew near Pohai Nani Retirement Center. Whenever the pilots (even the non-Blue Angel pilots) fly near to the hills behind Kaneohe Bay Shopping Center. I always wonder if they are in trouble and those planes will crash because they are so near. Where are their brains?!! If my ears hurt with the increased activity when the Blue Angels were here, the marine life will also be affected. Someone(s) reported whales and dolphins brain hemorhaging from the sonars waves. So do not increase the noise level by increasing aircraft activity. With a higher noise level, it will be more difficult for our children to study in or out of school. It will also lower our property values.

144-2
It has also come to my attention that there will be an increase wih wastewater. Currently the base plant overflows are diverted to the Kailua Waste water facility by city contract. Problem: this plant has repeated violations of governmental environmental regulations. The Kailua ultraviolet sanitization equipment has been inoperable for several years releasing inadequtely treated wastwater offshore. Therefore the environmental violations will increase with expanded aircraft activity and infrastructure. You do not have permission to do this. And fix the current problem.

This is not being a good neighbor. This is being our enemy!

Sherrie Ching
45-181 Lilipuna Rd #F
Kaneohe HI 96744

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From:	vanessa nichols [kahamoon@yahoo.com]
Sent:	Wednesday, December 28, 2011 12:17 AM
To:	mv22h1eis
Cc:	polytech@att.net; alwerj@mac.com; Christian Werjefelt; werjefelt@hotmail.com; jnichus@yahoo.com
Subject:	Fw: Aircraft issues

----- Forwarded Message -----
From: vanessa nichols <kahamoon@yahoo.com>
To: "mv22hleis@beltcollins.com" <mv22hleis@beltcollins.com>
Cc: "polytech@att.net" <polytech@att.net>; "alwerj@mac.com" <alwerj@mac.com>; christian <cwerje@hotmail.com>; "werjefelt@hotmail.com" <werjefelt@hotmail.com>
Sent: Wednesday, December 28, 2011 12:10 AM
Subject: Aircraft disturbances

Aloha,
145-1 I am writing as a very concerned citizen about the proposed increases in aircraft training in the Kaneohe Bay area. This is a very serious problem on many counts. The most obvious problem lies in the safety of the residents in this area. The residents are put at risk of potential dangers. The recent crash near the sand bar was a big wake up call to the fact that there are risks involved in flying near populated areas. It is very disappointing that this isn't a bigger concern on the part of the military. The safety of the population should be the highest priority. I am certain that there are other areas which would be more suitable for this sort of training, ie flying out farther over the ocean instead of in the bay.

145-2 The loud noise from the airplanes, jets, and helicopters is also a very big concern. It is tremendously irritating, especially when the drills and training occurs at odd hours of the night. It is very difficult to sleep when this occurs. In addition, there haven't been enough studies done on the effects on endangered wildlife which are protected in this area.

In sum, there are a large amount of very concerned citizens in the Kaneohe Bay area, who are hoping to deter this training from occurring. I am one of these citizens. It would be absolutely devastating and unforgivable if an aircraft ever crashed into the home of someone living along the bay. My parents live right on the bay, and I myself have experienced first hand the fear of a possible crash. The amount of drills are already at an unacceptable level, any more than this would be completely outrageous and irresponsible on the part of the military. We feel that the aircraft training program needs to be totally reevaluated in terms of what is best for the safety and security of people and wildlife in the surrounding areas.

With sincere concern,
Vanessa W. Nichols

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Amy Kepilino

From:	Joel Levey [alohalevey@gmail.com]
Sent:	Wednesday, December 28, 2011 11:05 AM
To:	mv22h1eis
Subject:	Upolo Airport EIS Statement of Record

December 20, 2011

Dept. of the Navy, Naval Facilities Engineering Command, Pacific Division
Attn: Under Secretary of the Navy
c/o EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

Dear Under Secretary and EIS Project Manager:

Seasons Aloha to you both! I am a longtime resident of North Kohala, and during this generally happy time of the holiday season, I am saddened to learn of a proposed basing and operation of MV-22 Osprey tiltrotor aircraft and H-1 helicopters at our little Opolu Airport in the midst of rich farmland and rural community. I have examined the Environmental Impact Statement that was prepared for this project and am writing you now to express my objections and deep concerns, specifically regarding the environmental impacts related to the use of Upolu airport located in the district of North Kohala in the county of Hawaii.

146-1 I feel this is an utterly inappropriate location for such activity, and ask you to please reconsider this proposed location, which, after closely examining the EIS document itself, is based on a lot of inaccurate and out-of-date information. For example, the EIS states that the nearest hospital is in Waimea, which is incorrect. The Kohala Hospital, and the Kohala Health Clinic, are right here in this local community only a few miles away from Upolu. 146-2 The EIS also states that the impact on marine life is not an issue. However, the pristine waters of the North Kohala coastline is actually a marine life sanctuary, and are the favored birthing grounds for the Humpback Whales which frequent these waters. Also, the endangered Monk Seal is often seen on the rocks near Opolu Airport and was just sighted there the other day. There are many more examples of misinformation and inaccuracies in the EIS report that will be referred to further on.

146-3 The two "community" meetings that were held regarding this proposal have been held nearly 45 minutes drive away up the mountain road in Waimea, which is in the South Kohala district –rather than in the directly impacted North Kohala district coastal town of Hawi – the actual local community that would be most significantly impacted by this expansion of Marine/Navy activity in its midst. When questioned, the Project representatives at the meeting acknowledged that they had never actually visited the proposed region, or had only visited there briefly many many years ago. This is especially disturbing when such proposed activity is likely to have a significant impact on the quality of life for local residents, wildlife, and tourists visiting this pristine natural and historic region of North Kohala.

146-4 It has come to my attention that even the biologist for this EIS has never been to Upolu. This seems incongruous with making a responsible environmental assessment and raises in question the quality, accuracy, and reliability of the science on which the EIS itself was based. To prepare an EIS while avoiding involving the local community and neglecting to do the due diligence necessary to actually visit this region to conduct

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proper research to assess the environment – as well as its sociological impact of having increased operations at Upolu Airport –is unwise and irresponsible.

146-5 On Page 2-53 of the EIS there is a column for "Farmland" relevance to be assessed, however this column is left completely blank! The region of North Kohala is one of the richest Farmlands in the County of Hawaii and is of significant environmental concern.

146-6 While the EIS states that jet fuel run off and fuel dumping over the ocean and land would occur, the EIS also stated that, "there would be no damage." I wonder how this unsubstantiated claim can be made when coastal zones close to Upolu are regarded as Marine Sanctuaries and the waters off Upolu have provided habitat for birthing and mating Humpback whales for thousands of years. Besides the prevalence of whales in these waters, we have also seen endangered Monk Seals near by along the coast here and Green Sea Turtles in the waters off Upolu. While it notes that the Pueo is also found in the Upolu area, it ignores that nesting I'o , endangered Hawaiian hawks, are also found nearby. The report that is cited in the EIS regarding the presence of hoary bat in the area was done in 1997, during which time the researchers only stayed two nights, did not see a hoary bat and assumed that there were none. However, the hoary bat that live there are seen often in this area by local residents.

146-7 Upolu has one of two dairies remaining in the state of Hawaii. There is concern that the noise levels will impact both the milk production of cows and the quality of milk that is likely to be produced by stressed cows who are frightened by noisy military aircraft. Such stress hormones in the cows' milk are also likely to impact those who ingest it and this needs to be assessed and considered in preparing the EIS.

146-8 With noise in mind, my family, guests, and farm workers have already experienced military aircraft flying at dangerously low elevations, recklessly buzzing over the tree tops of local farms in the North Kohala region frequently over the years. Repeated incidents of such reckless behavior on the part of military aviators in the Upolu-North Kohala region leads us to be extremely wary of how increased military operations will impact the quality of life and safety for our community.

The Hawi, North Kohala region has the longest stretch of undeveloped coastline in Hawaii, and is one of the most pristine, undisturbed, and natural areas in the State. Baseline ambient sound levels in the EIS need to be recalculated to reflect the extreme peace and quiet of this area, which is qualitatively and quantitatively extremely different from a noisy, urban, military aviation setting. It is difficult to imagine that the increased presence of noisy military aircraft would not have a profoundly noticeable, disturbing, and intrusive impact on the quality of life for local residents and visitors to this region.

The presence of military aircraft and operations will have a tremendous impact on quality of life for local residents who are largely visually oriented to look skyward north toward the ocean and across to Maui from the descending slopes of the North Kohala mountains. Many of our local residents look out over Upolu toward the beautiful view of Haleakala across the ocean. The noise, distraction, and pollution of increased airborne military flights in the Upolu area promises to be significant and will certainly disturb the pristine, quiet, beauty, and tranquility of this area. The intrusive impacts of military flights in and out of Upolu on local residents – and upon the tourist trade which is a significant source of commerce for local residents – will be undeniable and are not at all addressed in the EIS.

146-9 The archeological and cultural impact of increased military activity at Upolu airport is also of great concern. We wonder how the EIS can justify the statement that there are, "No archeological resources of any significance" when many of the most significant archeological sites in all of the Hawaiian Islands exist in this area, and are well documented along the Kohala Coast very near Upolu. Access would potentially be

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146-9 restricted, or denied, to Mo'okini Heau and King Kamehameha's birthplace, which are held as sacred places in our region. There are many other religious, historically significant, and culturally meaningful sites along this stretch of the Kohala Coast.

146-10 The EIS also addressed the ground water in this area. The report stated, "Status code of the groundwater is that it is currently being used as fresh drinking water that is irreplaceable and has a high vulnerability to contamination (Mink and Lau, 1993)." The EIS must take into consideration that the Upolu area is frequented by severe droughts and the water resources available to this area are of great importance and value to the residents of the Upolu area.

146-11 Upolu is also an area of significant wild fire danger and I don't see this addressed in the EIS at all. With military operations and severe winds in this area, the risk of igniting a wildfire that would endanger local residents seems an issue of great importance that must be addressed by the EIS when considering the risks of military exercises at Upolu.

The severe, sudden, and dangerously strong updrafts of the winds specific to this special area are so significant that they even have unique individual Hawaiian names designated to them, and are noted and commemorated in traditional Hawaiian chants and woven into the hula tradition. In my local North Kohala halau, my Kumu specifically teaches us the names of these winds to be especially aware of and respectful of them.

With safety in mind, the EIS does not adequately address this fact that wind gusts along the shoreline of Upolu and the adjacent areas reach up to 70mph and may come from any direction without warning. The fierce winds of this region have many names and are well known and documented in local lore. We also have windmills in close proximity to Upolu airport. All these factors combine to indicate that it is hazardous both for our service members to practice and learn how to fly helicopters and for local residents, tourists who frequently visit Upolu area.

146-12 According to the EIS that was published, there would be an increase of 23% air traffic with frequency at approximately 250 exercises per year. This is based on an unsubstantiated "*guess*" due to inadequate information on the number of planes flying in and out of Upolu. They "guessed" that we have 800 per year. Some local residents estimate the number to actually be a few dozen. Whatever the actual current numbers, can you imagine how severe the impacts will be of greatly increased traffic into and out of Upolu on our local community?

146-13 None of the studies that the EIS relied upon appear to be current. Most of the ones cited are at least a decade old. Contact and recommendations do not appear to have come from OHA, NOAA, DLNR, local citizens, Sierra Club, Ocean Conservancy, or The Nature Conservancy – which are all important sources of information upon which a reliable EIS should be based.

In view of all of these legitimate concerns, I urge you to please reconsider this plan of increasing military training at Upolu Airport. I strongly believe such activity will harm the community, the quality of life, and the pristine environment of Upolu and North Kohala. Thank you for your consideration.

Most sincerely,

Michelle Levey, M.A.
North Kohala resident, organic farmer, Member of the Board of Sustainable Kohala, North Kohala CERT volunteer, Co-Chair for the West Hawaii Workplace Wellness Task Force, NPAC, Nutrition & Physical Activity

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Coalition of Hawaii County, a project of the University of Hawaii at Manoa, Office of Public Health Studies, John A. Burns School of Medicine, and faculty for University of Minnesota Medical School programs on the Island of Hawaii.

Cc: Sen. Dan Inouye, Sen. Daniel Kahikina Akaka, Sen. Josh Green, M.D., Rep. Mazie Hirono, The Hon. Neil Abercrombie, Governor, State of Hawaii

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Dr. Joel Levey

PO Box 1298, Kapaau, HI 96755 • (808)889-0056

12/18/11

RECEIVED

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NAVFAC Pacific

Naval Facilities Engineering Command, Pacific Division
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

Attn: EV21, MV-22/H-1 EIS Project Manager

Dear Project Manager:

I am writing to you regarding the proposed basing and operation of MV-22 Osprey tiltrotor aircraft and H-1 helicopters in Hawaii and specifically the impacts related to the use of Upolu airport located in the district of North Kohala in the county of Hawaii.

147-1 As a long time local resident, educator, a discerning researcher, and a local resident of North Kohala I write to express my deep concerns about the Navy and Marines proposal to dramatically increase military operations at Upolu Airport near Hawi, North Kohala on the Island of Hawaii. The fact that the two meetings that have been held have been held nearly 45 minutes drive from here is disturbing when such proposed activity is likely to have a significant impact on the quality of life for local residents, wildlife, and tourists visiting this pristine natural region.

147-2 It has come to my attention that the biologist for this EIS has never been to Upolu. This seems incongruous with making a responsible environmental assessment and to me as a discerning researcher reflects both poor judgment, and bad science. To prepare and EIS while avoid involving the community and neglecting to do the due diligence necessary to actually visit this region to conduct proper research to assess the environment – as well as sociological impact – of having increased operations at Upolu Airport, is unwise and irresponsible.

147-3 While the EIS states that jet fuel run off and fuel dumping over the ocean and land would occur, the EIS also stated that, "there would be no damage." I wonder how this unsubstantiated claim can be made when coastal zones close to Upolu are regarded as Marine Sanctuaries and the waters off Upolu have provided habitat for birthing and mating Humpback whales for thousands of years. Besides the prevalence of whales in these waters, we have also seen endangered Monk Seals near by along the coast here and Green Sea Turtles in the waters off Upolu. While it notes that the Pueo is also found in the Upolu area, it ignores the nesting I'o that are also found nearby. While the EIS states that the hoary bat that lives there, the report that is sited was done in 1997 the researchers only stayed two nights, did not see a hoary bat – which are seen often in this area - and assumed that there were none.

147-4 Upolu has one of one of two dairies remaining in the state of Hawaii. There is concern that the noise levels will impact both the milk production of cows and the quality of milk that is likely to be produce by stressed cows who are frightened by noisy military aircraft. Such stress hormones in the cows milk are also likely to impact those who ingest it and this needs to be assessed and considered in preparing the EIS.

With noise in mind, I must say that I, my family, guests, and farm workers have experiences military aircraft flying at dangerously low elevations, recklessly buzzing over the tree tops of local farms in the North Kohala region frequently over the years. Repeated incidents of such reckless behavior on the part of military aviators in the Upolu-North Kohala region leads myself, my family, and other local residents to be extremely wary of how increased military operations will impact the quality of life and safety for our community.

147-5 The Hawi and North Kohala region has the longest stretch of undeveloped coast line in Hawaii is one of the most pristine, undisturbed, natural areas in the State. Baseline ambient sound levels in the EIS need to be recalculated to reflect the extreme quiet of this area... which is qualitatively and quantitatively extremely different from a noisy, urban, military aviation setting. Its difficult to imagine that the increased presence of noise military aircraft would not have a profoundly noticeable, disturbing, and intrusive impact on the quality of life for local residents and visitors to this region.

The presence of military aircraft and operations will have a tremendous impact on quality of life for local residents – who are largely visually oriented to look skyward north toward the ocean and across to Maui from the descending slopes of the North Kohala

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Dr. Joel Levey

PO Box 1298, Kapaau, HI 96755 · (808)889-0056

147-5 mountains where many local residents look out over Upolu toward the beautiful view of Maui and Haleakela. The noise, distraction, pollution of increased airborne military flights in the Upolu area promises to be significant and will certainly disturb the pristine, quiet, beauty, and peace of this area. The intrusive impacts of military flights in and out of Upolu on local residents – and upon the tourist trade which is a significant source of commerce for local residents – will be undeniable and are not at all addressed in the EIS.

147-6 The archeological and cultural impact of increased military activity at Upolu airport is also a great concern. We wonder how the EIS can justify the statement that there are, "No archeological resources of any significance" when many of the most significant archeological sites in all of the Hawaiian Islands exist and are well documented along the Kohala Coast very near Upolu. Access would potentially be restricted, or denied, to Mo'okini Heau and Kamehameha's birthplace which are held as sacred places in our region. There are many other religious, historically significant, and culturally meaningful sites along this stretch of the Kohala Coast.

147-7 The EIS also addressed the ground water in this area. The report stated, "Status code of the groundwater is that it is currently being used as fresh drinking water that is irreplaceable and has a high vulnerability to contamination (Mink and Lau, 1993)." The EIS must take into consideration that the Upolu area is frequented by severe droughts and the water resources available to this area are of great importance and value to the residents of the Upolu area. Upolu is also and area of significant wild fire danger and I don't see this addressed in the EIS at all. With military operations and severe winds in this area, the risk of igniting a wildfire which would endanger local residents seems an issue of great importance that must be addressed by the EIS when considering the risks of military exercises at Upolu.

147-8 With safety in mind, the EIS does not adequately address the fact that wind gusts along the shoreline of Upolu and the adjacent areas reach up to 70mph and may come from any direction without warning. The fierce winds of this region have many names and are well known and documented in local lore. We also have windmills in close proximity to Upolu airport. All these factors combine to indicate that it is hazardous both for our service members to practice and learn how to fly helicopters and for local residents, tourists who frequently visit Upolu area.

147-9 According to the EIS that was published, there would be an increase of 23% air traffic with the frequency at approximately 250 exercises per year. This is based on an unsubstantiated "guess" due to inadequate information on the number of planes flying in and out of Upolu. They "guessed" that we have 800 per year. Some local residents estimate that the number is actually a few dozen. Whatever the actual current numbers, can you imagine how severe the impacts will be of greatly increased traffic into and out of Upolu on our local community.

147-10 None of the studies that the EIS relied upon appear to be current which is most concerning to me as a researcher and resident of the Upolu area. Most of the studies cited are at least a decade old. Contact and recommendations do not appear to have come from OHA, NOAA, DLNR, local citizens, Sierra Club, Ocean Conservancy, Nature Conservancy – which are all important sources of information upon which a reliable EIS should be based.

I urge you to please reconsider this plan of increasing military training at Upolu Airport and strongly believe will harm the community, the quality of life, and the pristine environment of Upolu and North Kohala.
Thank you for your consideration.

Most sincerely,

Dr. Joel Levey

Dr. Joel Levey, (North Kohala resident, organic farmer, Member of the Board of Sustainable Kohala, North Kohala CERT volunteer, Co-Chairs for the West Hawaii Workplace Wellness Task Force, NPAC, Nutrition & Physical Activity Coalition of Hawaii County, a project of the University of Hawaii at Manoa, Office of Public Health Studies, John A. Burns School of Medicine, faculty for University of Minnesota Medical School programs on the Island of Hawaii)

Cc: Sen. Dan Inouye, Sen. Daniel Kahikina Akaka, Sen. Josh Green, Rep. Mazie Hirono, Rep. Colleen Hanabusa, Rep. Mark M. Nakashima

148

Amy Kepilino

From: Margaret Krainer [margaretkrainer@hotmail.com]
Sent: Wednesday, December 28, 2011 12:03 PM
To: mv22h1eis
Subject: Kaneohe marine Corps Base DEIS

148-1 Please consider the impact on the community and environment of the proposed increase in air traffic from Kaneohe Marine Corps Air Station.

The effect on the environment looks disasterous, particularly noise and wastewater effects. The DEIS glossed over these and did not use accurate data in drawing conclusions.

This is a high density population area - but the statistics used in the DEIS skewed that fact by included unhabitable mountain areas, where the military already has technical installations.

Many people will suffer loss of health from the proposed increase in noise.

Please consider this email. I just learned about this issue, and read that snail mail will be accepted if it was sent yesterday, so surely this email can be included in the community input.

Sincerely, Margaret Krainer

1

149

From: Krainer [Krainerp001@hawaii.rr.com]
Sent: Wednesday, December 28, 2011 12:06 PM
To: mv22h1eis
Subject: KMCAS DEIS

Please consider the impact on the community and environment of the proposed increase in air traffic from Kaneohe Marine Corps Air Station.

149-1

The effect on the environment looks disasterous, particularly noise and wastewater effects. The DEIS glossed over these and did not use accurate data in drawing conclusions.

This is a high density population area - but the statistics used in the DEIS skewed that fact by included unhabitable mountain areas, where the military already has technical installations.

Many people will suffer loss of health from the proposed increase in noise.

Please consider this email. I just learned about this issue, and read that snail mail will be accepted if it was sent yesterday, so surely this email can be included in the community input.

Sincerely, Peter Krainer

1

150

From: Laura Curtis [curtisaloha@gmail.com]
Sent: Thursday, December 29, 2011 4:04 PM
To: mv22h1eis
Subject: DEIS Impact Statement

150-1

Please limit aircraft noise and activity, especially eliminating any fighter aircraft, hybrid Ospreys, loud Helicopters or noisy aircraft flying over or within 5 miles of residential areas during landing and takeoff below 15000 ft. It's bad enough with your BAYFEST blasting music so loud that it vibrates my house and we live clear across the bay in Kaneohe. Nothing needs to be turned up that loud. Even when we attended the BAYFEST, we had to use earplugs to keep from going deaf. NO MORE NOISE!!!! I have to actually vacate my home that weekend because the disturbance is so extreme. Your help will be truly appreciated.

Mahalo,

Laura Curtis

1

151

RECEIVED

'11 DEC 22 A8:03

NAVFAC [illegible]

12/21/11

HI-IES PROJECT manager

I have seen monk seal, endanger honey bats, + whales [illegible] off coast by Upolu AIRPORT, KOHALA.

151-1 I have been adjacent to Airport + I have felt highly variable full gale winds. The EIS is FAULTY in not dealing with these very dangerous environmental problems

Sincerely,

Jonathan St Benjamin

152

LAURIE AND JACK GOLDSTEIN
PO Box 44333
Kawaihae, HI 96743

PEARL HARBOR MAIL CENTER
DEC 24 2011
PEARL HARBOR HI 96860

Naval Facilities Engineering Command, Pacific
Attn: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

Re: EV21, MV-22/H-1 EIS

The issue of using Upolu airport for training exercises has not been studied sufficiently, nor has the correct information been utilized for the study. It is alarming that a decision of such import could be made based on erroneous and unsubstantiated data.

There are many negative impacts this military usage would create, some listed below:

1) Wildlife:

152-1 This site is a favorite for endangered humpback whales who mate and give birth just off Upolu Point. They are extremely sensitive to ocean and other disturbances. The access area to the training site appears to be in direct proximity to where the whales gather. The White tailed Tropicbird nests at Upolu Point as well. Both of these animals are state recognized indigenous animals and will be threatened by the additional activity on land and frequent disturbance in the air.

2) Economics:

152-2 a) Tourism: Our economy relies heavily on tourism. Visitors come to this part of the Hawaiian islands to enjoy the peaceful and old-world-Hawaiian charm of the area and to enjoy and learn about the culture. They come to see and spend money in the charming towns along the coast, in addition to coming to see our wonderful and diverse wildlife as listed above. The usage of this site in the midst of these charming and quiet towns which bring in money from tourism, would certainly reduce interest and tourism and therefore be another blow to our already fragile economy.

152-3 b) Real estate: Noise levels will certainly increase with frequent large planes taking off and landing, which will be a deterrent to people wanting to live and build in these typically quiet and peaceful communities. Real estate will depreciate rather than appreciate, and the many dollars that are ordinarily put into the economy for building new homes will be gone. The economy will take another hit after this long period of non-growth, which might be far longer term and far more detrimental than the current recession.

152

3) Cultural:
152-4 This area and its surrounding land are sacred to the Hawaiian people. The appropriation of this site for military training would be totally inappropriate and in fact be an insult to the Hawaiian people who hold it sacred.

These are but three of the areas we feel need to be addressed more carefully. An environmental study done with appropriate data to assess whether in fact this would be an appropriate use of the Upolu Airport would be the first appropriate step in determining this issue.

Respectfully,

Jack Goldstein   Laurie Goldstein

Cc: The Honorable Daniel Inouye, US Senate
The Honorable Daniel Akaka, US House of Representatives
The Honorable Mazie Hirono, US House of Representatives
The Honorable Colleen Hanabusa, US House of Representatives
Representative Mark Nakashima
Senator Josh Green, M.D.
The Honorable Neil Abercrombie, Governor, State of Hawaii

153

RECEIVED
'11 DEC 27 A7:57
NAVFAC Pacific

About training use of Upolu airport, ahem:

Dear preservers of liberty and freedom,

Thank you for the jobs you do everyday.

Going from Pendelton, OR w. 2100 troops to OAhu, where there are no facilities built ($773,000,000" if you're lucky) & then commuting to The Big Island of Hawaii for training boys & girls to fly MV22 Ospreys & H1 Cobra & Hueys, is a silly idea. Very dangerous in many ways. I have seen the winds there
153-1 whip up the air & sea unforgivingly.

It is also right where there is an annual passage of whales for many
153-2 months; & boy, will you be in trouble with everybody who cares for whales, including you, and even the whales, of course.

Now, the environmental impact statement is pitiful. Way old
153-3 data; ignorant; not done by experts on site, even; much less locals who know. I have seen green turtles & hawks (endangered) there.

The extreme activities already going on at Kawaihae Port of entry & Poa hakuloa Military Area create enough impact on the environment & population & animals, economy, ocean. Quit while you're ahead. People won't take much more. Respect the treasures of the place. Preserve its liberty & freedom by staying out. There will be archeological & cultural opposition as well.

I urge you to avoid this move. It is ill-considered, expensive & above all dangerous to our troops & our well-being.

Sincerely, Susan Laughlin

154

United States Department of the Interior

NATIONAL PARK SERVICE
Ala Kahakai National Historic Trail
73-4786 Kanalani St., Suite 14
Kailua-Kona, HI 96740

IN REPLY REFER TO:

RECEIVED
'11 DEC 27 A7:59
NAVFAC Pac

December 22, 2011

Attn: EV21, MV-22/H-1 EIS Project Manager
Naval Facilities Engineering Command, Pacific Division
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

RE: DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR BASING OF MV-22 AND H-1 AIRCRAFT IN SUPPORT OF III MARINE EXPEDITIONARY FORCE (MEF) ELEMENTS IN HAWAII

Attn: EV21, MV-22/H-1 EIS Project Manager:

Thank you for providing the Ala Kahakai National Historic Trail with the opportunity to submit comments to you during your preparation of the DEIS for basing of MV-22 and H-1 aircraft in support of III Marine Expeditionary Force (MEF) elements in Hawaii.

The National Park Service (NPS) administers the Ala Kahakai National Historic Trail (NHT), added to the National Trails System by the U.S. Congress on November 13, 2000 (Public Law 106-509). In January 2009, the Ala Kahakai NHT Comprehensive Management Plan (CMP) and EIS were adopted as policy and listed in the Federal Register. The legislation authorizing the Ala Kahakai NHT identifies an approximately 175-mile portion of prehistoric *ala loa*, and other trails on or parallel to the seacoast extending from Upolu Point on the northern tip of Hawaii Island down the west coast of the island around South Point to the east boundary of Hawaii Volcanoes National Park. The Ala Kahakai National Historic Trail combines surviving elements of the *ala loa* with segments of later *alanui aupuni,* which was developed on or parallel to traditional routes, *mauka-makai* trails, and more recent pathways and roads that create links between the historic segments. The preservation and protection of natural and cultural resources and landscapes are vital to the mission of the Ala Kahakai National Historic Trail.

Ala Kahakai National Historic Trail was established to administer the preservation and protect, reestablish as necessary, and maintain the ancient coastal *ala loa* and associated resources and values, along with linking trails on or parallel to the shoreline. The goal is to provide high quality experience, enjoyment and education guided by Native Hawaiian protocol and etiquette while protecting the trail's natural and cultural heritage and respecting private and community interests. The northern most section of the legislated 175 mile Ala Kahakai National Historic Trail corridor is located adjacent to Upolu Airport.

154-1 The National Park Service would like to inform the applicant that contrary to the DEIS (page 4-153) which states: "*no historic trails are known to exist in this area* (BCH 1999: Footnote 1 on page 35)", a segment of the Ala Kahakai National Historic Trail is located along the coastal parcel, between the Upolu Airport runway and the shoreline.

154

Ala Kahakai NHT, State of Hawaii Department of Transportation (HDOT), Airports Division, and numerous North Kohala community groups have been working in partnership to assist in the management and care of this historically significant cultural landscape. It is in the National Park Service's direct association with the project area of Upolu Airport that we are providing the following comments and concerns regarding the DEIS.

Land Use – Upolu Airport (4.2.2.4)

154-2 The DEIS states that the nearby land uses surrounding the project area is limited to cattle grazing. Other nearby land use includes residential properties, one of which is approximately 0.2 miles from the west end of the runway, and another home approximately 0.5 miles to the south. Also several parcels to the east of the runway are being marketed for private residences.

Noise – Upolu Airport (4.5.2.4)

154-3 The DEIS states that *"aircraft operations are not in proximity to residential or other noise sensitive land uses to warrant noise modeling and analysis, i.e., noise impacts are not anticipated. Hence, no evaluation of existing conditions for aircraft noise was conducted at Upolu Airport"*. As mentioned above there are residences in very close proximity to Upolu Airport and the potential for more in the near future. Other land uses near the airport include subsistence shoreline gathering practices and recreational and traditional trail uses. The Ala Kahakai NHT at its closest point is approximately 150 feet from the north edge of the runway.

This project will have noise impacts on nearby residences, subsistence gatherers and trail users. We recommend that the project conduct a study of potential auditory impacts for Upolu Airport.

Biological Resources – Upolu Airport (4.8.2.4)

154-4 This project needs to assess impacts to fauna beyond the fenced-in environment. Upolu Airport is located directly adjacent to the marine environment where several species listed under the Endangered Species Act (ESA) are present. Humpback whales *(Megaptera novaeangliae)*, Hawaiian Monks Seals (*Monachus schauinslandi*), and Green Sea Turtles *(Chelonia mydas)*, all either frequent or are seen in this area. Please include an examination of potential impacts to these and other marine fauna.

We applaud that the applicant is looking at habitats outside of the airport; however, in the discussion of habitat, the coral reef ecosystem evaluation is based on personal communications from dives 20+ years ago. Please either provide cited studies or conduct studies of habitat as part of the current project.

Cultural Resources – Upolu Airport (4.9.2.4)

154-5 As this project constitutes a federal undertaking as defined under Section 106 of National Historic Preservation Act of 1966 (NHPA), 36 CFR Part 800, applies. Federal Regulations (36 CFR 800.4) clearly state the process of how to identify historic properties. An important part of determining what should be included in the identification and determination of historic properties is seeking information from consulting parties, and other individuals and organizations likely to have knowledge of, or concerns with, historic properties in the area, and identify issues relating to the undertaking's potential effects on historic properties, as well as gathering information

2

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154-5 from Native Hawaiian Organizations (NHO) to assist in identifying properties which may be of religious and cultural significance to them and may be eligible for the National Register. Consultation is an important part of determining the area of potential effect (APE). The APE must take into account physical and construction, visual, auditory, social, economic, land use, and cumulative effects (36 CFR 800.16(d)). As this project pertains to the use of Upolu Airport, the APE is far too narrow. In defining the APE, the project should consult with community and NHO's. It is our opinion that the APE should be broadened to include more of the surrounding cultural landscape.

Please make an effort to consult directly with the North Kohala community in North Kohala.

Thank you for the opportunity to provide these comments early in your environmental review process. I look forward to our continuing communication on this proposed project. Please contact me, 808-326-6012 ext.101, or our resource staff archeologist, Rick Gmirkin, at ext. 102 to discuss any questions you may have on our comments.

Sincerely,

Aric Arakaki

Aric Arakaki
Superintendent

cc: B. Leithead-Todd, County of Hawaii Planning Department
State of Hawaii, DLNR, Department of Forestry and Wildlife, Na Ala Hele
State of Hawaii, DLNR, State Historic Preservation Division
Office of Hawaiian Affairs
NPS Pacific West Region

3

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Duplicate letters of 011, 013, and 081.

155

![Ocean Conservation Society]

December 16, 2011

Dept. of the Navy
Naval Facilities Engineering Command, Pacific Division
Attn. EV-21, MV 22/H-1 EIS Project Manager
258 Makalapa Dr. Suite 100
Pearl Harbor, HI 96860-3134

To Whom It May Concern:

Recently, we became aware of the proposed project involving the Upolu airport in Hawaii and we are highly concerned about the potential effects that this project will have on Humpback whales. In our review of the EIR associated with the Upolu proposal, we found inadequate consideration of the effects of aircraft noise on the local humpback whale population. This is of particular concern considering: 1) that these animals use the area as a breeding ground and; 2) that the area of proposed operations at Upolu is part of the Hawaiian Islands Humpback Whale National Marine Sanctuary established by Congress in 1992 through the National Atmospheric and Oceanic Administration.

Humpback whales are an endangered species protected under both the Marine Mammal Protection Act and the Endangered Species Act. The potential impacts of aircraft noise in the area as a result of the proposed use of Osprey and H-1 helicopters may have significant, if not severe, consequences to Humpback conservation and well-being in the area.

We strongly urge you to adopt a precautionary approach to the use of the Upolu facility and postpone any deployment of aircraft at Upolu airport until a new and proper EIR that includes objective studies of the impacts of noise on Humpbacks and other marine mammal species in the area, can be caried out and properly evaluated. We would also suggest that once a new EIR has been prepared, that it be offered for public consideration and comment before any further action is taken toward the deployment of aircraft.

Thank you in advance for your consideration.

Sincerely,

Dr. Maddalena Bearzi
President

Capt. Charles Saylan
Executive Director

P.O. Box 12860 • MARINA DEL REY, CA 90295 • TEL: 310.822.5205 • FAX: 310.822.5729
WWW.OCEANCONSERVATION.ORG • INFO@OCEANCONSERVATION.ORG

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Petition to: Oppose the use of Upolu Airport for Military Aviation Operations by the United States Marine Corps

Petition summary and background	The United States Marine Corps is bringing the MV-22 Osprey and H-1 Helicopters to Hawaii and to Upolu airport.
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders to act now. We oppose the use of Upolu Airport for Military Operations by the United States Marine Corps. We feel there will be an Impact on noise, cultural history, view plane, wildlife, fishing, airspace, erosion, and quality of life.

Printed Name	Signature	Address	Email Address	Date
JAMES LAND	[signature]	PO Box 551694 Kapa au HI	herenowjine Gmail.com	12/3/11
GAIL MACKENZIE	Gail MacKenzie	Box 190687 Hawi, HI	→	12/13/11
MO JUMALAN	Mo. Jumalan	Box 1121- Kapaa. 96755		12/4/11
Travis Dodson	Travis Dodson	Hawi, HI 96719	chillosophy@live.com	12/3/11
Francis McGough	[signature]	General Delivery Hawi Hi 96719	—	12/3/11
David Stark	David Stark	PO Box 6311 Kamuela, Hi 96743	dhstark466@yahoo.com	12/3/11
Lewis Whitney	[signature]	P.O. Box 340 Hawi HI 96719	lew@kohala.org	12/3/11
Ben Kolodinsky	B Kolaidy	Gen Del. Kapa Au 96755	Ben@Ohanalivingfarms.com	12/3/11
Ben LaSalle	[signature]	Gen Del. Kapaau 96755	BdlaSalle@gmail.com	12/3/11
Nadia Wolf	Nadia Wolf	55-699 Kanei Rd. Hawi	sacredsupport@olympus.net	12/3/11
Sean Leahy	S. Ly	P.O. Box 198900 PMB 125 Hawi, HI 96719	sivashambo@hotmail.com	12/3/11
Dani Kennedy	Dani Kennedy	PO Box 551794 Kapa'au, HI 96755	danielecta@gmail.com	12/3/11

(12)

Please Return to: Alyssa Slaven PO BOX 1017 Kapa'au, HI 96755

www.mcvh.usmc.mil/MV22H1EIS

155

Petition to: Oppose the use of Upolu Airport for Military Aviation Operations by the United States Marine Corps

3

Petition summary and background	The United States Marine Corps is bringing the MV-22 Osprey and H-1 Helicopters to Hawaii and to Upolu airport.
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders to act now. We oppose the use of Upolu Airport for Military Operations by the United States Marine Corps. We feel there will be an Impact on noise, cultural history, view plane, wildlife, fishing, airspace, erosion, and quality of life.

Printed Name	Signature	Address	Email Address	Date
John Kennedy	[signature]	P.O. Box 551794 Kapaau, HI 96755	aussyfied@hotmail.com	12/3/11
Robert Thomas	[signature]	Box 336 Kapaau 96755	robertthomas@hawaii.rr.com	12/3/11
Theresa Fassi-H.	[signature]	171 Pier Ave Santa Monica CA 90405	TFassi@hi-cal.com	12/3/11
Conyn Villacorte	[signature]	PO Box 315 Hawi HI 96719	conynvillacorte@hotmail.com	12/3/11
Bennie Severson	[signature]	Bx 1193 Kapaau Hi. 96755	bonniemikai@yahoo.com	12/3/11
Aluita Salud	[signature]	Box 491 Hawi HI	—	12/3/11
Tammy Toole	[signature]	PO Box 44401 Kawaihae HI 96743	Hachet@hawaii.rr.com	12/3/11
Susan Bartaluzzi	Susan Bartaluzzi	64-5270 Hohoa #B	SusanBart@AOL.com	12/3/11
Ashtin Hart	[signature]	PO Box 960, Kapaau, HI 96755	ashespants@hotmail.com	12/4/11
Leia Lawrence	Leia Lawrence	PO Box 984 Kapaau, HI 96755	LeiaLawrence@gmail.com	12/4/11
J. Brooke	J. Brooke	P.O.Box 551704 Kapaau 96755	—	12/4/11
Brad Belmarez	B-B	Box 1000 Kapaau	BradBelmarez@Gmail	12/5/11

(12)

Please Return to: Alyssa Slaven PO BOX 1017 Kapa'au, HI 96755

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Petition to: Oppose the use of Upolu Airport for Military Aviation Operations by the United States Marine Corps

2

Petition summary and background	The United States Marine Corps is bring the MV-22 Osprey to Hawaii and wants to conduct a projected 489 Operations a year at Upolu Airport
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders to act now. We oppose the use of Upolu Airport for Military Operations by the United States Marine Corps.

Printed Name	Signature	Address	Email Address	Date
Lanric Hyland	[signature]	53-3988 Ainakea Dr Kapaau 96755	Ric.Hyland@Yahoo.com	12-2-2011
William Crisp	William Crisp	"		12-2 2011
Henry Danford	[signature]	"	FNHowlee@Yahoo.com	"
Josephine Naunagan	[signature]	"		12-2-11
Nahale Napeahi	[signature]	"	picolinos papa nap@earthlink.net	
Nephi Napeahi	[signature]	"	same as above	12-2-11
Lorraine Yadao	Lorraine Yadao	"		12-2-11
Heribert Fecht	[signature]	"	HPfecht@gmail.com	12-2-11
Ernest Valencia	E.F.V.	"		12-2-11
Constantino Salvador	C. S.	"		12-2-11
Jerome Patino	JR Patino	"		12-2-11
Margaret Wilhelm	M. Wilhelm	"		12-2-11
Lori Hardy	Lori Hardy	"		12-2-2011

(13)

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A-5 DEIS Comment Letters

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Petition to: Oppose the use of Upolu Airport for Military Aviation Operations by the United States Marine Corps

5

Petition summary and background	The United States Marine Corps is bringing the MV-22 Osprey and H-1 Helicopters to Hawaii and to Upolu airport.
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders to act now. We oppose the use of Upolu Airport for Military Operations by the United States Marine Corps. We feel there will be an Impact on noise, cultural history, view plane, wildlife, fishing, airspace, erosion, and quality of life.

Printed Name	Signature	Address	Email Address	Date
Richard E Schmidt	[signature]	PO 1449 Kapau HI 96755	[illegible]@Yahoo.Com	12-9-11
Renee L. Wilson	[signature]	P.O. Box 1263 Kapaau HI 96755	venereg@Gmail.com	12-9-11
Kimberly Sawers	[signature]	General Delivery Hawi Hawaii 96719	morningglory57@hotmail.com	12.9.11
Marni Perelman	[signature]	PO Box 1607 Kapaau HI 96755	[illegible]@hotmail.com	12 9 11
Rosi Green	[signature]	15913 SE Anita Dr. Milwaukie OR 97267	fiddlinrosi@gmail.com	12/9/11
Justin Galdones	[signature]	P.O. Box 182 Hawi, HI		12-9-11
Kanoe Phillips	[signature]	P.O. Box 1088 Kapaau HI 96755		12/9/11
Katrina Scheihing	[signature]	p.o. box 190677 Hawi HI 96719		12/10/11
Jonathan Gaines	[signature]	PO Box 520 Hawi HI 96719	thai5jon@yahoo.com	12/10/2011
Marisa McCann	[signature]	PO BOX 6641 Kamuela HI 96743		12/10/2011
Cara McCann	[signature]	" "		" "
(12) Megan Price	[signature]	PO Box 551779 Kapaau HI		12/10/2011

Please Return to: Alyssa Slaven PO BOX 1017 Kapa'au, HI 96755

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Petition to: Oppose the use of Upolu Airport for Military Aviation Operations by the United States Marine Corps

4.

Petition summary and background	The United States Marine Corps is bringing the MV-22 Osprey and H-1 Helicopters to Hawaii and to Upolu airport.
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders to act now. We oppose the use of Upolu Airport for Military Operations by the United States Marine Corps. We feel there will be an Impact on noise, cultural history, view plane, wildlife, fishing, airspace, erosion, and quality of life.

Printed Name	Signature	Address	Email Address	Date
Larry Roberts	[signature]	Po Box 385786 Waikoloa HI 96738	Larryrbf@aol.com	12/10/11
Janelle Williams	[signature]	PO Box 437174 kamuela HI 96743	jlw2@hawaii.edu	12/11/11
Jeanna McRae	[signature]	PO BOX 190707 HAWI 96719	jqmcrae808@gmail.com	12/11/11
Mark Pott	[signature]	P.O. Kapaau		12/11
Jono Lee	[signature]	PO Box 190626 Hawi HI	jonolee@me.com	13DEC11
Jeramiah Morgan	[signature]	Gen Delivery Kapaau HI	Jeramiahdouglas@Gmail.com	12-13-11
Kelly Nedved	[signature]	PO BOX 190612, HAWI HI 96719	nedvoodoo@hotmail.com	12/14/11
Cassandra Robinson	[signature]	P.O. Box 728	—	12/15/11
Christopher Flores	[signature]	Houseless Hoodless, [illegible]	floreschrist00@yahoo.com	12/15/11
Debbie Sell	[signature]	Ohana Living Farms		12/15/11
Sally Woodcock	[signature]	— ♡ —	sallywoodcock@gmail.com	12/15/11
Randall Wapner	[signature]	Po Box 1457 Kapaau.		12/15/11
(14) Dashiell Kuhr	[signature]		dash.kuhr@gmail.com	12/15/11
David Gier	[signature]	65-1297 Kohala Mtn Rd		12/15/11

Please Return to: Alyssa Slaven PO BOX 1017 Kapa'au, HI 96755

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A-5 DEIS Comment Letters

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Petition to: Oppose the use of Upolu Airport for Military Aviation Operations by the United States Marine Corps

7

Petition summary and background	The United States Marine Corps is bringing the MV-22 Osprey and H-1 Helicopters to Hawaii and to Upolu airport.
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders to act now. We oppose the use of Upolu Airport for Military Operations by the United States Marine Corps. We feel there will be an Impact on noise, cultural history, view plane, wildlife, fishing, airspace, erosion, and quality of life.

Return petitions to: P.O..Box 1017 Kapaau, HI 96755

Printed Name	Signature	Address	Email Address	Date
Jana Bogs	Jana Bogs	PO Box 198900, PMB 203 Hawi, Hi 96719	JanaBogs@gmail.com	12-3-11
Lesley Patton	Lesley Patton	P.O. 1065 Kapaau HI 96755	grammawl@gmail.com	12-3-11
Mary Sky Schoolcraft	Mary Sky S.	PO Box 1358 Kapa'au, HI 96755	maryskyschoolcraft@yahoo.com	12-3-11
Roland Pacheco	[illegible]	PO 1672 Kapaau, HI 96755	supersonic@earthlink.net	12/3/11
Son Azure	[illegible]	PO Box 1202 Kapa'au 96755	downwindspiral@yahoo.com	
Alan Thal	Alan Thal	PO B 879 Kapaau 96755	alantg@Gmail.com	12/3/11
Rick McEvoy	Rick M. Evoy	PO Box 332 Kapaau 96755	Kohalakid@Gmail	12/3/11
Isabel Bryan	[illegible]	PO Box 190772 Hawi 96719		12/3/11
Lisa Hallett	[illegible]	PO 423 Kapa'au, Hi., 96755	paikoman@yahoo.com	12/3/11
Todd Andrews	[illegible]	PO Box 423 Kapaau, Hi 96755	.	12/3/11
Charles Russell	Charles Russell	PO Box 1543 Kapaau 96755	ROCKAHULA3@AOL.com	12/3/11
(12) Susan Russell	Susan F Russell	P.O. Box 1543 KAPAAU HI 96755	"	

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Petition to: Oppose the use of Upolu Airport for Military Aviation Operations by the United States Marine Corps

6

Petition summary and background	The United States Marine Corps is bringing the MV-22 Osprey and H-1 Helicopters to Hawaii and to Upolu airport.
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders to act now. We oppose the use of Upolu Airport for Military Operations by the United States Marine Corps. We feel there will be an Impact on noise, cultural history, view plane, wildlife, fishing, airspace, erosion, and quality of life.

Return petitions to: P.O..Box 1017 Kapaau, HI 96755

Printed Name	Signature	Address	Email Address	Date
DONNA Malte	Donna Malte	BOX 207 Kapaau	dmaloha@gmail	12/3/11
Rebecca West	Rebecca West	Box 190709 Hawi Hi		12/3/11
Fara Boisvert	Fara Boisvert	PO 523 Kapaau		12/3
KRISTI KRANZ	Kristi Kranz	Box 190546 HAWI	KRANZSICK@AOL.com	12/3
KARIN COOKE	Karin Eichtinger Cooke	PoB 1585, Kapaau	Karin@Kokdula.com	12/3
Susan Laughlin	Susan Laughlin	PO Box 1235 Kapa'au 96755		
Rose Love	Rose Love	PO Box 190776 Hawi, Hawaii		
Amy Irwin	H.M. IRWIN	PO B 1541 Kapaau		12/3/11
Anna Pacheco	A. P.	PO Box 1672 Kapaau 96755		12/3/11
Dawn Barnett	Dawn Barnett	PoBox 1078 Kapaau 96755		12/3/11
Lara Johnson	[illegible]	PoBox 190719 Hawi 96719	ljcatgirl@gmail.com	12/3/11
(12) Renée Rudzinski	[illegible]	POBox 1457 Kapaau 96755		12/3/11

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Petition to: Oppose the use of Upolu Airport for Military Aviation Operations by the United States Marine Corps

9

Petition summary and background	The United States Marine Corps is bringing the MV-22 Osprey and H-1 Helicopters to Hawaii and to Upolu airport.
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders to act now. We oppose the use of Upolu Airport for Military Operations by the United States Marine Corps. We feel there will be an Impact on noise, cultural history, view plane, wildlife, fishing, airspace, erosion, and quality of life.

Printed Name	Signature	Address	Email Address	Date
Susan Barnes	[illegible]	55-380 Hoea Rd Hawi	kukii1@hawaiiantel.net	12/3/11
Warren Vignato	[illegible]	PO 329		12-3-11
TERRY ADKISON	[illegible]	55-3147 Park Rd, Hawi	terryadkison@yaho	12/3/11
Mike Lancaster	[illegible]	HAWI		11 11
Susan Ince	[illegible]	54-417 Polai Pl. Kapaau	susan.ince@hawaii.rr.com	12/3/11
Christian Myint	Christian Myint	55-158 Kokoiki rd.	christianmyint@hotmail.com	12/3/11
Kathleen Dorn	Kathleen Dorn	PO Box 323 Keaau		12-3-11
Tom Frank	[illegible]	P.O. Box 317 Kurtistown 96760		12/3
Imme Ropowski	[illegible]	Pob 1472 KAPAAU		12-1/3
Paul Nelson	[illegible]	P.O. 667 Kapaau		12/3
Karen Rosen	Karen Rosen	PO BOX 278 Hawi		12/3
(12) [illegible]	[illegible]	P.O. Box 538 / Hawi		12/3

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Petition to: Oppose the use of Upolu Airport for Military Aviation Operations by the United States Marine Corps

8

Petition summary and background	The United States Marine Corps is bringing the MV-22 Osprey and H-1 Helicopters to Hawaii and to Upolu airport.
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders to act now. We oppose the use of Upolu Airport for Military Operations by the United States Marine Corps. We feel there will be an Impact on noise, cultural history, view plane, wildlife, fishing, airspace, erosion, and quality of life.

Return petitions to: P.O..Box 1017 Kapaau, HI 96755

Printed Name	Signature	Address	Email Address	Date
MICHAEL ATKINSON	Michael Atkinson	P.O. Box 1597 KAPAAU		12-7-11
Cynthia Potter	Cynthia Potter	PO BOX 1606 Kapaau Hi 96755		12/7/11
LINDA SCHUSTER	[illegible]	P.O. BOX 190616 Hawi Hi 96719		12/7/11
Colleen Roberts	Colleen Roberts	PO Box 190616 Hawi HI	cocorob1@yahoo	12/7/11
Michael Faust	[illegible]	PO Box 190662 Hawi HI	mfaust@hawaii.rr.com	12-7-11
BRIAN A INGRAHAM	[illegible]	PO. BOX 6891 KAMUELA HI 96743		12-7-11
APRYL ROBERTS	[illegible]			
Micah Fitch	[illegible]	P.O. Box 190654 Hawi		12-7-11
Michael Fitch	[illegible]	P.O. Box 190654 Hawi		12-7-11
Tej Flora	[illegible]	75-6009 Alii Dr. Kailua-Kona	laplaya@gmail.com	12/10/2011
Willy Quayle	[illegible]	55-1074 Kaauhuhu Kapaau		12/10/11
(12) William Satterlee	William Satterlee	PO Box 1511, Honokaa, Hi 96727		12/6/11

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Petition to: Oppose the use of Upolu Airport for Military Aviation Operations by the United States Marine Corps

11

Petition summary and background	The United States Marine Corps is bringing the MV-22 Osprey and H-1 Helicopters to Hawaii and to Upolu airport.
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders to act now. We oppose the use of Upolu Airport for Military Operations by the United States Marine Corps. We feel there will be an Impact on noise, cultural history, view plane, wildlife, fishing, airspace, erosion, and quality of life.

Printed Name	Signature	Address	Email Address	Date
Mona Frank Maui	[signature]	53-4056 Kolonahe St	monfrang@mon.com	12/14/11
Jack Hutchings	Jack Hutchings	PO Box 510 96719 HAWI 55-327 Hear rd	HAWIJACK@GMAIL.COM	12/14/11
James Philyaw	James Philyaw	55-496 Hawi Rd Hawi	pholoniusphilyaw@gmail.com	12/15/11
Margaret Frohmader	Margaret Frohmader	PO Box 298 Kapaau 96755 55-655 Hanaloa Cp Kapaau	maggiemaef61@yahoo.com	12/15/11
Dory Ryskamp	Dory Ryskamp	59-220 Maki Rd Kamuela	dory.aloha@gmail.com	12/15/11
KAREN MARTINEZ	Karen Martinez	PO Box 55 1761 Kapaau	hello_karen@ rocketmail.com	12/15/11
YOLANDA HYDE	Yolanda Hyde	P.O.Box 98 HAWI, HI 96719	Yoleehyde@gmail.com	12-15-11
Evelyn McCarthy	Evelyn McCarthy	POB 2558, KAMUELA 96743	EVELYN.REG@GMAIL.COM	12/14/11
Darren Bacon	[signature]	Box 62 Hawi, Hi. 96719		
James Williams	[signature]	Box 760 Kapaau Hi 96755		12/14/11
M Matthew Lettier	[signature]	Box 532 Kapaau	Elo B. bble.C	12/14/11
(12) DAN THOMAS	Daniel Thomas	P.O. BOX 551 KAPAAU	Kthomas4567@HOTMAIL.COM	12/14/11

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Petition to: Oppose the use of Upolu Airport for Military Aviation Operations by the United States Marine Corps

10

Petition summary and background	The United States Marine Corps is bringing the MV-22 Osprey and H-1 Helicopters to Hawaii and to Upolu airport.
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders to act now. We oppose the use of Upolu Airport for Military Operations by the United States Marine Corps. We feel there will be an Impact on noise, cultural history, view plane, wildlife, fishing, airspace, erosion, and quality of life.

Return petitions to: P.O..Box 1017 Kapaau, HI 96755

Printed Name	Signature	Address	Email Address	Date
SCOTT McNAMARA	Scott McNamara	P.O. Box 384392 Waikoloa 96738	mcnamarathon@hotmail.com	12-14-11
John Sebastian	John Sebastian	PO Box 190713 Hawi		
RUTH ROTSTEIN	Ruth Rotstein	P.O.B. 784 KAPAAU 96755		12/17/11
DAVID Rotstein	David Rotstein	" " "		12/17/11
Bonnie Beckett	Bonnie Beckett	P.O. BOX 115 Kapaau, HI		12/17/11
JM PEDERSEN	[signature]	POB 551751 Kapaau 96755	—	12/17/11
LINDA Halbritter	L Halbritter	BOX 532 KAPAAU		12/17/11
MICHAEL LINEKER	M Lineker	BOX 310 HAWI, Hi		
ELIZABETH MARKON	E. Markon	P.O.B. 1623 Kapaau 96755		12/17/11
Dehzhur Green	Dehzhur Green	P.O. Box 1368 Kapaau 96755	—	12/17/11
Joseph Green	Joseph Green	Box 551690, Kapaau 96755		12/17/11
(12) Nate Hayward	Nate Hayward	Box 190900 #132 Hawi 96719		12/17/11

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Petition to: Oppose the use of Upolu Airport for Military Aviation Operations by the United States Marine Corps

13

Petition summary and background	The United States Marine Corps is bringing the MV-22 Osprey and H-1 Helicopters to Hawaii and to Upolu airport.
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders to act now. We oppose the use of Upolu Airport for Military Operations by the United States Marine Corps. We feel there will be an Impact on noise, cultural history, view plane, wildlife, fishing, airspace, erosion, and quality of life.

2011

Printed Name	Signature	Address	Email Address	Date
Linda Laich	Linda Laich	55-588C Hawi Rd.	bilin@sbcglobal.net	12-8-11
William Laich	William Laich	55-588C Hawi Rd.	bilin@sbcglobal.net	12-8-11
Sydney Limtiaco	Sydney Limtiaco	PO Box 296 Kapa'au	Espana333@yahoo.com	12/8/11
Marian Tompkins	Marian Tompkins	Kapaau		12/8/11
Bradley Kymar	[illegible]	Kapaau		12/10/11
Joel Leavey	Joel Leavey	PO Box 248 Kapaau	—	12/10/11
NOAH DAHN	[illegible]	Hawi	Mohala78@yahoo	12/10/11
Laura Dawn	[illegible]	Hawi	—	12/10/11
B. Wilde	B. Wilde	Hawi —	—	
Tonia Thomas	Tonia Thomas	"	brook@nomworks hawaii.com	12/10/11
Brooks Thomas	Brooks Thomas	"	"	"
(12) Julia Pena	Julia Pena	"	oceanwoman808@yahoo.com	12/10/11

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Petition to: Oppose the use of Upolu Airport for Military Aviation Operations by the United States Marine Corps

12

Petition summary and background	The United States Marine Corps is bringing the MV-22 Osprey and H-1 Helicopters to Hawaii and to Upolu airport.
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders to act now. We oppose the use of Upolu Airport for Military Operations by the United States Marine Corps. We feel there will be an Impact on noise, cultural history, view plane, wildlife, fishing, airspace, erosion, and quality of life.

Return petitions to: P.O..Box 1017 Kapaau, HI 96755

Printed Name	Signature	Address	Email Address	Date
Robert DeFazio	[illegible]	PO BOX 190583 96710	RCDEFAZIO@Yahoo	12-3-11
Vicky Trillium	Vicky Trillium	P.O. Box 1386 96755	vicky-trillium@gmail.com	12-3-11
Heather Morgan	[illegible]	55-158 Kokoiki Rd.	heather_liz_808@yahoo.com	12/3/11
Sadie Garcia	[illegible]	P.O. BX 1000 Kapaau	benchristian12@aol.com	12/3/11
Ben Barclay	[illegible]	P.O. Box 911 96755	Benchristian12@aol.com	12-3-11
Clem Sweey	[illegible]	PoBox 954 96755	tippynclem@hotmail.com	12-3-11
Carol Weirack	[illegible]	P.O. Box 190591 96719	—	12-3-11
DeeAnne Domnick	Dee Anne Domnick	P.O. Box 371, HAWI 96719	barefootmd@aol.com	12-3-11
Rick Chalker	Rick Chalker	POB 355 Kapaau 96755	Kohala889@yahoo.com	12-3-11
Hap Tallman	HAP TALLMAN	P.O. 411 Hawi, 96719	Hapt@Hawaii.net	12-3-11
Joey Beadley	[illegible]	P.O. Box 1295 96755	jsbsound@yahoo.com	12-3-11
(12) Nelson Denman	[illegible]	General Delivery Hawi, HI 96719		

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Petition to: Oppose the use of Upolu Airport for Military Aviation Operations by the United States Marine Corps

15

Petition summary and background	The United States Marine Corps is bringing the MV-22 Osprey and H-1 Helicopters to Hawaii and to Upolu airport.
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders to act now. We oppose the use of Upolu Airport for Military Operations by the United States Marine Corps. We feel there will be an Impact on noise, cultural history, view plane, wildlife, fishing, airspace, erosion, and quality of life.

Printed Name	Signature	Address	Email Address	Date
Summer	[signature]		gentlesummer222 @yahoo.com	
OBER	[signature]			
VALERIE DRAM	[signature]	BOX 451 KAPAAU	4VALERIEDRAM@Gmail.com	
JASON K. VEGA	[signature]	P.O. BOX 1582 Kapaau		

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Petition to: Oppose the use of Upolu Airport for Military Aviation Operations by the United States Marine Corps

14

Petition summary and background	The United States Marine Corps is bringing the MV-22 Osprey and H-1 Helicopters to Hawaii and to Upolu airport.
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders to act now. We oppose the use of Upolu Airport for Military Operations by the United States Marine Corps. We feel there will be an Impact on noise, cultural history, view plane, wildlife, fishing, airspace, erosion, and quality of life.

Printed Name	Signature	Address	Email Address	Date
Yolanda Hyde	[signature]	553453 KAAUHUHU RD — P.O. Box 98 - HAWI, 96719	Yoleehydea@gmail.com	12-19-11
THOMAS SHAVER	[signature]	54 3760 HANAULA APO RD KAPAAU, HI 96755	tshaverdo@yahoo.com	12/19/11
PATRICIA BENJAMIN	[signature]	55823 KEAHIPOE PLACE	HAWI EQUATED@GMAIL	
Jonathan S. Benjamin	[signature]	55823 Keahipoe Pl. Hawi	jonathan.equated@gmail.com	12/19/11
GALE LEONARDI	[signature]	PO BOX 190625 55-581 HAWI, HI 96719	whatagal818@yahoo.com	12/19/11
Renee Wurzen	[signature]	P.O. BOX 1263 Kapaau HI 96755	reneeg@gmail.com	12/19/11
DALL KABIR	[signature]	54 23 89 Kynnersley Rd.	dkabir@msn.com	12/19/11
William N. Houts	[signature]	54-420A KAPAAU Rd	WIL_Houts@yahoo.c	12/19/11
Anita Giordana Gherardi	[signature]	55-544 Banana Ranch Rd HAWI 96719	agghera[illegible]@hawaiiantel.net	12/19/11
STEPHEN GOULD	[signature]	P.O. BOX 198900, PMB 202 HAWI, HI. 96719		12/19/11
LEA MIZUTA	[signature]	P.O. Box 178900 PMB 262 HAWI HI 96719	none	12/19/11
Robert Elaru	[signature]	P.O. Box 44 Hawi, HI. 96719		12/19/11

(12)

Please Return to: Alyssa Slaven PO BOX 1017 Kapa'au, HI 96755

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Petition to: Oppose the use of Upolu Airport for Military Aviation Operations by the United States Marine Corps

17

Petition summary and background	The United States Marine Corps is bringing the MV-22 Osprey and H-1 Helicopters to Hawaii and to Upolu airport.
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders to act now. We oppose the use of Upolu Airport for Military Operations by the United States Marine Corps. We feel there will be an Impact on noise, cultural history, view plane, wildlife, fishing, airspace, erosion, and quality of life.

Printed Name	Signature	Address	Email Address	Date
KATI LANEY	[signature]	Box 198900 PMB 132 Hawi, HI 96719	Kativasbi@gmail.com	12/17/11
Roy Farber	[signature]	HAWI HI 96755		

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Petition to: Oppose the use of Upolu Airport for Military Aviation Operations by the United States Marine Corps

16

Petition summary and background	The United States Marine Corps is bringing the MV-22 Osprey and H-1 Helicopters to Hawaii and to Upolu airport.
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders to act now. We oppose the use of Upolu Airport for Military Operations by the United States Marine Corps. We feel there will be an Impact on noise, cultural history, view plane, wildlife, fishing, airspace, erosion, and quality of life.

Printed Name	Signature	Address	Email Address	Date
Jon Adams	[signature]	PO Box 446	Hawi, Hi 96719	12/10/11
Janet Guastalli	[signature]	PO Box 446	Hawi, Hi 96719	12/10/11
SNEH CAMBLIN	[signature]	PO 729	KAPAAU, HI 96755	12/10/11
Carla Orellana	[signature]	POB 190656	Hawi, H. 96719	12/10/11
Dwight Burns	[signature]	PoBox 190656	HAWI Hi 96719	12/10/11

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Petition to: Oppose the use of Upolu Airport for Military Aviation Operations by the United States Marine Corps

19

Petition summary and background	The United States Marine Corps is bringing the MV-22 Osprey and H-1 Helicopters to Hawaii and to Upolu airport.
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders to act now. We oppose the use of Upolu Airport for Military Operations by the United States Marine Corps. We feel there will be an Impact on noise, cultural history, view plane, wildlife, fishing, airspace, erosion, and quality of life.

Printed Name	Signature	Address	Email Address	Date
Michelle Levey	Michelle Levey	P.O.B. 1298 Kapaau HI 96755	alohalevey@yahoo.com	12/16/11
Joel Levey	[signature]	POB 1298 Kapaau HI 96755	AlohaLevey@yahoo.com	12/16/11
Garry W Dakito	[signature]	POBX 2045 Volcano HI		12/17/11
Matthew Mage				
Michael Perez	[signature]	PO Box 7389 Kurtistown HI 96720		12/17/11

(5)

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Petition to: Oppose the use of Upolu Airport for Military Aviation Operations by the United States Marine Corps

18

Petition summary and background	The United States Marine Corps is bring the MV-22 Osprey to Hawaii and wants to conduct a projected 489 Operations a year at Upolu Airport
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders to act now. We oppose the use of Upolu Airport for Military Operations by the United States Marine Corps.

Printed Name	Signature	Address	Email Address	Date
Jim McClelland	[signature]	P.O. Bx 492405 Kawaii 96749	The1the7thsun@yahoo	12/10
Bob Moitoza	[signature]	P.O. Box 1526 Kapaau HI 96755		12/10/11
Anita Miceli	AJMiceli	P.O. Box 1590, Kapaau HI 96755		12/19/11

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Printed Name	Signature	Address	Email Address	Date
Anita Miceli	[illegible]	P.O. Box 1590 Kapa'au HI 96755		12/9/11
Tom [illegible]	[illegible]	P.O. Box 557 Hawi		12/9/11
BILLY BARRETO	[illegible]	PO BOX 937 K 96719		12/9/11
Brian Thomas	[illegible]	Po Box 357 Hawi HI 96719		12/9/11
Shiloh Barros	[illegible]			12/9/11
Jared	[illegible]	PO Box 1795 Kapaau HI 96755		12/9/11
Kristen Cosmi	[illegible]	P.O. Box 44716 Kamuela 96743		12/9/11
[illegible]	[illegible]	PO 44716		12/9/11
JOSHUA [illegible]	[illegible]	PO 3263 HAWI, HI 96719	Frajoshua@gmail.com	12/9/11
Celeste Santos	[illegible]	Po Box 1297 Hi 96755		12/11/11
Thilani Cypriano	[illegible]	PO Box 1247 Kapaau Hi 96755	lhivibe@hotmail.com	12/12/11
★ [illegible]	GUSTAVO ACOSTA	P.O. Box 247	gus@hawaiiantel.net	12/13/11
[illegible] L. Bravo	[illegible]	PO BOX 746 Kapaau		12.13.11
Greg Peterson	[illegible]	PO Box 384503 Waikoloa 96738		12/13/11
Maria Carvalho	Maria Carvalho	Box 843 Kapaau 96755		12/13/11
Kyan Mullen	[illegible]	P.O. Box 132 Kapaau		12/13/11

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Petition to: Oppose the use of Upolu Airport for Military Aviation Operations by the United States Marine Corps

Petition summary and background	The United States Marine Corps is bringing the MV-22 Osprey and H-1 Helicopters to Hawaii and to Upolu airport.
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders to act now. We oppose the use of Upolu Airport for Military Operations by the United States Marine Corps. We feel there will be an Impact on noise, cultural history, view plane, wildlife, fishing, airspace, erosion, and quality of life.

Printed Name	Signature	Address	Email Address	Date
Carol Masuhara	Carol Masuhara	P.O. B 266 Kapaau	hamast266@gmail.com	12/6
Maki Pinahs	Maki Pinahs	PO BOX 190704 Hawi	[illegible]@live.com	12/6
Chika Takahashi	[illegible]	P.O. B 190704 Hawi	chikakonitakahashi@yahoo.co.jp	12/6
Lena Kapalieli	Lena Kapalieli	P.O Box 283 Kapaau Hi		
Hiipoi Krappe	Hiipoi E Krappe	" 308 96755		12/06/11
Renee Perez	[illegible]	Po Box 1257 Kapaau Hi 96755	pomaikai27@Yahoo.com	12/06/11
MACEY EMELIANO	Macey Emeliano	P.O.BOX 484 HAWI Hi 96719		12/06/11
Mihana Diaz	[illegible]	65-1692 Kohala Mtn Rd	mdiaz@hpa.edu	12/08/11
JIM TOMAN	[illegible]	Puakea Bay Ranch	jantoman@gmail	12/09/11
Brannon Boa[illegible]	Brannon Boa[illegible]	General Delivery Kapaau HI 96755	[illegible]@yahoo	12/9/11
Rio Miceli	[illegible]	PO Box 1590 Kapaau		12/9/11
Andrew Trempy	[illegible]	P.O. Box 267 Hawi HI 96719	[illegible]@gmail.com	12/6

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Dennis Rodgers	Kapaau	HI	96755	Unite	12/9/2011	This is a bedroom commumity and we want to keep it that way. Please no noise, traffic, polution, and take over. It is a big island go to the mountains please.
Heidi Byron	Keauhou	HI	96739	Unite	12/12/2011	We move here from the mainland for the peace and quiet. Please move the Marine Training somewhere better suited to the environment they will be utilizing.
Chiya Parks	kapaau	HI	96755	Unite	12/12/2011	I was born and raised 3 miles from this proposed operation...please please please leave this ONE little bit of our paradise alone. Thank You.
Lisa Love	St. Augustin	FL	32095	Unite	12/13/2011	There is a lot of Hawaiian history in this area that deserves to be kept sacred.
Jean Sunderland	Kapaau,	HI	96755	Unite	12/14/2011	We do not want this noise polution in this residential area.
Marianne Eaton	Hawi	HI	96719	Unite	12/14/2011	I live 2 miles from the airport and it will impact me. I go to bed early and am a very light sleeper. Plus I worry about the dairy cows.
inga sybel	Paauilo	HI	96776	Unite	12/16/2011	That part of the island is very small and it would create too much traffic in the air and on the roads..there is only one way in and out of the district...makai or mauka ..nothing in between...
Nancy Heldt	hawi	HI	96755	Unite	12/16/2011	This is a quiet rural community. We are concerned and know that this change will affect noise, air, sea, traffic, and soil pollution. The last thing this quiet community needs is base for the military. PLEASE do not do this. The community is very much against this act.
keith wallach	kamuela	HI	96743	Unite	12/17/2011	the military already controls a sizable play ground on this island, practice there
Christine Thomas	Hawi	HI	96719	Unite	12/19/2011	YOU CANNOT DESTROY OUR QUALITY OF LIFE WITH THESE WAR CAMES IN OUR FRONT YARD>
Dennis Phillips	Pasadena	CA	91104	Unite	12/20/2011	I'm a Big Island property owner.

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Name	City	State	Zip	Coun	SignedOn	Comment
Les Forrest Arnold	Hawi	HI	96719	Unite	12/3/2011	We have a very quiet rural community where a military training mission would disrupt our visitor industry and quality of life.
tim head	kapaau	HI	96755	Unite	12/3/2011	congested highway from Kawaihae with aircraft fuel tankers. Damage to
Dash Kuhr	Kapaau	HI	96755	Unite	12/3/2011	We will not allow any military activity to occur at Upolu Airport.
Becky Lambert	Victoria		v8n 3l3	Cana	12/4/2011	I support this cause. Please also check out the petition I created to help address human trafficking in the province of British Columbia. http://www.change.org/petitions/minister-of-public-safety-and-solicitor-general-increase-octips-budget-to-750000-annually-and-rehire-robin-pike
Leah Naylor	Kapaau	HI	96755	Unite	12/6/2011	To keep our coastline pristine and ensure that coastal access remains intact. The Marines will have to find somewhere else to do their nighttime operations. Why do they even need an airport?
LAHI WATSON	PUNALUU	HI	96717	Unite	12/7/2011	Military operations in Upolu are unnecessary.
Richard Benton	Kapaau	HI	96755	Unite	12/7/2011	Do not want to see, hear, fear destructive, lethal military aircraft exercises over, on or around the land of Aloha or anywhere near our pristine coast land and sea community of Kohala, because it will pollute, promote killing and destroy this beautiful environment.
Peter Beemer	Kapaau	HI	96755	Unite	12/7/2011	I do not see any military or civilian value in using Upolu Airport for exercise's of any sort.
Doyle Leeding Jr.	Castaic	CA	91384	Unite	12/7/2011	It will creat excessive noise in this area. The military has several other areas that they can conduct these operations.
Alea Schechter	Honokaa	HI	96727	Unite	12/8/2011	I like it quiet and peaceful
Joseph Ayer	Hawi	HI	95019	Unite	12/9/2011	We are very sensitive souls on the endangered species list, and the commotion from the military would disturb our habitat.

Gail Byrne	Waikoloa	HI	96738	Unite	12/20/2011	The Kohala coast, next to and for 12 miles north and south of Upolu Airport, has the most numerous intact, pre-contact archeological sites in the State and this area is considered a global jewel. This area is also host to endangered plants and animals. Undoubtedly this operation will have a severe impact on the cultural context of this special area and might disturb traditional practitioners and could harm the endangered species known to inhabit this coast. Finally, this area has some of the last remaining pristine marine habitat and marine conservation area is less than two miles from the airport. Any water quality impacts from this operation are not tolerable.

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nadine robertson	mountain vi	HI	96771	Unite	12/20/2011	Why am I signing? Because it is just plain wrong for all reasons. DO NOT DISTURB cultural, historical, wildlife, fauna, and the quiet. No to noise, dust, fuel pollution. Take night time practice to Nevada's desert. There's AFB Nellis. Go there...NOW! No more military using our home as they want; ie, practicing for this and that. This is our home, our sacred land, not war-like zone. Shame!
fax sinclair	waikoloa	HI	96738	Unite	12/20/2011	Sure, kill off all the tourist trade and &%$#* the Hawaiians and all who live on The Big Island. AND STOP BOMBING US!
Bobbie Terai	Kamuela	HI	96743	Unite	12/20/2011	I don't not want the noise or potential harm to our coast.
wendy wagner	kapaau	HI	96755	Unite	12/20/2011	I am signing because I have moved 53 times and 6 thousand miles to find peace and quiet here in Kohala. Peace is our most endangered species. I am on the edge of an island in the middle of the pacific on the edge of the US. Where else could I go to find this peace? PLEASE leave us alone and quiet. This is absolutely not a place for the military in any way shape or form. Peace to you and yours in these Holy Days
Cleon Bailey	Kaumela	HI	96743	Unite	12/20/2011	The US Military has been great to me and my family! But its unilateral methods for procuring lands for training has to be headed off here on the big Island before all you see and hear is its foot print of nosie, smoke, and fire; soldiers take it to Fort Carson Colorado or El Toro in California.

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Name	City	State	Zip	Country	SignedOn
1 Alyssa Slaven		HI	96755	United States	12/3/2011
2 Ronnie Sla\	Hawi	HI	96755	United States	12/3/2011
3 Karin Cook	Hawi	HI	96719	United States	12/3/2011
4 Les Forrest	Hawi	HI	96719	United States	12/3/2011
5 tim head	kapaau	HI	96755	United States	12/3/2011
6 Yasiu Krusz	Chicago	IL	60613-001	United States	12/3/2011
7 Joel Levey	Kapaau, HI	HI	96755	United States	12/3/2011
8 Renee Wul	Kapaau	HI	96755	United States	12/3/2011
9 william laic	hawi	HI	96719	United States	12/3/2011
10 Brooks Th	Hawi	HI	96719	United States	12/3/2011
11 Dash Kuhr	Kapaau	HI	96755	United States	12/3/2011
12 JiYoung Ch	Bundang		463-500	Korea, Republic of	12/4/2011
13 Becky Laml	Victoria		v8n 3l3	Canada	12/4/2011
14 Joshua Fra	Hawi	HI	96719	United States	12/4/2011
15 Michal Car	Hawi	HI	96719	United States	12/5/2011
16 susan cox	kapaau	HI	96755	United States	12/6/2011
17 Carol Perry	Kapaau	HI	96755	United States	12/6/2011
18 Leah Naylo	Kapaau	HI	96755	United States	12/6/2011
19 Debbie Wil	hawi	HI	96719	United States	12/6/2011
20 David Perr	Kapa'au	HI	96755	United States	12/6/2011
21 Lisa Dreesz	Tualatin	OR	97062	United States	12/6/2011
22 Erika Kuhr	Kapaau	HI	96755	United States	12/6/2011
23 jessica ferb	hawi	HI	96719	United States	12/6/2011
24 Pamela De	Kamuela	HI	96743	United States	12/6/2011
25 sally lundb	paauilo	HI	96776	United States	12/6/2011
26 LAHI WATS	PUNALUU	HI	96717	United States	12/7/2011
27 Adrienne V	Kapaau	HI	96755	United States	12/7/2011
28 Keone Ma	Kapaau	HI	96755	United States	12/7/2011
29 Frieda Frie	Medford	OR	97504	United States	12/7/2011
30 Alvitta Sole	hawi	HI	96719	United States	12/7/2011
31 william cot	hawi	HI	96719	United States	12/7/2011
32 alice mckit	tucson`	AZ	85712	United States	12/7/2011
33 Regina We	Kapaau	HI	96755	United States	12/7/2011
34 sonya rosn	hawi	HI	96719	United States	12/7/2011
35 Nova Whit	Paradise	CA	95969	United States	12/7/2011
36 james m nc	Fargo	ND	58102	United States	12/7/2011
37 Richard Be	Kapaau	HI	96755	United States	12/7/2011
38 Heather Br	Kapa'au	HI	96755	United States	12/7/2011
39 Lila Tremo	Kapaau	HI	96755	United States	12/7/2011
40 Andre Nog	Hawi	HI	96719	United States	12/7/2011
41 Peter Been	Kapaau	HI	96755	United States	12/7/2011
42 Kristina Le	Hawi	HI	96719	United States	12/7/2011
43 Jeanie Slav	Lexington	KY	40514	United States	12/7/2011
44 Chelsea Le	Santa Barb	HI	93105	United States	12/7/2011
45 Doyle Leed	Castaic	CA	91384	United States	12/7/2011
46 Leslie Nug	Kapa'au	HI	96755	United States	12/8/2011

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47 Cecily Mille	Santa Barb	CA	93108	United States	12/8/2011
48 Alea Schecl	Honokaa	HI	96727	United States	12/8/2011
49 Andrea De	Kapaau	HI	96755	United States	12/8/2011
50 Michael Kr	Keauhou	HI	96739	United States	12/8/2011
51 Jon Spinac	New York	NY	10010	United States	12/8/2011
52 Nicole Gon	Kapaau	HI	96755	United States	12/8/2011
53 richard lieb	hawi		96719	Haiti	12/9/2011
54 ian mcveig	waikoloa	HI	96738	United States	12/9/2011
55 Robert Gol	Hawi	HI	96719	United States	12/9/2011
56 Duane Ellio	Hawi	HI	96719	United States	12/9/2011
57 Shanda Car	Kapaau	HI	96755	United States	12/9/2011
58 Joseph Aye	Hawi	HI	95019	United States	12/9/2011
59 Dennis Rod	Kapaau	HI	96755	United States	12/9/2011
60 Marcel Thc	Kapaau	HI	96755	United States	12/9/2011
61 Zemira Rot	Kapaau	HI	96755	United States	12/9/2011
62 Mara Ledw	Hawi	HI	96719	United States	12/9/2011
63 Dennis Can	Hawi	HI	96719	United States	12/9/2011
64 Beth Thom	Kapaau	HI	96755	United States	12/9/2011
65 Kevin Coch	Kapaau	HI	96755	United States	12/11/2011
66 Clyde Will	Hawi	HI	96719	United States	12/11/2011
67 Sharon Ols	Kailua-Kon	HI	96740	United States	12/12/2011
68 Heidi Byror	Keauhou	HI	96739	United States	12/12/2011
69 evalena wi	Hawi	HI	96719	United States	12/12/2011
70 alexis sugs	Kapaau	HI	96755	United States	12/12/2011
71 chris borns	kapaau	HI	96755	United States	12/12/2011
72 Kimberly P	gainesville	GA	30506	United States	12/12/2011
73 Chiya Park	kapaau	HI	96755	United States	12/12/2011
74 Lisa Love	St. Augusti	FL	32095	United States	12/13/2011
75 Jean Sunde	Kapaau,	HI	96755	United States	12/14/2011
76 Elizabeth B	Riverside	CA	9250777	United States	12/14/2011
77 Marianne E	Hawi	HI	96719	United States	12/14/2011
78 Bernadette	Kamuela	HI	96743	United States	12/15/2011
79 Rachel Javi	Kapaau	HI	96755	United States	12/16/2011
80 Norma Rav	Hawi	HI	96719	United States	12/16/2011
81 Deborah B	La Mesa	CA	91942	United States	12/16/2011
82 inga sybel	Paauilo	HI	96776	United States	12/16/2011
83 John Goble	Hawi	HI	96719	United States	12/16/2011
84 Maryann B	Honokaa	HI	96727	United States	12/16/2011
85 joan chann	hawi	HI	96719	United States	12/16/2011
86 madeleine	Kamuela	HI	96743	United States	12/16/2011
87 constance	Kapaau	HI	96755	United States	12/16/2011
88 Suzanne D	Toluca Lak	CA	91602	United States	12/16/2011
89 Karen Alva	denver	CO	80229	United States	12/16/2011
90 Chelsea Ka	Waipahu	HI	96797	United States	12/16/2011
91 Henrilyn K	Kapaau	HI	96755	United States	12/16/2011
92 Nancy Helc	hawi	HI	96755	United States	12/16/2011
93 Jack Coddi	Kamuela	HI	96743	United States	12/17/2011

94	keith walla kamuela	HI	96743 United States	12/17/2011
95	David Azol Hawi	HI	96719 United States	12/18/2011
96	Deborah V Kapaau	HI	96755 United States	12/19/2011
97	Yoko Harac Captain Co	HI	96704 United States	12/19/2011
98	Christine Tl Hawi	HI	96719 United States	12/19/2011
99	Lila Liebma El Bolson		8430 Argentina	12/19/2011
100	Rhoady Lee Kapa'au	HI	96755 United States	12/19/2011
101	Michael Bo Kamuela	HI	96743 United States	12/20/2011
102	Justin Rum Kamuela	HI	96743 United States	12/20/2011
103	James Posr Kamuela	HI	96743 United States	12/20/2011
104	Kevin McC Kamuela	HI	96743 United States	12/20/2011
105	zett amora kamuela	HI	96743 United States	12/20/2011
106	Dennis Phil Pasadena	CA	91104 United States	12/20/2011
107	Brad Parso Princeville	HI	96722 United States	12/20/2011
108	JOSEPH LE/ KAILUA KO	HI	96740 United States	12/20/2011
109	janice palr kailua-kona	HI	96745 United States	12/20/2011
110	Jim Cisler Kawaihae	HI	96743 United States	12/20/2011
111	Piikalama E Kapaau	HI	96755 United States	12/20/2011
112	nadine rob mountain v	HI	96771 United States	12/20/2011
113	Cynthia Gia Hi	HI	96743 United States	12/20/2011
114	Kenneth Bl Kamuela	HI	96743 United States	12/20/2011
115	fax sinclair waikoloa	HI	96738 United States	12/20/2011
116	Bobbie Ter Kamuela	HI	96743 United States	12/20/2011
117	wendy wag kapaau	HI	96755 United States	12/20/2011
118	Cheryl Sed Kapaau	HI	96755 United States	12/20/2011
119	Theresa D'/ Kappau	HI	96755 United States	12/20/2011
120	Peter Vilkir Kailua Kona	HI	96745 United States	12/20/2011
121	Cleon Baile Kaumela	HI	96743 United States	12/20/2011
122	michael sw waikoloa	HI	96738 United States	12/20/2011
123	Mele McPh Kamuela	HI	96743 United States	12/20/2011
124	gary ackerr kapaau	HI	96755 United States	12/20/2011
125	Gail Byrne Waikoloa	HI	96738 United States	12/20/2011
126	Vicky Broo Kapaau	HI	96755 United States	12/20/2011

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Petition to: Oppose the use of Upolu Airport for Military Aviation Operations by the United States Marine Corps

Petition summary and background	The United States Marine Corps is bringing the MV-22 Osprey and H-1 Helicopters to Hawaii and to Upolu airport.
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders to act now. We oppose the use of Upolu Airport for Military Operations by the United States Marine Corps: We feel there will be an Impact on noise, cultural history, view plane, wildlife, fishing, airspace, erosion, and quality of life.

Printed Name	Signature	Address	Email Address	Date
Jill Jones	[illegible]	56-2805 Lahuiki Pl 96719	jjoneslepik@gmail.com	12/17/11
Paul Lepik	[illegible]	56-2805 Lahuiki Pl 96719	paullepik@mac.com	12/17/11
Leeca Schiffer	[illegible]	PO Box 190634 HAWI, HI 96719	lee2a62@wildblue.com	12/17/11
JAMES BERG	[illegible]	56-2948 Puakea Bay Dr Hawi, HI 96719	JEJTMBERG@gmail.com	12/17/11
Coral Swensen	CORAL SWENSEN	53-450 HO'EA RD. HAWI, HI 96719	Rainbow Coral@hotmail.com	12-17-11
Jazz Smith	[illegible]		jazz.[illegible]@gmail.com	12-17-11
Keshel Sutton	[illegible]	PO Box 1104 Kapaau Hawaii 96755		12.17.11
NAKOA SUTTON	NAKOA SUTTON	PO Box 1104 KAPAAU		12.17.11
[illegible]	[illegible]	Box 1104 Kapaau HI 96755		12-17-11
[illegible]	[illegible]	[illegible] Rd Hawi HI		12/17/11
[illegible] Thomas	[illegible] Thomas	55-1023 KAINOA	Kthomas4567@hotmail.com	12/17/11
DAN THOMAS	Dan Thomas	55-1023 KAINOA	Kthomas4567@hotmail.com	12/17/11

Printed Name	Signature	Address	Email Address	Date
James Laird	James Laird	PO Box 427 Kamuela 96743	—	
Susan Mitnik	Susan Mitnik	P.O. Box 1633, Kapaa 96755		
Katie Hastings	Katie Hastings	1477 Kalanianaole 96720		12/17/11
Gavin Hastings	Gavin Hastings	1477 Kalanianaole 96720		12/17/11
Quinten Hastings	Quinten Hastings	1477 Kalanianaole 96720		12/17/11
Dylan Hastings	Dylan Hastings	1477 " "		12/17/11
Elizabeth Purtell	Elizabeth Purtell	P.O. Box 1625 Kapaa	mizlizp@yahoo.com	12/17/11
John Lang	[illegible]	Elwani Kaahae		12/17/11
Courtney Lynx	Courtney Lynx	55-198 Lincoln Hawi, HI	lynxdhana@yahoo.com	12/17/11
Suzanne Nery	Suzanne Nery	Bx 12-1620 HI 96755	—	12/17/11
James Dunkelow	[illegible]	PO Box 107 Volcano HI 96785		12/17/11
Carole Bradbury	Carole Bradbury	PO Box 198900 PMB #106 Hawi HI 96719	—	12/17/11
Jim Pemble	[illegible]	PO Box 1035 Kapaau 96755		12/18/11
Joan Bauer	Joan Bauer	General Delivery Hawi 96719	CodyBauer @Gmail	12/18/11
Trish Kennedy	Trish Kennedy	Box 1555 Kapaau HI 96755	TrixieKennedy@[illegible].com	12/18/11

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Printed Name	Signature	Address	Email Address	Date
Rachael Parkhurst	Parkhurst	55-1023 Kainoa Rd	rachael parkhurst@[illegible]	12/17/11
Christina J. Cruz	Christina J. Cruz	55-535 Hawi Rd.	abysstar@yahoo.com	12-17-11
Forrest Arnold	F Arnold	54-247 Honopueo Rd	forrest@hawaiigreenrealty.com	12/17/11
David Link	[illegible]	P.O. Box 190752 Hawi, HI 96759	hi.wastrouble@hotmail.com	12/17/11
Adelhard Pambas	Adelhard	26 Bird Grove Dr, Pittsfield, MA 01201	vandanapambas@yahoo.com	12/17/11
Szilard Lazar	SZILARD LAZAR	55-380 Hoea Rd	szilardl@yahoo	12/17/11
Dana G. Moss	Dana G. Moss	53-4036 Hiwa Hiwa Pl.	yes1z@vb@hawaiiantel.net	
Loring Robbins	[illegible]	PO 190732 Hawi 96719	loring@thegrid.net	12/17
Lani Owen Lani Owen	Lani Owen	P.O. Box 142 Hawi 96719	leilaniohawaii@yahoo.com	12/17/11
Henrili Munden	Henrili Munden	POB 359, Kapaau 96755		12/17/11
Kelly Beyer	K Beyer			12/17/11
Alicia Glover	[illegible]	General Delivery, Hawi HI 96719		12/17/11
Stuart Johnson	Stu Johnson	PO 1391 Kealakekua, HI 96750		12/17/11
Nicole Pemble	Nicole Pemble	P.O. 1308 Kapaau. HI 96755	nicolereneez@hotmail.com	
Thomas R. Villanosin	[illegible]	PO. 131 Honokaa HI 96727	—	12/17/11

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The Senate

STATE CAPITOL
HONOLULU, HAWAII 96813

RECEIVED
'11 DEC 27 A7:57
NAVFAC Pacific

OFFICE OF SENATOR JOSHUA BOOTH GREEN M.D.

December 21, 2011

Mr. John Bigay
Naval Facilities Engineering Command Pacific
EV21, MV-221 EIS Project Manager
258 Makapala Drive, Suite 100
Pearl Harbor, HI 96860-3134

Dear Mr. Bigay:

Thank you for the opportunity to offer these comments regarding the draft environmental impact statement (EIS) that was released in late November addressing, in part, potential impacts that Marine Corps MV-22 Osprey flight training operations would have on at the Pohakula Training Area (PTA) and the Upolu airport in North Kohala which is part of State Senate District 3.

Since the release of the EIS many constituents have contacted me regarding the adverse impacts that Marine flight training operation would in their communities. Needless to say the vast majority of their comments were negative. The One of their major concerns was noise. As you are aware, North Kohala is a pastoral area that is attracting many new residents who are drawn there by the scenic beauty, cultural attractions, and the quiet slow pace of life. Both Hawi and Kapa'au are undergoing an arts and crafts renaissance that includes the addition of art galleries, small craft shops and new restaurants. The greatest fear from the residents there is the disruption to their tranquility that Osprey operations would have. I have been informed that consultants form Wyle Labs indicated that the ambient noise levels there are very low, that evening single-engine planes and tour helicopters noise is quite invasive.

Additionally, many of the residents have commented on the inadequacy of the EIS. Apparently there is a prevailing consensus that the draft EIS utilized old data, more than 12 years old, and a more thorough analysis is needed. I have also highlighted several other major concerns as they pertain to Upolu Airport and PTA.

With respect to Upolu Airport

156-1
- The analysis of land use summarized a Final Environmental Assessment that was prepared by the State Department of Transportation, Airports Division in 1999.

Senator Joshua Booth Green M.D.
3rd District – North Kona / South Kona / North Kohala / South Kohala
HAWAII STATE CAPITOL, Room 222 – HONOLULU, HAWAII 96813
PHONE: (808) 586-9385 ·Cell: (808) 937-0991: TOLL FREE HAWAII ISLAND: (808) 974-400 ext. 9385 · FAX: (808) 586-9391 ·
E-MAIL: joshuaboothgreen@yahoo.com

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The Senate

STATE CAPITOL
HONOLULU, HAWAII 96813

OFFICE OF SENATOR JOSHUA BOOTH GREEN M.D.

156-1
- This environmental assessment is seriously outdated and should be supplemented with a new EIS.

156-2
- Three terrestrial fauna surveys were conducted in April, July, and October 1997. These surveys identified habitat for three species of birds; The Pueo, or Hawaiian Short-eared Owl, the 'Akekeke or Ruddy Turnstone, the Kea'e kea or White-tailed Tropicbird. The Pueo has been listed endangered on O'ahu. The 'Akekeke and Kea'e kea are listed as "high concern" by U.S. Fish and Wildlife Service's Regional Seabird Conservation Plan. These fauna surveys should also be updated to get a more accurate count of bird populations there.

156-3
- In was pointed out that the area is also an important roosting site for the Kolea, or Pacific Golden Plover. There is a strong concern that these transient visitors **pose a serious hazard potential for bird/aircraft strikes (BASH) at Upolu.** This needs further study.

With regards to PTA

156-4
- How will construction and Osprey & helicopter noise affect the Palila bird in critical habitat close to proposed landing pads? As you know the Palila is a critically endangered bird species and has been subject to several environmental lawsuits. Additional information is need as to what mitigation efforts with be undertaken to ensure the Palila's viability.

156-5
- Also, there are areas adjacent to PTA that are habitat to the endangered 'Ope'ape'a, or the Hawaiian Hoary Bat. Again, I would strongly suggest that additional information regarding bat habitat be obtained, including what mitigation efforts would be undertaken to protect this species.

From my review of the report, I do believe that the current EIS as it pertains to the Big Island needs to be widened in scope to include additional information on the noise impacts, as well as additional survey data regarding the various bird and mammal species listed above.

156-6
Finally I would like to point out that Chapter 343 of the Hawaii Revised Statutes requires the preparation of supplemental statements when there are possibilities that there may be negative environmental effects of a proposed activity. This also includes reviewing the economic, social welfare, cultural impacts the proposed Marine Corps Osprey training would have of the North Kohala area.

In responding to my comments, I would ask that you include all appropriate reference and studies that support your conclusions and mitigation efforts.

Senator Joshua Booth Green M.D.
3rd District – North Kona / South Kona / North Kohala / South Kohala
HAWAII STATE CAPITOL, Room 222 – HONOLULU, HAWAII 96813
PHONE: (808) 586-9385 ·Cell: (808) 937-0991: TOLL FREE HAWAII ISLAND: (808) 974-400 ext. 9385 · FAX: (808) 586-9391 ·
E-MAIL: joshuaboothgreen@yahoo.com

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The Senate

STATE CAPITOL
HONOLULU, HAWAII 96813

OFFICE OF SENATOR JOSHUA BOOTH GREEN M.D.

I will be sharing these comments with our Department of Transportation Director Glenn Okimoto and Deputy Director for Airports Ford Fuchigami.

I'm confident that if all parties communicate openly and in good faith, we can resolve current concerns and accommodate all stakeholders involved.

Best wishes,

Josh Green MD.

Josh Green, M.D
Senate District 3
Chair Senate Health Committee

Senator Joshua Booth Green M.D.
3rd District – North Kona / South Kona / North Kohala / South Kohala
HAWAII STATE CAPITOL, Room 222 – HONOLULU, HAWAII 96813
PHONE: (808) 586-9385 ·Cell: (808) 937-0991: TOLL FREE HAWAII ISLAND: (808) 974-400 ext. 9385 · FAX: (808) 586-9391 ·
E-MAIL: joshuaboothgreen@yahoo.com

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Dept. of the Navy
Naval Facilities Engineering Command, Pacific Division
Attn. EV-21, MV 22/H-1 EIS Project Manager
258 Makalapa Dr. Suite 100
Pearl Harbor, HI 96860-3134

RECEIVED
'11 DEC 22 A8:15
NAVFAC Pacific

To whom it may concern,

157-1 I am very upset that you are planning to use our coast line on the Big Island for your exercises. The Kohala coast is already suffering from the economic downturn and tourism is our life line. Your helicopters will be very disturbing to the environment with noise pollution especially at night. The rotor wash is another concern which could increase erosion and harm marine life and costal birds. Please rethink this plan.

Thank you,
Kathie Babben
808 889-5380
Hawi, Hawaii

Kathie Babben

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

January 12, 2012

Department of the Navy
Naval Facilities Engineering Command, Pacific
Attention: EV21, MV-22/H-1 EIS Project Manager
258 Makalapa Drive, Suite 100
Pearl Harbor, Hawaii 96860-3134

Gentlemen:

SUBJECT: Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of the Third Marine Expeditionary Force (III MEF) Elements in Hawaii located at Marine Corps Base (MCB) Hawaii Kaneohe Bay, Island of Oahu

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR) Land Division distributed or made available a copy of your report pertaining to the subject matter to DLNR Divisions for their review and comments.

At this time, enclosed are comments from our Land Division – Oahu District on the subject matter. Should you have any questions, please feel free to call Darlene Nakamura at 587-0417. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosure

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NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 14, 2011

MEMORANDUM

TO: **DLNR Agencies:**
__Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
X Engineering Division
__Div. of Forestry & Wildlife
__Div. of State Parks
__Commission on Water Resource Management
X Office of Conservation & Coastal Lands
X Land Division – Oahu District
X Historic Preservation

To:

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of the Third Marine Expeditionary Force (III MEF) Elements in Hawaii
LOCATION: Marine Corps Base (MCB) Hawaii Kaneohe Bay, Island of Oahu
APPLICANT: Department of the Navy on behalf of U.S. Marine Corps.

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by December 27, 2011.

Only one (1) copy of the document is available for your review in Land Division office, Room 220.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417. Thank you.

Attachments

( ) We have no objections.
(✓) We have no comments.
( ) Comments are attached.

Signed: T. Chee
Date: 12/21/11

cc: Central Files

159

January 5, 2012
Kalaupapa, HI 96742

Department of the Navy
Naval Facilities Engineering Command, Pacific
2578 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134

Attn: EV21, MV-22/H-1 EIS Project Manager

Aloha,

I am writing to express my sincere disappointment with the "public meeting" that was held in Kalaupapa concerning the EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii. It is my understanding that Kalaupapa will be **directly** affected by this project. Therefore, I would like to offer the following comments:

• Kalaupapa should have been notified and a public meeting held way before Tuesday, December 13, 2011 given the 45-day public comment period ended only two weeks later!

• It was most inappropriate to place a required EIS public meeting into the middle of the Kalaupapa monthly meeting. The EIS information is very extensive and did not get adequate coverage during the Navy's allotted time.

159-1

• The information disseminated at the meeting was difficult to comprehend as there were no visual aids. May I suggest that at a minimum a Power Point presentation and handouts be utilized at the next meeting?

• We were informed that we could review the EIS online which is great if you are not on dial-up like most of us in Kalaupapa. Do you have any idea how long it takes to download over 1,000 pages at 28.8Kbs? In addition, our Internet service tanked for about one week during the remaining two weeks of the comment period. If we can't download the EIS and no hard copies were provided, how can we read it, mull it over in our brains and respond with any thoughtful comments in less than a week during the biggest holiday season of the year?

I would appreciate, and expect, that future meetings and information will be more carefully planned and executed. The folks that you sent to the meeting were very nice and professional – we just needed to see them sooner, longer and by themselves.

Mahalo for your consideration,

Jane Claire Cappelle

Jane "Claire" Cappelle

CC:
Senator Daniel Inouye
Senator Daniel Akaka
Representative Mazie Hirono
Representative Colleen Hanabusa
Governor Neil Abercrombie

Jane C. Cappelle
PO Box 117
Kalaupapa HI 96742

JAN 03 2012
96742

Department of the Navy
Naval Facilities Engineering Command, Pacific
258 Makalapa Drive #100
Pearl Harbor, HI 96860-3134

ATTN: EV21, MV-22/H-1 EIS Project Manager

159

160

NEIL ABERCROMBIE
GOVERNOR
STATE OF HAWAI'I

RECEIVED

'12 JAN -6 A10:45

STATE OF HAWAI'I
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

ALBERT "ALAPAKI" NAHALE-A
CHAIRMAN
HAWAIIAN HOMES COMMISSION

MICHELLE K. KAUHANE
DEPUTY TO THE CHAIRMAN

M. WAIALEALE SARSONA
EXECUTIVE ASSISTANT

December 22, 2011

Department of the Navy
Naval Facilities Engineering Command, Pacific
258 Makalapa Drive, Suite 100
Pearl Harbor, Hawaii 96860-3134
Attn: EV21, MV-22/H-1 EIS Project Manager

Aloha Sir or Madame:

Subject: DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR BASING OF MV-22 AND H-1 AIRCRAFT IN SUPPORT OF THIRD MARINE EXPEDITIONARY FORCE ELEMENTS IN HAWAII

Mahalo for the opportunity to review the subject report and provide comments.

Molokai Training Support Facility (MTSF)

160-1 We note that the MTSF was not subject to noise modeling activities to estimate operational noise levels, especially evening low level approaches over residences near the airport. There has been a history of documented complaints regarding helicopter training and the EIS should include more data, analysis, and consideration of mitigation efforts.

Hawaii Army National Guard Facility
Puunene, Maui (HIARNG)

160-2 The State of Hawaii and Maui County are involved in a joint planning and development effort involving over 700 acres at Pulehunui, Maui. The master plan includes commercial, industrial, recreational, prison/correctional, and agricultural uses. We suggest that Mr. Mich Hirano of the consultant firm Munekiyo & Hiraga be contacted for more information on planned uses and possible impacts of

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Department of the Navy
December 22, 2011
Page 2

160-2 helicopter operations on land use compatibility, visual and aesthetic resources, noise, and air quality.

If you have any questions, please contact our Planning Office at 620-9517.

Me ke aloha,

Albert "Alapaki" Nahale-a
Chairman

161

RECEIVED '12 JAN -4 A8:24 NAVFAC Pacific

Maika'i Kamakani 'O Kohala, Inc.
P.O. Box 40 Kapaau, Hawaii 96755-0040
Phone (808) 884-5757 EIN#91-2153058
www.mkoki.org

December 23, 2011

RE: Upolu Airport Military Training in response to community input of Draft EIS - appears incomplete & need of an indepth & current study

As a native Hawaiian nonprofit organization, we are concerned about the Hawaiian bats, Hawaiian monk seals, native bird sanctuary newly constructed in our small town as well as environmental issues of coastal erosion; noise pollution; fuel storage facilities; hauling fuel in and out of Upolu which will incur safety issues of our community to include roadway concerns of traffic and the improvement and upkeep of the roads leading into the area for use must be addressed and we request a current Federal Environmental Impact Statement be completed "in full".

161-1 It is known fact the Hawaiian bat habitat & nesting as well as Hawaiian monk seals frequent the area of Upolu. Hawaiian monks seals round the corner of our north point into Upolu and end eastward to the area of Hapu'u to join blonde sea lions on the salt flats of Hapu'u on the coastline. No mention of this was made evident on the draft EIS presented. I am aware that DLNR has no known record of these activities as we have inquired of this through our Kauhola Project east of Upolu at Kauhola Point aka: Lighthouse.

With our newly constructed Hawaii Wildlife Center which will care for these native species of concern, the need to release wildlife into the general population should also be addressed which is also missing in this report. In October, 2011 we began conversation with the Hawaii Wildlife Center in hopes to partner with them in having Kauhola Point be an area of release for the birds. We will continue to have discussions of this once the center is in full activity of business.

161-2 Coastal erosion has been a continual concern environmentally for our Kohala residents and we would like to see it restored it by replanting lauhala trees & other deep rooted plants to keep the coastline secured as much as possible. Address the concerns of heavy weight & traffic on the area which has not seen much use of this proposed capacity.

161-3 Noise pollution is a concern for the Botelho Dairy Farm in the area as well as for residents in the area. Include the safety issues of wind generators in the area not knowing of any detailed flight patterns is an important issue again not addressed in the draft EIS presented. Hauling fuel in and out of Upolu on a road of much needed improvement and maintenance, traffic concerns, fuel storage facilities all is in need of a full report on impact.

We do understand the need of an increase in military training and securing our Pacific Region for military purposes of safety for our community and our state, but it should not be handled in a manner of not having a current Federal EIS completed in the area of Upolu - nothing else would be fully acceptable and respectful given the concerned issues at hand. Do the right thing and give us our request of a complete & full indepth study of a Federal EIS for Upolu Airport and its effects it will have on our Kohala Community.

Sincerely in Aloha,

Stephanie N. Naihe Laxton
Founder/President

162

Dear EIS Project Manager,

I want to voice my huge concern about the noise pollution produced by helicopters regarding the purposed military helicopter training at Upolu Airport. North Kohala is a rural community (in fact, the only still producing dairy on the Big Island directly neighbors the Upolu Airport). There is very little noise pollution here in North Kohala which mostly consists of monthly tsunami warning sirens, the annual Ironman Race, motorcycle groups driving through North Kohala on the Akoni Pule Highway on holidays, and occasional ambulance or police sirens. Even though North Kohala is a quiet rural community we are also a highly sought after tourist destination for its natural beauty, birth place of King Kamehameha, and now Zip line adventures. I cannot begin to imagine the negative impact from the noise pollution the huge military helicopters will produce. Especially since the birth place of King Kamehameha is right by the Upolu Airport, along with the well preserved Mo'okini Heiau. Also the Upolu Shoreline Habitat Restoration Project just got completed making this a very easy accessible area for walking and fishing year round, and for whale watching during their annual migration to the Hawaiian Islands for birthing.

162-1 That the military can have access to the Upolu Airport during dire times like WWII is important and understandable. But allowing MV-22 and H-1 helicopter squadrons to train year round at the Upolu Airport will make the Upolu shoreline and Hawaiian Heritage Landmarks so loud with noise pollution that no one other than the military will be able to enjoy this beautiful and easily accessible public use area. For years I have walked around the Upolu Airport many times a week and when an occasional small tourist helicopter comes to make a couple practice landings, the noise from the helicopter is extremely loud and disturbing, definitely making enjoying nature and the ocean wave sounds impossible. I think about how loud the noise will be from several military helicopters flying in to North Kohala Upolu Airport for training and know that North Kohala will never again be the quiet and peaceful place to live and to visit while these helicopters are present.

I ask the U.S. Marine Corps to please choose a different airport location for the squadron helicopter training where the noise pollution impact will not be so disturbing and community changing. The Kona Airport is in my mind a very viable airport to use for helicopter training as it is located away from highly visited Hawaiian Heritage Landmarks, habitat renovation shoreline access, families homes, livestock animals, and a quiet and peaceful community. So please take in to consideration the profound negative impact moving the Marine Helicopter training will have on community of North Kohala and protect this fragile and quiet community.

Sincerely,

Valerie Oram

163

ALAN M. ARAKAWA
Mayor

WILLIAM R. SPENCE
Director

MICHELE CHOUTEAU McLEAN
Deputy Director

COUNTY OF MAUI

DEPARTMENT OF PLANNING

December 23, 2011

Department of the Navy
Naval Facilities Engineering Command, Pacific
258 Makalapa Drive, Suite 100
Pearl Harbor, Hawaii 96860-3134

Attention: EV21, MV-22/H-1 EIS Project Manager

Dear EIS Project Manager:

SUBJECT: COMMENTS ON A DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR THE BASING OF MV-22 AND H-1 AIRCRAFT IN SUPPORT OF III MARINE EXPEDITIONARY FORCE ELEMENTS IN HAWAII, WITH THE ONLY FACILITY IMPROVEMENTS IN MAUI COUNTY TO BE AT THE MOLOKAI TRAINING AND SUPPORT FACILITY ON MAUNA LOA HIGHWAY ACROSS FROM THE MOLOKAI AIRPORT, AT HOOLEHUA, MOLOKAI, HAWAII; TMK: (2) 5-2-004:047 (EAC 2011/0014)

The Department of Planning (Department) is in receipt of the above-referenced invitation to comment on the Draft EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii. The Department understands the proposed action includes a range of activities throughout Hawaii, but that within Maui County facility improvements include the following, with associated actions:

- The Department of the Navy is proposing site improvements on Molokai at the Molokai Training And Support Facility (MTSF project), and the MTSF project is on land controlled by the United States, pursuant to an Executive Order from Hawaii; and
- The MTSF project site would support occasional refueling for training activities by providing a secured area for operations and equipment. Improvements may include clearing, grubbing, grading, and paving of up to approximately 3.3% of the approximately 12 acre site if needed. A fence would also be installed around the property.

Based on the foregoing, the Department provides the following comments on the Draft EIS:

1. The confirmed land use designations for the MTSF project site are as follows:

    - State Land Use: Agricultural
    - 163-1 Molokai Community Plan: Agriculture
    - County Zoning: Agricultural
    - Other: Outside the Special Management Area (SMA)

250 SOUTH HIGH STREET, WAILUKU, MAUI, HAWAII 96793
MAIN LINE (808) 270-7735; FACSIMILE (808) 270-7634
CURRENT DIVISION (808) 270-8205; LONG RANGE DIVISION (808) 270-7214; ZONING DIVISION (808) 270-7253

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2. 163-2 Fauna known to inhabit the area include the Pacific golden plover, kolea, or *Pluvialis fulva*. It is an indigenous, migratory bird protected by the Migratory Bird Treaty Act (MBTA), which is present in the MTSF project vicinity at certain times of the year. Runway area clearance of these birds for the safety of aircraft approaching or departing the adjoining Molokai Airport is common through the use of shotgun blasts. Harm to the species during site improvements should be avoided; and

3. 163-3 We do not find in the Draft EIS or its appendices the basis for the summary conclusion in Table 6-7 that "No archaeological sites have been identified within the APE." In this regard please coordinate with the State Historic Preservation Division of the Hawaii Department of Land and Natural Resources prior to ground disturbance for site improvements.

Thank you for the opportunity to comment. Should you require further clarification, please contact Current Planning Supervisor Jeffrey Dack at jeffrey.dack@mauicounty.gov or at (808) 270-6275.

Sincerely,

CLAYTON I. YOSHIDA, AICP
Planning Program Administrator

for WILLIAM SPENCE
Planning Director

xc: Jeffrey P. Dack, AICP, Current Planning Supervisor
Nancy M. Mcpherson, Molokai Planner
EAC File
General File
WRS:CIY:JPD:sa
K:\WP_DOCS\PLANNING\EAC\2011\0014_MV-22_H-1Aircraft\CommentLtr.doc

164

ALAN M. ARAKAWA
Mayor

RECEIVED

'12 JAN -6 A10:46

NAVFAC

DEPARTMENT OF TRANSPORTATION

JO ANNE JOHNSON-WINER
Director
MARC I. TAKAMORI
Deputy Director
Telephone (808) 270-7511

COUNTY OF MAUI
200 South High Street
Wailuku, Hawaii, USA 96793-2155

November 28, 2011

EV21 EIS Project Manager
Department of the Navy
Naval Facilities Engineering Command, Pacific
258 Makalapa Drive, Suite 100
Pearl Harbor, Hi 96860-3134

Subject: EIS for the Basing of aircraft in support of III Marine Expeditionary Force Elements in Hawaii

Dear EIS Project Manager,

Thank you for the opportunity to comment on this project. We have no comments to make at this time.

Please feel free to contact me if you have any questions.

Sincerely,

Jo Anne Johnson Winer

Jo Anne Jonhson Winer
Director

165

EIS Project Manager
Naval Facilities Engineering Command Pacific
258 Makalapa Drive, Suite 100
Pearl Harbor
HI 96860-3134
ATTN: EV21, MV-22H-1

Dear Sirs,

My wife and I have lived in North Kohala for many years. We very much appreciate the rural pastoral nature of this community and the efforts of its inhabitants to keep it that way. We access the coastal area around Upolu Point frequently and find it enjoyable because of the peaceful and little disturbed character of the surrounding countryside.

The unique and historically important aspect of the nearby Mookini Heiau is also a draw for tourists and locals. We were relieved to learn that the off road motor vehicle race course had been discontinued as it created serious erosion and fouling of the reef with muddy runoff. Besides the noise & disturbance, the bare ground is also subject to wind erosion and we support the work Kohala Lihikai to restore the area to its natural environment.

165-1 It is clear that landing/takeoff activity by large hover aircraft such as the Osprey MV-22 VTO and the Bell H-1 will significantly increase disturbance and wind gusting in the area. What is not clear from the draft EIS, is how these negative impacts will be addressed by the Navy command. We do not oppose using Upolu Airport for military air exercises as long as the responsible authorities take all reasonable precautions to mitigate the environmental and community impacts.

We sincerely request that the EIS consider these issues explicitly and in detail with respect to protective measures which will help to preserve the valuable community resource we have in the Upolu Point area.

Thank you for your consideration,

Coert Olmsted
Margaret Frohmader

27 Dec 2011

Coert Olmsted
Margaret Frohmader
Po Box 298
Kapa'au
HI 96755

Fred Cachola, Principal Investigator
Native Hawaiian Researchers Ohana
P.O. Box 190725
Hawi, HI 96719

RECEIVED
'12 JAN -3 A11:19
NAVFAC Pacific

December 26, 2011

Naval Facilities Engineering Command Pacific
Attn. EV21, MV-22/H-1 EIS Project Manager
248 Makalapa Drive, St. 100
Pearl Harbor, HI 96860-3134

Re: Upolu Airport

Dear Project Manager,

The Native Hawaiian Researchers Ohana (NHRA) welcomes this opportunity to comment on the *Draft Pahakuloa EIS basing MV-22 and H-1 aircraft in Hawaii using Upolu Airport.* And we are invoking our rights and responsibilities to comment on this Federal undertaking as a Native Hawaiian Organization (NHO) as defined and directed in Sec. 106 of the National Historic Preservation Act of 1966 (NHPA). NHRA was established over 20 years ago with an emphasis of doing historical, cultural, archaeological (HCA) research in Kohala. Recently, our focus has been to work in collaboration with community groups in Kohala to preserve and protect the extensive HCA resources along the entire Kohala coastal areas. In doing so, we launched a special project for this purpose; *Malama i Na Wahi Pana o Kohala* which is one of about 65 community-service projects sponsored by the North Kohala Community Resource Center. We assume that you are complying with Sec. 106 of NHPA. . .and more specifically with the *"U.S. Department of Defense Directive-Type Memorandum 11-001, Consultation Policy With Native Hawaiian Organizations"*, issued and distributed by the Department of Defense (DoD) in April, 2011. I take great pleasure for being recognized by the DoD as one of several Native Hawaiians who consulted with the DoD and assisted in the development of this policy and training military personnel to comply with this policy. **We would like to request a summary of your efforts to reach out to NHOs and to engage them in meaningful consultation regarding the proposed Upolu Airport undertaking.. . .and a list of NHOs who responded to your solicitations and are currently consulting with you.**

We appreciate your acknowledgement of the significant historic context of the immediate area around Upolu airport. Yes, this is the area selected by the High Priest Paao to introduce and establish a new political and religious order, to restore what was believed to be the decreasing *mana* (spiritual power) among the Hawaiian *Ali'i* (chiefly class). We would like to add that he was the principal architect for the placement, design and construction of the highly significant site of Mookini Heiau. . only 1.6 miles from Upolu Airport and well within the approach for landings and takeoffs of your proposed military aircraft. The heiau is one of the largest on the island of Hawaii, very archaeologically intact and continues to be used by many native Hawaiian worshipers. It is so significant that it has been declared as a National Historic Landmark by the Department of Interior. This is one of the highest recognition of historical significance issued by the Department of Interior and according to Sec. 106 of NHPA, this designation requires solicitation of advise and comment from the Advisory Council on Historic Preservation (ACHP) in Washington DC. **We assume that you have complied with Sec. 106 and**
166-1 **would like to request a copy of your solicitation for advise and comment by the ACHP and a copy of their response.**

Yes, mahalo (thanks) for also acknowledging that this is the area where Kamehameha the Great was born. He was undoubtedly the greatest Hawaiian warrior/statesman.. . the first to unify four warring kingdoms into one unified Nation. . .and the perceptive leader in ushering the Hawaiian Kingdom towards the assimilation of Western attitudes, beliefs, practices and mores. He is a contemporary with George Washington and other founders of our Nation. . .and has often been called the "Napoleon of the Pacific" because of his mastery in military science and superior battle field command. The original statue of Kamehameha was dedicated in 1883 at Kapaau, in Kohala; and a duplicate is front and center in Statuary Hall at our nation's Capitol in Washington DC, dedicated when we became the 50th State in 1959.. His two birthstones have not been moved since they were used in the birthing process by his mother, Kekuapoiwa, a high chiefess of Kohala, ca 1736. Several Kohala kupuna (elders) including myself continue to malama (care for) this very sacred area of Kamehameha's birthstones and other nearby areas closely associated with his birth, such as Umi Wai Bay, and the Kapakai canoe-landing area. This birthing area for Kamehameha the Great is only two miles from Upolu Airport, and like the Mookini Heiau is well within the landing and takeoff approaches and the surrounding airspace proposed for military aircraft at Upolu Airport.

Mookini Heiau and the Kamehameha Birth Site/Birthstones are two of the most sacred and significant
166-2

cultural sites in the entire State of Hawaii. We strongly oppose the proposed DoD's use of Upolu Airport, because the presence and practice of military operations at Upolu will destroy the sanctity and sacredness of this area. . .greatly diminishing the quiet, serene and dignified physical and spiritual environment so necessary for Native Hawaiians to exercise and maintain their cultural beliefs, ceremonies and religious practices Besides the physical impact of flying aircraft, there is also the severe psychological affect of military intrusion into the sacred ceremonies conducted by Native Hawaiians in this area. The Department of Interior has established well defined limits of airspace for aircraft flying over National Parks and other sacred sights. We suggest that those perimeters be considered as the minimal limitations that should be applicable around Mookini Heiau and the Kamehameha Birthsite/Birthstones. There should be consistency among Federal agencies in establishing and enforcing such regulations around the airspace for significant
166-2 historic and cultural resources.

We believe that the Area of Potential Impact (APE) is much too narrowly defined, as being only the "paved runway" of the airport plus a 100 ft. buffer measured from the edge of the tarmac. Surely, the sight and sounds of military aircraft flying in and out of Upolu will have a profound impact that would extend way beyond the narrow runway. . .indeed, they would affect all human and animal behavior for miles around the perimeter of the runway. The APE must include that entire area affected by the visual and physical impact of military aircraft buzzing in and out of Upolu Airport. Therefore we do not agree with your conclusion that "There would be no operational impacts on cultural resources due to the proposed action". We suggest the mitigation is definitely required for the cultural environmental consequences at Upolu. How can you mitigate for the fury of sights and sounds generated by military operations in this area?

166-3 We have also heard rumors of live-firing around the Upolu Airport area. Is this true? Please describe all of the proposed military operations in the Upolu area.

Mahalo for your compliance with Sec. 106 and the DoD consultation policy which allows a Native Hawaiian Organization to participate in the Sec. 106 process required in your proposed us of Upolu Airport for MV-22 and H-1aircraft. We look forward to your responses to our requests for information and our opposition to this federal undertaking.

Me kealoha pumehana, (Sincerely)

Fred Cachola

Fred Cachola
Priincipal Investigator

167

HONOLULU FIRE DEPARTMENT

CITY AND COUNTY OF HONOLULU

636 South Street
Honolulu, Hawaii 96813-5007
Phone: 808-723-7139 Fax: 808-723-7111 Internet: www.honolulu.gov/hfd

PETER B. CARLISLE
MAYOR

KENNETH G. SILVA
FIRE CHIEF

EMMIT A. KANE
DEPUTY FIRE CHIEF

December 23, 2011

EV21, MV-22/H-1 EIS Project Manager
Naval Facilities Engineering Command, Pacific
Department of the Navy
258 Makalapa Drive, Suite 100
Pearl Harbor, Hawaii 96860-3134

Subject: Draft Environmental Impact Statement (EIS) for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii

We received your correspondence of November 8, 2011, and appreciate the opportunity to comment on the above-mentioned project.

The Honolulu Fire Department (HFD) fully supports the basing of three squadrons at the Marine Corp Base Hawaii (MCBH); however, we have concerns regarding changes to the existing infrastructure and our ability to provide adequate service to the expanded facility and remote training areas on Oahu.

Emergency response resources for MCBH are provided by the Federal Fire Department (FFD), which is located on base. The HFD supplements FFD responses when requested by surrounding communities. While there is an increase in activities and population on base, the HFD does not anticipate the need for additional response resources or facilities.

167-1 In regard to infrastructure improvements, we understand that the MCBH is under federal jurisdiction; however, as an accredited all-hazards response organization, the HFD has a fiduciary duty to provide awareness of the applicable standards we abide by.

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For example, the following is a standard from the National Fire Protection Association 1: Fire Code:

> "Provide a fire apparatus access road for every facility, building, or portion of a building hereafter constructed or moved into or within the jurisdiction when any portion of the facility or any portion of an exterior wall of the first story of the building is located more than 150 feet (45 720 mm) from a fire apparatus access road as measured by an approved route around the exterior of the building or facility." (2006 NFPA 1, Section 18.2.3.2.2)

> "A fire department access road shall extend to within 50 ft (15 m) of at least one exterior door that can be opened from the outside and that provides access to the interior of the building." (2006 NFPA 1, Section 18.2.3.2.1)

As the HFD is the primary response organization for training areas outside of the MCBH, it would beneficial to have a clear line of communication established between our personnel and those responsible for securing such areas. Having maps and access information/instructions readily available to HFD personnel would be helpful.

167-2 Maintenance and/or improvements to service roads and trails would allow for safe and timely responses by HFD apparatuses and personnel. We also request the posting of weight limitations for all bridges and/or crossings to minimize damage to our apparatuses, which range in gross vehicle weight from 38,640 to 60,740 pounds.

There is a high consequence/low probability that a catastrophic event will occur; however, the HFD will work with appropriate staff to ensure that necessary preparations are completed prior to the program's initiation.

Should you have any questions, please contact Acting Assistant Chief Roy Murakami of our Administrative Services Bureau at 723-7118 or rmurakami2@honolulu.gov.

Sincerely,

KENNETH G. SILVA
Fire Chief

KGS/RM:jo

168

POLICE DEPARTMENT

CITY AND COUNTY OF HONOLULU

801 SOUTH BERETANIA STREET · HONOLULU, HAWAII 96813
TELEPHONE: (808) 529-3111 · INTERNET: www.honolulupd.org

PETER B. CARLISLE
MAYOR

LOUIS M. KEALOHA
CHIEF

DAVE M. KAJIHIRO
MARIE A. McCAULEY
DEPUTY CHIEFS

OUR REFERENCE JT-LS

December 23, 2011

Naval Facilities Engineering
Command, Pacific
Department of the Navy
258 Makalapa Drive, Suite 100
Pearl Harbor, Hawaii 96860-3134

Attention: EV21, MV-22/H-1, EIS Project Manager

To Whom It May Concern:

This is in response to a letter received from Ms. Karen Sumida (dated November 8, 2011) requesting comments on the Draft Environmental Impact Statement for the Basing of MV-22 and H-1 Aircraft in Support of Third Marine Expeditionary Force (III MEF) Elements in Hawaii.

168-1 This project should have no significant impact on the facilities or operations of the Honolulu Police Department.

If there are any questions, please call me at 529-3255.

Sincerely,

LOUIS M. KEALOHA
Chief of Police

By

JOHN THOMPSON
Acting Assistant Chief of Police
Support Services Bureau

Serving and Protecting With Aloha

169

NEIL ABERCROMBIE
GOVERNOR

GLENN M. OKIMOTO
DIRECTOR

Deputy Directors
JADE T. BUTAY
FORD N. FUCHIGAMI
RANDY GRUNE
JADINE URASAKI

IN REPLY REFER TO:
STP 8.0699

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

December 28, 2011

Ms. Karen Sumida
Business Line Manager
Department of the Navy
Naval Facilities Engineering Command, Pacific
248 Makalapa Drive, Suite 100
Pearl Harbor, Hawaii 96860-3134

Dear Ms. Sumida:

Subject: MV-22 and H-1 Aircraft in Support III Marine Expeditionary Force Elements in Hawaii
Draft Environmental Impact Statement (DEIS)

Thank you for requesting the State Department of Transportation's (DOT) review of the subject project.

DOT previously commented on the subject case during the Notice of Intent to Prepare an Environmental Impact Statement in its letter STP 8.0220 dated September 3, 2010, (Appendix A of the DEIS), and now offers the following supplemental comments provided by the DOT Airports Division and Highways staffs.

The DOT Airports Division has no objections to the proposed alternatives; however, the military should be cognizant of the historical and cultural sites surrounding some of our airports.

The DOT Highways Division completed its review of the subject project and concluded it will not have significant impact to the DOT highway facilities. However, a permit is required for the movement of oversized and overweight equipment/loads on State highway facilities.

DOT appreciates the opportunity to provide these supplemental comments. If there are any questions, including the need to meet with DOT Airports Division or Highways Division staffs, please contact Mr. Elton Teshima of the DOT Statewide Transportation Planning Office at telephone number (808) 831-7978.

Very truly yours,

GLENN M. OKIMOTO, Ph.D.
Director of Transportation

Attachment: Ltr. STP 8.0220 dtd. 9/03/10

169

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

BRENNON T. MORIOKA
DIRECTOR

Deputy Directors
MICHAEL D. FORMBY
FRANCIS PAUL KEENO
JIRO A. SUMADA

IN REPLY REFER TO:
DIR 0949
STP 8.0220

September 3, 2010

Ms. Karen Sumida
Business Line Manager
Department of the Navy
Naval Facilities Engineering Command, Pacific
258 Makalapa Drive, Suite 100
Pearl Harbor, Hawaii 96860-3134

Dear Ms. Sumida:

Subject: MV-22 and H-1 Aircraft Support of III Marine Expeditionary Forces Elements in Hawaii – Notice of Intent (NOI) to Prepare an Environmental Impact Statement (EIS)

Thank you for requesting the State Department of Transportation's (DOT) review of the subject project.

DOT understands that the subject Department of the Navy, U.S. Marine Corps project is for the basing and operation of MV-22 tiltrotor (MV-22) and Osprey aircraft and H-1 Cobra (H-1) and Huey attack helicopters in support of III Marine Expeditionary Force (MEF) training and readiness operations in Hawaii. While project personnel (approximately 2,100 persons) will be located at Marine Corps Base (MCB) Hawaii Kaneohe Bay, beach landing zones are planned at Marine Corps Training Area Bellows (Bellows). Other airport facilities identified in the NOI that may be used for training include; Wheeler Army Airfield, Dillingham Airfield, Pohakuloa Training Area, Molokai Training Support Facility and Kalaupapa Airfield, and Pacific Missile Range Facility.

Given the project location (at MCB) and the landing training facilities (Bellows) including the various statewide airport facilities, DOT highway and airport facilities can be impacted with more personnel stationed or traveling to the operations or training areas, and equipment being transported to and from those areas. Therefore, DOT requests that the draft EIS address the project impacts to the various State airport and highways facilities.

DOT appreciates the opportunity to provide comments and requests four copies of the Draft EIS when it is available. If there are any questions, please contact Mr. David Shimokawa of the DOT Statewide Transportation Planning Office at telephone number (808) 587-2356.

Very truly yours,

BRENNON T. MORIOKA, Ph.D., P.E.
Director of Transportation

SLP:km
bc: AIR-EP, HWY-P, STP(SLP)

DEIS Public Comments
Waimea Elementary School
Tuesday, November 30, 2011
5:30pm to 8:30pm

Oral Comments

	Name	Comment
170-1	Neil Logan	I live above Upolu Airport. In addition to being concerned about air quality, noise pollution, and other environmental issues, I'm concerned that utilizing Upolu Airport as proposed as a military training area and strategic landing and takeoff site will turn it into a military target, and it is not currently.
170-2		If the Marine Corps could incorporate these aircraft into local ecosystem regeneration (e.g., reforesting the previous koa'ia and sandlewood forest) that would benefit the local community, the community would be more amendable to the Marine Corps' activities.

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DEIS Public Comments
Hilo Intermediate School
Thursday, December 1, 2011
5:30pm to 8pm

Oral Comments		
	Name	Comment
	Mitch Carlson PO Box 11141 Hilo, HI 96721	I'm impressed that the Marine Corps provided numerous resources, in and out of uniform, to answer questions and provide a helpful, friendly PR presence at the meeting.
171-1		Being a resident of the Big Island and being aware of the many objections to new initiatives (i.e., siting the new 30-meter telescope on Mauna Kea, concerns regarding spent plutonium/radioactive waste at present facility.
		Further impressed by staff dealing with protestors who arrived – and complained bitterly about, "hard to find" meeting space.

DEIS Public Comments
Hilo Intermediate School
Thursday, December 1, 2011
5:30pm to 8pm

Oral Comments		
	Name	Comment
	Richard Toledo	A life-long resident, born & raised. Army vet; Vietnam combat vet, purple heart, bronze star & silver star. Two earned during Tet offensive.
172-1		Encourage military to train people as best they can. Was artillery forward observer. Had to depend on training of people who were supporting me. Had never met them. Maps were sometimes wrong. Communication was iffy in some places. Had to trust that people firing were doing it properly and had received the best training. One air strike called in….when he let the bombs off, hope he didn't sleep thru close air support class. In support of training. If Hawaii is the best place to train…all for it.

DEIS Public Comments
Hilo Intermediate School
Thursday, December 1, 2011
5:30pm to 8pm

	Oral Comments	
	Name	**Comment**
173-1	Robert Sumner-Mack	How many fuel tanker trucks will be going and coming during ops and what arrangements for infrastructure damage repair to road system?
173-2		Given that even worse bee diseases that occur on the mainland are waiting to arrive from Guam and Okinawa, what kind of preventive actions will military take to prevent importation of infected bee to Hawaii?

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DEIS Public Comments
Waimanalo Elementary & Intermediate School
Thursday, December 7, 2011
5:30pm to 8:30pm

	Oral Comments	
	Name	**Comment**
174-1	Steven Tayama	I am against this military expansion in Waimanalo. Why, my main concerns are: One the safety of the community. Two, it increases the chances of Waimanalo of becoming a military target. Three, noise and pollution.

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DEIS Public Comments
Castle High School
Thursday, December 8, 2011
5:30pm to 8pm

	Oral Comments	
	Name	**Comment**
175-1	Kahukauhane	By executive decree…there is still a trust relationship between U.S. & Hawaiian people. Why are the Marines still here? Land should be returned back to the kingdom. Contradicts the Constitution, Article 6, No. 2, Supremacy of Law of the Land, if there's a treaty between U.S. and another entity. These aircraft are not welcome here. Money being allocated to this project is in the millions. Why haven't they cleaned up Waiahole and Waikane?

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Appendix A-5
Responses to Draft EIS Comments

Letter ID	Comment ID	Response
001	1	Construction contracts are subject to the Federal Acquisition Regulations (www.acquisition.gov/FAR/), which includes small business programs. The Department of the Navy (DoN) cannot guarantee that all work is awarded to local businesses.
001	2	Comment noted.
001	3	The new squadrons plan to conduct training within existing training area. On the island of Hawaii, specifically Bradshaw Field, at designated landing zones, and within the impact area. No additional lands around Pohakuloa Training Area (PTA) are proposed.
001	4	The issue of MV-22 safety is addressed in Volume 1 of the DEIS, pages 3-102 to 3-107. In summary, the MV-22's Class A mishap rate of 3.99 per 100,000 flight hours is below the average rate for military aircraft (see Table 3-19). (Note: Class A mishaps are the most severe and always investigated.) The 3.99 mishap rate includes the period when the MV-22 was in its developmental/test flight stage. The DEIS has been revised to reflect the following recent data. With the return of the aircraft to operational status in FY2004, after redesign, one Class A mishap occurred in FY2008, resulting in a mishap rate of 1.12 per 100,000 flight hours. The updated overall mishap rate, incorporating FY2011 data and based on more than 90,000 flight hours is 3.32.
001	5	The National Environmental Policy Act (NEPA) implementing regulations (Title 40 Code of Federal Regulations [CFR] Part 1500) requires evaluation of the "No Action" Alternative (40 CFR §1502.14(d)). It provides a baseline for comparing effects of the action alternatives.
001	6	Depleted uranium (DU) at PTA is present from the former use (1960s) of spotting rounds. DU has been identified in specific subareas within the impact area at PTA and has not been detected outside of this area. Because of the restricted use and access on PTA, and restrictions on firing high explosives within DU-identified areas, the proposed MV-22 and H-1 training at PTA would not affect DU. The Army has conducted studies and monitoring to address concerns about DU. It believes that the primary reason for immobilization is due to the large particle size of the uranium and the fact that the uranium primarily exists as large metal fragments. Among other factors, the soil types on Hawaii's ranges also serve to limit DU migration from the impact area. Although it is highly unlikely that DU will move off the impact area due to military live-fire training, the Army continues to conduct air monitoring and sampling to ensure that migration is not occurring. Further information on this subject and a point of contact can be found at: http://www.garrison.hawaii.army.mil/du/
002	1	Regarding existing operations, the standard airfield hours for MCB Hawaii Kaneohe Bay are Monday to Thursday, 7:00 AM to 12:00 midnight; Friday, 7:00 AM to 10:00 PM; and Saturday, 8:00 AM to 5:00 PM. The airfield is generally closed on Sundays. These hours also apply to high power engine run ups. The public is notified of any exceptions to the hours through the Aloha Newsletter, available at http://www.mcbh.usmc.mil (located under Press Room on the left side of the page). Marine Corps Air Station course rules are drafted to have as little impact on the community as possible, while allowing aircrews to get the training they require. If members of the public feel that maintenance activities are occurring outside of standard hours and no exception notice has been published, they may contact the MCB Hawaii public affairs office. No rules are proposed to further restrict operations.

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Letter ID	Comment ID	Response
003	1	Airspace in the vicinity of Puu Lani Ranch is defined by the Federal Aviation Administration (FAA) as uncontrolled airspace. When operating in uncontrolled airspace, all aircraft are subject to certain qualifications, rules, and equipment requirements. As explained in the EIS, aircraft transiting routes to and from training areas throughout the state would fly primarily over the ocean. However, when flying over land is necessary, such as entering or leaving PTA, overland routes would be flown over non-residential areas as much as possible or flown at higher altitudes. Other situations that require flying over land are weather conditions, emergencies, instructions from the local air traffic controller, or temporary flight restrictions. In general, DoN does not anticipate regular or frequent flights in the vicinity of Puu Lani Ranch.
004	1	The noise analysis, which included operations to and from Helipad 101 (considered part of the airfield), showed that the Mokapu Boulevard back gate, Kaimalino neighborhood, and Aikahi Elementary School would be exposed to DNL less than 55 dB for all three scenarios: 2009 baseline conditions, No Action, and the proposed action. See Figures 3-3 and 3-4, on pages 3-30 and 3-33 of the DEIS, respectively. DNL is a way to measure noise and is primarily used for land use compatibility purposes. For example, a DNL of 55 decibels (dB) is typical for normal suburban residential neighborhoods, and a DNL of 50 is typical for quiet suburban neighborhoods (source: U.S. Environmental Protection Agency, 1974). As for moving certain flight paths toward Eagle and Boondocker, there are no plans to adjust flight paths at the base under this Proposed Action; however, your comments have been forwarded to the MCB Hawaii Community Plans and Liaison Officer (CPLO).
005	1	Regarding winds at Upolu Airport (or at any other location), Marine Corps pilots check on weather conditions prior to flights. If wind gusts "as high as 60 to 70 mph" are occurring, pilots would most likely avoid the site. Regarding the windmills located mauka of the airport, the aircraft would approach the runway from the ocean and, therefore, not present a potential conflict.
005	2	Regarding the impact of lights on the Mauna Kea observatories, a County of Hawaii ordinance applies to all outdoor lighting fixtures associated with buildings, recreational facilities, parking lots, roadways, etc., requiring specific types of lamps, shielding, and hours of operation. However, no lighting requirements relative to the observatories apply to aircraft. The FAA requires external position lights on aircraft in the National Airspace System (red on left wingtip, green on right wingtip, and white on the tail) to allow aircraft to visually identify other aircraft and to identify their approximate direction of flight in order to prevent mid-air collisions. All aircraft included in the proposed action would comply with FAA requirements
005	3	The issue of Bird Aircraft Strike Hazard (BASH) is addressed in the EIS, which acknowledges the potential for BASH risk due to the presence of fairly large numbers of wintering Pacific golden plover (*Pluvialis fulva*) at Upolu Airport. The risk would be managed through compliance with Marine Corps aviation safety procedures, including avoiding high-hazard situations and determining if altering or discontinuing operations are required. Some State DOT Airports undertake BASH control measures. The DEIS addresses rotor downwash effects on soil and provides an areal extent of impact for unpaved areas. In the case of Upolu Airport, rotor downwash would occur over the existing paved runway. Hence no affect on erosion and downgradient environments would occur.

Letter ID	Comment ID	Response
		Aircraft rotors would not directly affect vegetation.
005	4	According to State DOT Airports, the existing airfield pavement at Upolu Airport has maximum authorized landing weights as follows: 55,000 pounds for single-wheel aircraft; 82,000 pounds for dual-wheel aircraft; and 100,000 pounds for dual-tandem aircraft. These weights are adequate for all commuter/air taxi, general aviation, and military aircraft expected to use the airport on a regular basis and for use by C-130 aircraft on an occasional basis. The MV-22 has tandem wheels and a maximum load of 57,000 pounds, within the weight restrictions at Upolu Airport. Regarding the use of Akone Pule infrastructure, no convoys or heavy equipment would be associated with the new squadrons. Upolu Airport would be used infrequently by aviation squadrons, not by ground combat units.
005	5	Since Upolu Airport would be used infrequently—primarily as a diversion airfield when weather conditions are poor at PTA or during emergencies, the use could be either during the day or at night. Approach and departure would be over the ocean. Please see response to comment 005-1. Sound levels would be comparable to those from existing military aircraft. Flight operations, including altitudes, would occur in accordance with the designated airspace. Regarding the FAA rules for aircraft lighting, Please see response to comment 005-2.
005	6	State DOT Airports estimated a total of 800 annual operations at Upolu Airport in 2009. This is an estimate, not an actual count, since the airfield does not have an air traffic control tower. The DEIS stated that projected Marine Corps aviation operations in the year 2018 would include approximately 245 operations by the proposed MV-22 and H-1 aircraft. When combined with general aviation operations, 23 percent more operations were estimated at Upolu under the proposed action than under the No Action Alternative. This projection assumed that Upolu Airport would be used for confined area landings (CALs), a type of training operation. However, the DoN presently does not plan to use Upolu Airport for CALs training, as described in the DEIS. Instead, the use would be limited to flight operations currently carried out at State airports, in coordination with civilian airport authorities and in accordance with FAA procedures. Upolu Airport's main value to the squadrons would be as a diversion airfield in emergencies or poor weather conditions. The number of proposed operations presented in the Final EIS has been modified to reflect the removal of the CALs training. If the Marine Corps plans to use Upolu or any other State airport for specific exercises, similar to those conducted by the Army and other services, it would follow the procedures for requesting approval from the State DOT Airports Division.
005	7	As explained above, Upolu Airport would primarily serve as a diversion airfield when weather conditions are poor at PTA, or for emergency landings. Although any hours of use by an aircraft provides some basic training value, the type of use identified for Upolu Airport is not designated as training activity, but rather administrative use comparable to how the airfield is used by civilian aircraft.
005	8	The DEIS describes the proximity of two historic places: Mo'okini Heiau and the Kamehameha Birthsite. These sites would not be affected by the squadrons' infrequent use of Upolu Airport, which would be consistent with normal airport activities (e.g., landings and takeoffs). Regarding the small heiau in the area described by Kupuna Marie Solomon, routine flight operations at the airport would occur only on the paved runway within the fenced portion of the

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		property. Anything outside the perimeter fence would be outside the area of potential effect (APE), which includes the runway and a 350-foot buffer, and, therefore, would not be affected by rotor downwash.
005	9	As disclosed in the DEIS (pages 4-9 and 4-14), public access to the areas outside the active portion of the airport property would not be affected by routine flight operations.
006	1	With the proposed use of Upolu for routine flight operations (e.g., landing and taking off) rather than confined area landings (CALs) training, as explained in 005-6, noise contours are expected to be consistent with those modeled for the State's Upolu Airport Master Plan and Final EA (March 1999). This earlier noise analysis incorporated military use of the airfield at the time, and included noise generated by helicopters (e.g., UH-60 Blackhawks) and a few C-130 operations. MV-22 and H-1 noise levels are similar to those aircraft. The State's noise analysis showed that in both the base year and the projected year, 55 DNL contours were contained within the existing airport property and eastern avigation easement area. Given the limited use projected for Upolu Airport, no increased noise levels are anticipated.
006	2	Constant overflights would not occur. Impacts on tourism and farm economies would not occur for the following reasons: (1) the normal approach and departure to Upolu Airport would be over the ocean, (2) the proposed operations would be infrequent, e.g., emergency use (see response to comment 005-6), and (3) aviation activities would continue to adhere to applicable regulatory requirements, as well as operational procedures, to prevent pollution. Pohakuloa Training Area would be the main training area on the island of Hawaii for the MV-22s and H-1s.
006	3	As noted in the response to 006-2, the Department of the Navy (DoN) has reduced the proposed use of Upolu Airport to administrative use for diversion during emergencies or poor weather. No impact is anticipated from this limited use to the region's farm or tourism economies, or to social services.
006	4	Normal approach and departure flight tracks would be over the ocean.
006	5	Given the limited use of Upolu Airport by the new squadrons as described above, there would be no impacts on milking stock and, therefore, no need for mitigation. The airport is an existing facility.
006	6	Upolu Airport is a State airport on land owned by the State of Hawaii. It is not an enroute support base, nor are there any plans to construct military infrastructure at this location. Military use of this airport, and the majority of other State airports in Hawaii and the United States overall, is comparable to civilian use, i.e., landings and take-offs.
006	7	Personnel from the VMM and HMLA squadrons are not expected to spend any time in town, either during the day or at night.
006	8	As stated above, normal approach and departure would be over the ocean. If required, flights over inhabited land areas would be at a minimum altitude of 500 feet above ground level, in accordance with FAA procedures covering uncontrolled airspace.
006	9	The DEIS recognized and accounted for certain aircraft making more noise than others. For purposes of the EIS, noise impact is measured in terms of Day-Night Average Sound Level (DNL). As discussed in Section 3.5 of the DEIS, the computer modeling performed for DNL accounts for noise from many types of aircraft, their unique acoustic signatures based on their

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		flight path and profile, the number of existing/proposed (average daily) events of several types of operations, and the period of day in which they do/would occur. For purposes of comparing one type of aircraft to another, the FEIS includes noise levels of single flight events in terms of Sound Exposure Level (SEL) and Maximum Sound Level (Lmax) for several of the pertinent aircraft types currently using and proposed for use at MCB Hawaii Kaneohe Bay, including the proposed MV-22 and H-1. Data for single-event noise generated by the MV-22 and H-1 aircraft are provided in Section 3.5.
007		Comment noted.
008		Thank you for your comment.
009	1	In addition to the formal announcement in the *Federal Register*, and the *Environmental Notice* of the State of Hawaiʻi Office of Environmental Quality Control, notices of the DEIS public meetings were published in newspapers on all islands where training is proposed. The public meeting in Waimea was announced in *West Hawaii Today* and the *Hilo Tribune* on November 10 and 13, 2011.
009	2	The Waimea meeting venue for the DEIS public meeting/open house was accessible to residents interested in the proposed action. Waimea is in a centralized location and serves as North Kohala's commercial hub. The distance between Hawi/Kapa'au and Waimea (approximately 25 miles) is not unreasonable to expect people to travel. For example, Kailua-Kona residents who attended the meeting drove approximately 40 miles. The public meeting in Waimea was announced in *West Hawaii Today* and the *Hilo Tribune* on November 10 and 13, 2011, and also publicized in the State Office of Environmental Quality Control's *Environmental Notice* on November 23, 2011.
010	1	Regarding potential impacts on the dairy farm, the Draft EIS noted that the majority of training conducted by the new squadrons on the island of Hawaii would occur at Pohakuloa Training Area (PTA). The Department of the Navy (DoN) has reconsidered the use of Upolu for CAL exercise and proposes to limit use of this airport to standard administrative use in the event of diversions for poor weather or emergencies. PTA would be the main training area on the island of Hawaii for the MV-22s and H-1s. Given the infrequent use of Upolu Airport (comment 005-6 above), there would be no impacts on the dairy farm. Regarding the windmills, their construction was approved taking into account their location near the existing airport. The MV-22 and H-1 aircraft would operate in compliance with FAA procedures that apply to all aircraft using Upolu Airport. Normal approach and departure would be over the ocean, avoiding the windmills.
010	2	PTA would be the main training area on the island of Hawaii for the MV-22s and H-1s. Operations at Upolu Airport are projected to be infrequent. See responses to comments 005-6 and 006-2.
010	3	Please see response to comment 009-2.
011	1	Noise and pollution were evaluated at a level appropriate for their potential environmental impacts. In the vicinity of the existing Upolu Airport, (1) the normal approach and departure to Upolu Airport would be over the ocean, (2) the proposed operations would be infrequent, e.g., emergency use (see response to 005-6), and (3) aviation activities would continue to adhere to applicable regulatory requirements, as well as operational procedures, to prevent pollution.

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		Pohakuloa Training Area would be the main training area on the island of Hawaii for the MV-22s and H-1s. These issues are further addressed in Sections 4.4.2.4 and 4.4.3 (air quality) and 4.10.2.4 and 4.10.3 (hazardous waste/materials) of the DEIS. Transient use of Upolu Airport would result in no significant impacts with regard to air quality or hazardous materials/waste.
011	2	As discussed in the responses to 006-2 and 011-1, given limited flight operations, noise would be infrequent at this existing airport, and, therefore, no adverse effects on the tourism economy of the region would occur.
011	3	The issue of federal spending priorities is outside the scope of the EIS.
011	4	Please see response to comment 010-1.
011	5	Military expansion in the community is highly unlikely. As discussed in the EIS, basing locations for the VMM and HMLA squadrons were limited to Department of Defense (DoD) installations. Upolu Airport is not a DoD facility; it is a State airport on land owned by the State of Hawaii and is, therefore, not suitable or available to serve as a site for military facilities. The Department of the Navy's (DoN's) use of the airport is comparable in nature and frequency to use of the airport by civilian aircraft.
011	6	See responses to 011-1 through 011-5.
012	1	Upolu Airport is a State airport currently used by both commercial and military aircraft for periodic landings and takeoffs. The proposed use of this airport by the MV-22 and H-1 aircraft would be limited to use for diversion activities (emergencies and poor weather).
012	2	The level of effort undertaken for analyses of existing conditions at State airports was limited to review of existing information available for those locations; no new site-specific studies were completed. The decision not to conduct additional studies was tied to the minimal nature of potential impacts on the environment associated with the proposed use of existing State airports by the MV22 and H-1 aircraft. For cultural resources, the only available sources of data were the site files maintained by the Hawaii State Historic Preservation Division and the cited survey report from 1999, neither of which identified archaeological sites, traditional cultural properties, or historic buildings within the Area of Potential Effect (APE) (the runway and a 100-foot buffer measured from the edge of the tarmac). Should subsurface archaeological deposits be present within the APE, the rotor wash from the MV22 is not sufficiently powerful to expose such deposits.
012	3	Regarding Mookini Heiau and the Kamehameha Birthsite, see response to comment 005-8.
012	4	As explained in Section 2.7, NEPA specifies that impacts should be discussed in proportion to their potential significance; in other words, criteria are used to determine the appropriate level of analysis. It was determined that in the case of offshore marine resources, given the minimal impact of infrequent use of Upolu Airport, new surveys were not warranted. (If major construction or habitat modification had been proposed, posing a potential for runoff, surveys may have been warranted.)
012	5	See responses to 011-1 through 011-5.
013	1	As noted in the response to 005-6 above, the Department of the Navy (DoN) has reexamined its

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		proposal to use Upolu Airport for confined area landings (CALs) training for the MV-22 and H-1 aircraft. The proposal, discussed in the Final EIS, is to limit Upolu Airport to administrative use, comparable to use of this airport by civilian aircraft. Civilian airfields are routinely used by existing Marine Corps aviation squadrons, coordinating with civilian airport authorities in accordance with FAA procedures.
013	2	The EIS describes the proximity of the Kamehameha Birthsite. The site would not be physically affected by the squadrons' infrequent use of Upolu Airport, which would be consistent with normal airport activities (e.g., landings and takeoffs). Traditional use of the Birthsite also would not be impacted by noise, as noise levels are not anticipated to increase beyond the levels analyzed in the State DOT's March 1999 Environmental Assessment for Upolu Airport. Regarding the potential for pollution, transient use of the airport (landing and taking off) would result in no significant impacts with regard to air quality, water quality, or hazardous materials/waste. Aviation activities would continue to adhere to applicable regulatory requirements, as well as operational procedures, to prevent pollution.
013	3	No fuel runoff would be associated with proposed administrative use of Upolu Airport by the new squadrons (e.g., landing and taking off). No fuel would be dumped in the ocean.
013	4	Please see response to comment 010-1.
013	5	Please see response to comment 005-8.
013	6	Regarding noise and air quality, see responses to 005-6 and 011-1. Limited use of the airport as described would not be detrimental to biological resources or socioeconomic conditions. The issues of environmental justice and protection of children from environmental health risks are addressed in the DEIS. No disproportionate impacts on these populations have been identified.
013	7	No "regular military flight missions" are planned for Upolu Airport. Flight operations would be infrequent. For this reason, as well as the fact that aircraft would approach and depart over the ocean, no impacts are expected on the tourism economy. Similarly, these infrequent operations are not expected to affect housing values.
014	1	Please see response to comment 009-2.
015	1	Please see response to comment 009-2. As described in Section 2.2. of the DEIS, the Waimea Airport was listed as a possible airport for use. The Department of the Navy (DoN) is disclosing that Waimea and other State Department of Transportation airports could be used, as currently allowed by military aircraft.
015	2	See responses to 013-1. Regarding wind conditions, the marine environment, and cultural resources, see responses to 005-1, 006-1, and 005-8, respectively.
015	3	At the existing airport, the normal approach and departure of the MV-22 and H-1 aircraft would be over the ocean and operations would be infrequent (see 005-6 above). Vibrations characteristic of existing aircraft or of those allowed to operate at this existing airport are expected.
016	1	The State DOT accounts for routine aviation use, including use by military aircraft, of all State airports in its periodic Environmental Assessments/Environmental Impact Statements for airport

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		operations. Additional information has been included in Section 2.4.2.2 of the Final EIS.
016	2	Aviation operations at PTA are not proposed in areas known to be frequented by nene. The majority of nene at the installation are present within Training Area 1 (impact area). None of the landing zones (LZs) to be used by the squadrons are within PTA's Training Area 1. Arrival and departure vectors for nene to and from Training Area 1 are known to cross over or near LZ Boogie. LZ Boogie is not proposed for use by the VMM and HMLA squadrons. The DoN has made a "May affect but not likely to adversely affect" determination under Section 7 of the Endangered Species Act for nene at PTA. The U.S. Fish and Wildlife Service has concurred with this determination. The issue of standing is beyond the scope of the EIS.
016	3	Please see response to comment 011-1.
016	4	Comment noted.
016	5	Please see response to comment 016-1. State airports are available for use by federal (including military) and civilian aircraft in accordance with FAA order..
016	6	Two airports on the island of Hawaii—Keahole and Upolu—are located on coastlines fronting waters designated as part of the Hawaiian Islands Humpback Whale National Marine Sanctuary. Operating any aircraft within the sanctuary within 1,000 feet of any humpback whale is prohibited, except when in a designated flight corridor for takeoff and landing from an airport or runway. The VMM and HMLA squadrons would operate in compliance with these regulations.
016	7	Ordnance would be used only within the designated impact area at PTA. See discussions of seismic hazard and ordnance safety at PTA in section 4.10.2.3 and 4.10.3 of the Draft and Final EIS. No construction or operational impacts are expected with regard to seismic conditions and ordnance.
016	8	The proposed action addresses only up to two VMM squadrons and one HMLA squadron. Any additional increase in squadrons and their activities would require new environmental analysis.
017	1	The proposed action does not include establishment of a military base or any construction at Upolu Airport. The EIS analyzes impacts of operations by MV-22 and H-1 aircraft, not fighter jets. The aircraft would be based at MCB Hawaii Kaneohe Bay on the island of Oahu. Regarding potential impacts on tourism, see response to comment 006-2.
017	2	As disclosed in Section 4.4.3 of the DEIS, no significant impacts on air quality would occur from aircraft emissions at Upolu Airport or any of the other training areas. Table 4-30 in the EIS presents estimated annual air emissions from MV-22 and H-1 at the other training areas. It is also noted that new aircraft would serve to reduce the number of aging aircraft using less efficient combustion technology and having higher emission characteristics.
017	3	Routine aviation activities at Upolu Airport would have a negligible impact on water quality. Activities would be limited to landing and taking off on a limited basis. No construction or aircraft maintenance are proposed here. Aviation activities would continue to adhere to applicable regulatory requirements, as well as operational procedures, to prevent pollution. See also response to 011-1.
017	4	With Alternative A, seven facilities eligible for listing on the National Register of Historic Places (NRHP) at MCB Hawaii Kaneohe Bay are proposed for demolition, including six

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		bachelor enlisted quarters (BEQs) and an office/storage building. Under Alternative B, 15 NRHP-eligible facilities are proposed for demolition, including four BEQs, an office/storage building, five warehouses, two storage facilities, and three revetments. All were constructed in the early 1940s. The more extensive demolition associated with Alternative B would occur if VMM hangars and aprons are constructed at West Field. This is not the preferred alternative. Demolition of existing BEQs would make way for construction of new quarters, as described in Chapter 2. The existing buildings are very old, difficult to maintain, not energy efficient, and do not provide a good quality of life for occupants. Appropriate mitigation for this impact on cultural resources has been identified through consultation with the State Historic Preservation Division, the Historic Hawaii Foundation, the Advisory Council on Historic Preservation, the National Trust for Historic Preservation, and other interested parties, and mitigation commitments by the MCB Hawaii are documented in the Programmatic Agreement and will be documented in the Record of Decision.
018	1	Yes, the EIS must address impacts of the proposed action in a comprehensive manner. The document addresses a wide range of resources and issues, including direct, indirect, and cumulative impacts relating to land use, water quality, infrastructure, socioeconomics, marine resources, and energy use, among others.
018	2	As required under the National Environmental Policy Act (NEPA) and its implementing regulations, as well as by Secretary of the Navy internal policies, the EIS examines not only direct physical impacts related to the proposed action, but also the potential for indirect and cumulative impacts that are foreseeable within the region of influence identified for each resource.
018	3	The socioeconomics section of the DEIS (Section 3.11) evaluates potential impact of additional military personnel and dependents on housing, schools, recreation facilities, the economy, public safety, and health services.
018	4	See Section 2.3, Alternatives Development Process. This section summarizes the screening process used to develop the Hawaii basing alternatives evaluated in the EIS. The purpose of the proposed action is to ensure that the Marine Air-Ground Task Force (MAGTF) is capable of supporting III MEF requirements in Hawaii, and the need for the proposed action is to eliminate existing deficiencies of the MAGTF in Hawaii. Accordingly, basing of the squadrons outside of the state would not be considered reasonable. In addition to MCB Hawaii Kaneohe Bay, the screening process focused on the following Hawaii basing alternatives: Marine Corps Training Area Bellows, Wheeler Army Airfield, Dillingham Military Reservation, Joint Base Pearl Harbor-Hickam, Pohakuloa Training Area, and Pacific Missile Range Facility. These basing alternatives were evaluated against specific criteria, described in Section 2.3.1, to ensure that all analyzed alternatives met minimum operational requirements.
018	5	The perspective represented by the ahupua‘a, whereby resources are considered to be interdependent is acknowledged. The NEPA requirement to evaluate impacts cumulatively is one approach, which is followed in this document. Council on Environmental Quality (CEQ) regulations implementing NEPA define cumulative effects as “the impact on the environment which results from the incremental impacts of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency….or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.” Further, the analyses of impacts on cultural and natural resources contained in this EIS are

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		supported by data and findings from Integrated Cultural Resources Management Plans and Integrated Natural Resources Management Plans prepared for the various military installations. These documents provide holistic approaches to managing resources. For example, the INRMPs emphasize an ecosystem approach. The cultural resources section of the DEIS discusses ahupuaa as important for providing the historic context of each area, followed by descriptions of archaeological resources, traditional cultural resources, and historic buildings identified in the area of potential effect (APE) for this proposed action. Where relevant, the spiritual dimension is discussed, for example, in the case of traditional cultural resources, which may be places that are recalled in legends, memorialized in place names, or associated with cultural practices, beliefs, or customs.
018	6	DoD archaeologists and cultural resource managers regularly consult with Native Hawaiian organizations regarding the identification and evaluation cultural resources and recognize the importance of including Native Hawaiian perspectives in their approach to managing these resources.
018	7	That archaeological deposits are sometimes found in developed areas is acknowledged. The Programmatic Agreement that was developed through Section 106 consultation identifies mitigation measures and procedures to address known cultural resources and unanticipated discoveries. Archaeological monitoring of ground disturbing activities is one of the ways that MCB Hawaii protects buried cultural resources. In areas where MCB Hawaii has determined that there is a greater potential for buried deposits (i.e., adjacent to a known site), test excavations are conducted in advance of construction in order to determine if buried cultural deposits are present.
018	8	The Marine Corps consults with Native Hawaiian organizations as part of the Section 106 consultation process and also seeks input with these organizations as part of the NEPA process. For the current undertaking, MCB Hawaii has been consulting with various Native Hawaiian organizations as part of the Section 106 process and has developed a Programmatic Agreement (PA). During the 45-day DEIS comment period, the public was invited to offer input on cultural resources and to consider requesting Section 106 consulting party status. A list of consulting parties, including Native Hawaiian organizations, can found in the PA (Appendix K).
019	1	Aircraft noise impacts on Aikahi Park and Kaimalino were evaluated in the EIS. The noise analysis, which included operations along the east/west helicopter flight corridor (considered part of the airfield), showed that the Mokapu Boulevard back gate, Kaimalino neighborhood, and Aikahi Elementary School would be exposed to DNL less than 55 dB for all three scenarios: 2009 baseline conditions, No Action, and the Proposed Action. See Figures 3-3 and 3-4 on pages 3-30 and 3-33 of the DEIS, respectively. DNL is a way to measure noise and is primarily used for land use compatibility purposes. For example, a DNL of 55 decibels (dB) is typical for normal suburban residential neighborhoods, and a DNL of 50 dB is typical for quiet suburban neighborhoods (source: U.S. Environmental Protection Agency, 1974).
019	2	Please see response to comment 002-1.
020	1	See responses to 019-1 and 004-1. While Aikahi Elementary School and specific community areas mentioned in your letter are not listed in the table of POIs, these areas are modeled as illustrated on the noise contour maps (Figures 3-3 and 3-4 in the DEIS).

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021	1	Section 4.5 of the DEIS contains single-event noise levels for the MV-22 in terms of Sound Exposure Level (SEL) for Terrain Following (TERF) and Low Altitude Tactics (LAT) training. For purposes of comparing one type of aircraft to another, the FEIS includes additional noise metrics of single flight events in terms of Sound Exposure Level (SEL) and Maximum Sound Level (Lmax) for many of the pertinent existing/proposed aircraft types at MCB Hawaii, including the proposed MV-22 and H-1, as they pass by Kealohi Point. Single-event sound levels for an MV-22 takeoff and landing are not described because they are highly dynamic and unique events (compared to other types of aircraft, even helicopters), and because those events would be constrained to the MCB Hawaii airfield and landing zones. Table 3-2 of Section 3.3 of the DEIS contains the annual numbers of proposed flight operations for the MV-22 by type of operation. Total proposed flight operations are estimated to be nearly 8,000 for the MV-22 and approximately 14,200 for the H-1. The DEIS did include information on the frequency of MV-22 operations, as these data are necessary to analyze noise impacts. See the description of the noise study methodology and assumptions starting on page 3-27 of Volume 1. See also the tables in Appendix D-1, which give annual flight operations for various aircraft types, including day and night operations for departures, arrivals, touch-and-gos, and ground combat approaches.
022	1	Plans do not call for basing the aircraft at Upolu Airport. The squadrons would be based at MCB Hawaii Kaneohe Bay. Most of the training on the island of Hawaii would occur at PTA, and use of Upolu would be limited to diversion use (see 005-6.).
022	2	Regarding impacts on whales and other marine species, as explained in Section 2.7, NEPA specifies that impacts should be discussed in proportion to their potential significance. Based on criteria used to determine the appropriate level of analysis, it was determined that in the case of offshore marine resources, given the minimal impact of infrequent use of Upolu Airport and operational compliance with the Hawaiian Islands Humpback Whale National Marine Sanctuary, analysis of these resources was not warranted. Regarding the difference between “operation” and “event,” an operation is the metric in the EIS that quantifies uses of landing zones and airfields, while event is the term used to describe an aircraft going out for a given period of time to accomplish one or more training objectives. A landing is generally defined as an operation, and a takeoff is defined as an operation. See Section 3.3.2 of the EIS for descriptions of various training activities and how they are counted in terms of operations. Annual operations are shown in the EIS. Events or “trips” typically include multiple operations. Regarding outdated information in the EIS, as stated above, criteria was used to determine the appropriate level of analysis as well as the need for updated surveys or studies. In cases where there is little or no change in conditions, combined with the expectation of little or no impact on resources, additional detailed analysis is not warranted. Regarding aircraft sounds, The Department of the Navy (DoN) has reexamined its proposal to use Upolu Airport for confined area landings (CALs) training for the MV-22 and H-1 aircraft. As a result, the use of Upolu Airport by the new squadrons would be limited and infrequent, primarily for situations when aircraft are required to divert from the airfield at PTA (such as emergency situations or when weather conditions are poor at PTA). Night use is possible if emergencies occur at night. If the Marine Corps proposes to use Upolu or any other State airport for specific training exercises, it would follow the procedures for requesting approval from the State Department of Transportation (DOT) Airports Division.

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		Regarding cultural sites, the DEIS discloses the proximity of the Kamehameha Birthsite and Mookini Heiau to the airport. The sites would not be physically affected by the squadrons’ use of Upolu Airport, which would be consistent with normal airport activities (e.g., landings and takeoffs).
023	1	It is not the responsibility of the Marine Corps to specifically maintain “peace and the magic of Kohala.” The Marine Corps does support national security, which affords such conditions to exist.
023	2	As explained in Section 4.2 of the DEIS, current access to land and the coast near Upolu Airport (outside the perimeter fence) would not be affected.
023	3	Security at Upolu Airport would remain the same and not be affected by the squadrons’ infrequent use.
023	4	For purposes of the EIS, noise exposure is measured in terms of Day-Night Average Sound Level (DNL). As discussed in Section 3.5 of the DEIS, the computer modeling performed for DNL accounts for the noise from many types of aircraft utilizing LZs proposed for frequent use, their unique acoustic signatures based on their flight path and profile, the number of existing/proposed (average daily during the busiest month) events of several types of operations, and the period of day in which they do/would occur. Given limited use of Upolu Airport by the new squadrons, as discussed in the response to 011-1, sound impacts would be minimal—consistent with findings of the State Department of Transportation, Airports Division, in its March 1999 Environmental Assessment (EA) for Upolu Airport. The EA analysis showed both existing and projected 55 to 75 DNL noise contours contained within the airport property and eastern avigation easement.
023	5	In addition to the formal announcement in the *Federal Register*, and the *Environmental Notice* of the State of Hawai‘i Office of Environmental Quality Control, notices of the DEIS public meetings were published in newspapers on all islands where training is proposed. The public meeting in Waimea was announced in *West Hawaii Today* and the *Hilo Tribune* on November 10 and 13, 2011.
024	1	The DEIS discloses the proximity of the Kamehameha Birthsite to the airport. The site would not be physically affected by infrequent use of Upolu Airport primarily as a diversion airfield. Given that noise levels would not likely exceed those already analyzed by the State DOT’s Environmental Assessment for Upolu Airport, traditional use of the site would not experience any additional impacts. There are no plans to “use” the site.
024	2	As noted in the response to comment 005-6 above, the Department of the Navy (DoN) has reexamined its proposal to use Upolu Airport for confined area landings (CALs) training for the MV-22 and H-1 aircraft. Use of the existing Upolu Airport would be infrequent, as described in 005-6. No impacts are expected on the dairy.
024	3	As stated above, flight operations—day or night—would be infrequent. Aircraft are required to have lights at night for safety reasons (see response to comment 005-2). It is unlikely that lights from aircraft landing and taking off at the airport would affect the communities two miles away.
024	4	Please see response to comment 009-2.
025	1	See responses to 024-2 and 016-6.

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		Regarding potential aircraft noise impacts on birds, if suitable habitat is available near airports, it serves as an attractant to birds and increases the risk of bird-aircraft strikes. Grasslands at Upolu Airport are probably the main attractant to birds. The height of the grass at some airports is kept low to prevent attracting birds. Certain birds apparently become acclimated to the sight and sound of aircraft, posing a BASH risk. BASH programs at civilian and military airfields are designed to avoid or minimize this risk.
025	2	See response to 024-1.
025	3	Marine Corps flight operations would be infrequent, with very little impact on the farming community. See response to comment 011-1.
025	4	When the *Federal Register* Notice of Intent (NOI) to prepare an EIS was published last August, Upolu was being considered for routine flight operations, along with all other State airports as described in Section 2.2 of the DEIS. Subsequently, during the scoping period, the Marine Corps identified the potential use of Upolu Airport for confined area landings (CALs) training and, while this was only a potential use, the impacts of that training were analyzed in the Draft EIS. Upon further consideration, and as explained in the response to 005-6 above, the Marine Corps has decided to limit activities at Upolu to routine flight operations (e.g., landing/taking off) and not conduct CALs. For specific exercises, the Marine Corps would follow existing procedures for requesting approval from the State DOT Airports Division. It is appropriate for the scope of an action or project to be revised as a result of scoping, consultation with agencies, EIS analysis, and/or public and agency comments on the DEIS. The purpose of the scoping process is to actively and constructively bring outside agencies, organizations, and the public into the NEPA process to help determine the scope and potentially significant issues to be analyzed. Regarding the public meeting venue, see response to comment 009-2.
026	1	Please see response to comment 009-2.
027	1	Please see response to comment 009-2.
028	1	Upolu Airport is not planned as a staging ground for military helicopters. Please see response to comment 005-6.
028	2	The MV-22 and H-1 aircraft would use the airport on an infrequent basis, mainly when needing to divert from PTA when weather conditions are poor (see response to comment 005-6). Therefore, no significant impacts are expected on the North Kohala community's economy and lifestyle. See responses to 011-1 through 011-5.
029	1	Noise and pollution were evaluated at levels appropriate for their potential environmental impacts. In the vicinity of the existing Upolu Airport, (1) the normal approach and departure to Upolu Airport would be over the ocean, (2) the proposed operations would be infrequent, e.g., emergency use (see response to comment 005-6), and (3) aviation activities would continue to adhere to applicable regulatory requirements, as well as operational procedures, to prevent pollution. Pohakuloa Training Area (PTA) would be the main training area on the island of Hawaii for the MV-22s and H-1s.
029	2	As noted in the response to 005-6, the Department of the Navy (DoN) has reexamined its proposal to use Upolu Airport for confined area landings (CALs) training for the MV-22 and H-

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		1 aircraft. Given the infrequent use of Upolu Airport, there would be no impacts on the region's tourism economy or real estate values. See response to comment 029-1.
029	3	Training did occur there in the past, and military exercises have been conducted more recently (2011).
029	4	Please see response to comment 005-6.
029	5	See responses to 028-2 and 029-2.
029	6	The DEIS discloses the proximity of the Kamehameha Birthsite and Mookini Heiau to the airport. The sites would not be physically affected by the squadrons' use of Upolu Airport, which would be consistent with normal airport activities (e.g., landings and takeoffs). Given that noise levels would not exceed those already analyzed by the State DOT's Environmental Assessment for Upolu Airport (March 1999), traditional use of the sites would not experience any additional noise impacts.
029	7	Please see response to comment 029-2.
029	8	Comment noted.
030	1	Regarding the public meeting venue, please see response to comment 009-2.
030	2	Please see response to comment 016-6.
030	3	The Department of the Navy (DoN) is preparing the EIS on behalf of the Marine Corps (which is part of the DoN) in accordance with the National Environmental Policy Act (NEPA). NEPA directs federal agencies to include environmental considerations in their decision-making process, to consider alternative ways to meet the agency's needs, to mitigate significant environmental impacts to the extent practical, and to involve the public in its decision making process. The Marine Corps has and will continue to modify the proposed action to reduce environmental impacts, in response to agency and public comments. Under NEPA, environmental assessments and impact statements are prepared by the proposing federal agencies.
030	4	The printout in "printouts stating results from 2004" could not be identified.
031	1	The EIS discloses no evidence to suggest that the proposed introduction of the VMM and HMLA squadrons would bring "more violent crime, assault, prostitution, and vehicle crashes; higher housing costs; toxins, explosives, and other hazards; and degradation of the environment." See the analyses in the EIS relating to roadway traffic, socioeconomics, hazardous materials and waste, ordnance safety, land use, and biological resources, among others. No significant impacts are expected in any of these areas. The EIS also looks at the potential for cumulative impacts of this proposed action in conjunction with previous, current, or reasonably foreseeable actions.
031	2	The EIS presents the Department of the Navy's (DoN) assessment of fire risk due to hot exhaust from the MV-22 (see page 3-58 in Volume 1 and Appendix F-1), as well as the Army's Integrated Wildland Fire Management Plan (page 4-89 in Volume 1). Exhaust deflectors on the MV-22 aircraft reduce the risk of fire at unprepared landing zones (LZs). Engine power is reduced on the deck and nacelles are rotated to a position to minimize direct flow to the ground. Additional operational measures to further minimize the already remote risk of fire include

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		surveying the LZ prior to landing to ensure compatibility, avoiding bushes or brush directly beneath the aircraft, and limiting time the aircraft is on deck at unprepared LZs before the next takeoff. Regarding MV-22 exhaust damage to ship flight decks, when the MV-22 nacelles are positioned vertically for takeoff, engine exhaust gases are directed toward the flight deck. As a precautionary measure, portable heat shields were used aboard LSD and LPD class ships during the first MV-22 deployments. Subsequent testing and analysis determined that instead of these heat shields, a nacelle modulation technique (the nacelles are periodically rotated a few degrees) was a more suitable and effective method to protect the flight deck. Using this method prevents heat buildup in the deck plating and negates any chance of damage.
031	3	The DEIS addresses rotor downwash effects on archaeological resources, natural resources, and soil. As explained in the document, the region of influence (ROI) for the proposed aviation activities is the area of downwash associated with MV-22 aircraft (see Appendix F-2 for details of the downwash evaluation). Based on the physical effects of downwash, the ROI is defined by a 350-foot (107-meter) radius from the aircraft's landing point. This ROI is used in the evaluation of impacts relative to both natural and cultural resources, as well as soils. Note:In the analyses of impacts to cultural resources, the ROI is referred to the Area of Potential Affect or APE. The 350-foot area surrounding the landing points are evaluated for potential affects to cultural resources. The DEIS discloses potential soil erosion at unpaved landing zones at Schofield Barracks East Range and parts of Kawailoa Training Area due to MV-22 downwash. Mitigation would involve monitoring conditions at the relevant LZs and, if needed, working with the range manager to implement appropriate repairs or maintenance actions. Regarding downwash effects on personnel, there is a misconception that excessive MV-22 downwash prohibits hoisting, fastrope, and overwater hover work. Rotor downwash of the MV-22 is similar to that of the CH-53E. After incorporating lessons learned from earlier operational test periods, procedures have been developed to effectively mitigate downwash effects on personnel working below or in the vicinity of the aircraft, as well as personnel exiting the aircraft via fastrope, rappel, or helocast operations. These procedures are safe, effective, and in use today.
031	4	Depleted uranium is confined to the impact area at PTA and has not been detected outside the impact area. The MV-22 would use only designated LZs. None of the LZs proposed for MV-22/H1 operations are within the impact area. Please also see response to comment 001-6.
031	5	The DEIS discloses Endangered Species Act (ESA)- and Migratory Bird Treaty Act (MBTA)-listed species recorded in the vicinity of the landing zones at PTA. For the complete report of the survey, see Appendix F-3. See also Appendix J for the ESA Section 7 documentation. None of the landing zones at PTA proposed for use by the squadrons are within or in the vicinity of palila critical habitat. It is acknowledged that data for Upolu Airport is based on natural resource surveys conducted in 1997. Conditions within the study area (proposed airport expansion areas) have remained relatively unchanged, and since no construction or habitat modification is proposed as part of the proposed action, the data from the earlier surveys was determined to be valid. If construction had been proposed, as it is at PTA, updated surveys may have been conducted. As explained in Section 2.7, NEPA specifies that impacts should be discussed in proportion to their potential significance; in other words, criteria are used to determine the appropriate level of analysis. It

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		was determined that in the case of natural resources, given the minimal impact of infrequent use of Upolu Airport, new surveys were not warranted. Section 4.9.3.7 in the DEIS acknowledges areas where additional archaeological surveys would be needed.
031	6	Three factors were considered in the decision not to hold a DEIS public meeting/open house on Molokai: (1) minimal impacts expected at the Molokai Training Support Facility, located adjacent to Molokai Airport; (2) very small attendance at a public scoping meeting/open house conducted at Kaunakakai; and (3) limited or lack of response from community members contacted for stakeholder interviews during the public scoping period. As part of the National Historic Preservation Act (NHPA) Section 106 process, two members of the EIS team accepted an invitation from the State Department of Health staff at Kalaupapa to attend a meeting at the settlement.
031	7	The decision not to hold a public meeting/open house on Kauai was based on anticipated impacts of the proposed training operations at PMRF (no significant impacts), guidance from PMRF staff, and the low level of interest during scoping. The Notice of Availability (NOA) of the Draft EIS was published in the *Garden Isle News*, the local Kauai newspaper. The NOA and CD containing the Draft EIS were distributed to Kauai government agencies and elected officials, and hard copies of the document were sent to three public libraries on the island. Impacts of training operations at Kaula Island and the PMRF water ranges by the Marine Corps are being evaluated in the Hawaii-Southern California Training and Testing EIS/OEIS. This document is in progress. The DoN also conducts annual marine mammal and seabird surveys at Kaula Island. The DoN has included the State of Hawaii Department of Land and Natural Resources (DLNR), U.S. Fish and Wildlife Service (USFWS), and the University of Hawaii on these surveys.
031	8	The Marine Corps Base (MCB) Hawaii acknowledges that sites are often related to other sites and does take this into account in the management of cultural resources. For analysis of impacts to cultural resources, the ROI is also referred to as the Area of Potential Affect, or APE. The APE for cultural resources was developed in consultation with Native Hawaiian organizations, Advisory Council on Historic Preservation (ACHP), State Historic Preservation Officer (SHPO), National Park Service, and other interested parties. Consultations regarding the potential effects of the proposed action on cultural resources continued through April 2012, and the results are documented in the Programmatic Agreement included in Appendix K.
031	9	No. Basing the new squadrons in Hawaii implements the overall strategy and schedule for Marine Corps aviation described in Section 1.1 of the EIS.
031	10	The V-22 has demonstrated its versatility and transformed the way the Marine Corps and Air Force Special Operations Command execute missions around the globe. The two services have numerous consecutive and successful deployments to their credit, covering Operation Iraqi Freedom, Operation Enduring Freedom, and operations in South America and Africa with Marine Expeditionary Units (MEUs). In 2011, one Marine tiltrotor squadron conducted high-intensity combat operations in Afghanistan, while a second performed contingency operations with the MEU. See also response to 058-15.
031	11	No Marine Corps base is planned on the island of Hawaii.
031	12	Equipment and personnel involved in the proposed aviation training are the aircraft and

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		aircrews. Transportation would be on board MV-22 and H-1 aircraft.
031	13	As reported in the *Honolulu Star Advertiser* on December 6, 2011, the CH-53D crash in Kaneohe Bay was a result of mechanical failure.
032	1	Comment noted.
033	1	Responses to request to provide: • Annual airport use: infrequent (see 005-6). Time of day would vary depending on weather and other conditions; most operations would occur during the day. • Maximum number of personnel overnighting: none. • Number/type of facilities: none. • Water source, power requirements: none. Security at the airport would remain unchanged. • Legal decibel level for neighborhoods: 65 dB DNL, which includes both day and night operations, is the Department of Defense (DoD) threshold for land use compatibility criteria. It is not a "legal" limit, and there is no single "legal" noise level threshold adopted by DoD. For example, agencies such as FAA and HUD have different criteria for noise exposure. • Willingness to use takeoff/landing corridor over ocean: yes. • Willingness to avoid habitat overflight: yes; per FAA, minimum altitude is 500 feet above ground level. • Interest in Coast Guard facilities: none. • Anticipated light pollution: aircraft would use lights at night as required for safety. There are no convoys associated with this Proposed Action. • Use of new signal emissions/possible interference: none. • Similar case studies of government/community co-creation: please provide. • Final authority on permission: Assistant Secretary of the Navy or his designee. • Other sites studied/compensation offered: see EIS, Chapter 2; no compensation offered. • Worst case, full 3-day exercise: not planned at Upolu Airport; major training would occur at PTA.
034	1	This question goes beyond the scope of the EIS and the proposed action. Please consider communicating with the congressional delegation on this issue.
035	1	The MV-22 would use only designated landing zones. None of the LZs proposed for MV-22/H1 operations are within the impact area. Because of restricted access and because depleted uranium is unlikely to migrate outside the impact area, no exposure would be associated with the proposed MV-22 and H-1 training. Please also see response to comment 001-6.
035	2	The Marine Corps is not a party to any lease with the Department of Land and Natural Resources at PTA.
035	3	The cleanup of depleted uranium is outside the scope of the EIS and the proposed action. Further information on this subject can be found at: http://www.garrison.hawaii.army.mil/

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035	4	The HMLA squadron would engage in live fire training at the PTA impact area in accordance with range standard operating procedures.
036	1	Please see response to comment 006-2. Further, there would be no impact on any historic structures in Hawi and Kapaau, as operations would be limited to the airport. Regarding the Kamehameha Birthsite, see response to comment 013-2. Regarding bird aircraft strike hazard, see response to comment 005-3. Regarding humpback whales, see response to comment 016-6.
036	2	Please see response to comment 036-1.
037	1	The EIS states that the 3d Regiment at MCB Hawaii Kaneohe Bay does not routinely train with rotary-wing *light-lift and attack support* (italics provided). The 3d Regiment trains with the Hawaii-based HMH squadrons flying CH-53s. The proposed action would correct existing rotary-wing deficiencies of the Hawaii Marine Air-Ground Task Force (MAGTF), which the MAGTF presently addresses through work-arounds such as deployments from the mainland U.S. Please see response to comment 018-4 regarding the process followed by the Department of the Navy (DoN) to develop basing location alternatives evaluated in the EIS.
037	2	All of the issues/resources listed in this comment are analyzed in Chapter 3 of the DEIS.
037	3	As explained in the EIS, the proposed action is intended to correct existing rotary-wing deficiencies of the MAGTF. To do so requires not only new equipment but personnel as well.
037	4	Cumulative impacts are evaluated in Chapter 5 of the EIS. The noise analysis was cumulative, incorporating noise from both based and transient aircraft currently using the base and expected to use the base in 2018 (the planning horizon). See Appendix D-1.1 for the operational assumptions used in the noise modeling.
037	5	Chapter 5 presents detailed analyses of cumulative impacts, providing calculations or estimates of potential cumulative changes in airspace, air quality, noise, drainage/water quality, cultural resources, socioeconomics, traffic, and infrastructure, among others. In several of the sections in Chapter 3, the analysis *is* cumulative, as the methodology requires taking other projects or actions into account, such as airspace, air quality, noise, socioeconomic, traffic, and infrastructure. Regarding biological resources, the EIS discloses no direct, indirect, or cumulative impacts that would result in loss of habitat or listed species.
037	6	No changes in existing public access would occur and, therefore, no affect on individuals engaging in subsistence activities are anticipated. As for impacts on subsistence resources, such as fish and limu, because the Proposed Action is unlikely to cause exceedances in protective regulatory or guideline levels for resources in air and water, no appreciable impact on ecological species inhabiting these resources or humans ingesting them are expected, and studies on these species were not conducted for this NEPA document.
037	7	Please see response to comment 037-6.
037	8	Please see response to comment 059-1.

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037	9	The proposed action would not affect recreational use in Kaneohe Bay.
037	10	The EIS addresses the issue of aviation safety; see Section 3.10.3.
037	11	The statement describing the area as low population refers to housing density; the area consists mainly of single-family residential use. Figure 3-1 in the DEIS shows the area fronting Kaneohe Bay dominated by "low density residential." As summarized in response to comment 037-4, cumulative aircraft noise has been evaluated; P8As and other aircraft were incorporated into the noise analysis. To address your other comments about noise evaluations, please see responses to 041-1, 051-1, 073-1 and 120-6. Regarding the comment about "increased frequency of exposure," DoD does not yet have established significance criteria for noise impacts related to frequency of exposure for use in NEPA studies. Regarding your comment about simultaneous takeoffs, although the noise modeling in the DEIS does not address simultaneous takeoffs, the Day-Night Average Sound Level (DNL) metric used in the DEIS to assess land use compatibility includes the cumulative or total noise exposure from all (modeled) takeoffs. The MV-22 would perform two types of takeoffs: (a) a short takeoff where the engine nacelles are nearly vertical and the aircraft rolls down the runway for a relatively short distance before leaving the ground, and (b) a vertical takeoff. The MV-22 cannot depart like a fixed-wing aircraft with its engine nacelles parallel to the ground as the rotors would strike the ground.
037	12	In addition to formal announcements in the Federal Register, notices were published in local newspapers on all islands where training is proposed to announce the DEIS public meetings and how copies of the DEIS could be obtained. As provided in the notices, hard copies of the DEIS, including source documents in the appendix, were available at 22 public libraries on Kauai, Oahu, Molokai, Maui, and Hawaii islands. All individuals who requested hard copies were accommodated. In addition, the PDF of the document was available on the project website and on the State Office of Environmental Quality Control (OEQC) website. The DEIS public comment period was conducted in accordance with standard practices for NEPA EISs. The public review period was 47 days. Because of the timely nature of these Marine Corps actions, review periods cannot always be extended or planned to avoid everyone's holiday schedules. Although the December 27 deadline was not extended, every reasonable effort was made to consider all comments in the Final EIS.
038	1	Please see response to comment 031-6.
039		(Internal government review comment.)
040	1	Military training was conducted at Upolu Airport in the past, as documented by the State Department of Transportation (DOT), Airports Division (March 1999). This included training by the Hawaii Army National Guard medical unit, U.S. Marine Corps Aviation Support Element, Hawaii Air National Guard, and U.S. Coast Guard. In addition, the Army occasionally trains at Upolu Airport, most recently in August 2011.
040	2	Please see response to comment 005-6.

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040	3	Please see response to comment 011-1.
040	4	Please see response to comment 029-6.
040	5	Please see response to comment 006-2.
041	1	Section 3.5.1 of the DEIS describes how the average values (e.g., DNL) were derived and how noise from single aircraft flybys were evaluated at Points of Interest (POIs). As noted in the subsection "Noise Study Methodology and Assumptions," the computer models use a spectral database of actual aircraft noise measurement. While model validation is conducted to make continuous improvements in the computer models, no validation was conducted for the model results for this Proposed Action and any measured baseline (2009) levels. As described in section 3.5 of the DEIS, computer modeling is most appropriate for comparing "before-and-after" noise impacts which would result from proposed changes or alternative actions with calculations made in a consistent manner. Although the DEIS presents the 2009 baseline noise environment which could theoretically be checked with noise monitoring, the EIS relies on the comparison of the future No Action Alternative to the (future) proposed action which cannot be monitored as they would not occur until the year 2018. The computer modeling incorporates a robust database of acoustic measurements of each aircraft type to compute the Day-Night Average Sound Level (DNL) contours upon which the analysis of noise exposure is based. To generate contours, DNL is computed for evenly-spaced grid points on the ground. For each grid point, the DNL is the logarithmic sum of single-event DNLs from each modeled flight profile (and run-up profile). A flight profile is an aircraft's power setting, altitude, and speed as a function of distance along a specific flight track. Each single-event flight DNL at each grid point accounts for the single-event Sound Exposure Level (SEL) and the number of annual average daily events of each modeled flight profile, with nighttime events, i.e., those occurring between the hours of 10 p.m. and 7 a.m., weighted by a factor of ten (10). DNL contours for the No Action Alternative are compared to the DNL contours of the proposed action scenario to determine the potential for noise impact.
042	1	Please see response to comment 002-1.
042	2	Please see response to comment 004-1.
043	1	Please see responses to comments 002-1 and 004-1.
044	1	As indicated in Section 3.5.1 of the DEIS, the Day-Night Average Sound Level (DNL) are cumulative sound levels that account for the exposure of all noise levels in a 24-hour period. The DNL includes a 10 dB penalty to nighttime events (10 p.m. to 7 a.m.) in order to account for increased human sensitivity to noise at night. The number of flight operations during DNL daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) periods for existing and proposed/alternative scenarios were estimated by Air Traffic Control and local squadrons at MCB Hawaii and by Headquarters U.S. Marine Corps for proposed MV-22, H-1, and other future aircraft. Because the DNL is an average, single event aircraft noises in dB can be both less than and greater than the dB reported as DNL. The results of the computer noise modeling as determined in dB DNL are compared to DoD thresholds for land use compatibility. As you are probably aware, 65 dB DNL and below is considered compatible with residential land uses. The computer noise modeling performed for the DEIS does account for the effects of

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		mountains. For aircraft other than helicopters and the MV-22, the computer model (NMAP) accounts for the effect of ground elevation and ground cover on sound propagation. For helicopters and the MV-22, the computer model (Rotorcraft Noise Model; RNM) not only accounts for the effect of ground elevation and ground cover on sound propagation but also for reflections. P-8 and C-17 operations are not part of the proposed action in this EIS; these operations were covered in separate actions. However, projected P-8 and C-17 operations have been included in the noise modeling to develop the noise contours shown in the subject EIS and account for potential cumulative impacts.
044	2	The noise analysis incorporated other aircraft using the base, including transient aircraft. See Appendix D-1.
044	3	The P-8 is not part of the proposed action but has been included in the noise analysis. The estimated maximum instantaneous (single-event) sound levels for a P-8 Poseidon at your residence would be 53 dB and 57 dB due to P-8 departures from Runways 04 and 22, respectively. The noise levels under the specific conditions you are interested in were not analyzed. In part, because no established criteria exists to assess the levels in this NEPA analysis. Regarding "source for numbers," P-8 noise exposure was estimated with the DoD's NOISEMAP suite of computer programs, along with the other modeled aircraft in the EIS. The P-8A Poseidon is a military version of the Boeing B737-800. As the P-8A Poseidon or the B737-800 does not specifically exist in the NOISEMAP database of reference acoustic data, NOISEMAP data for the Boeing B737-700 was used as a surrogate for the P-8A.
044	4	Yes, the noise model used for the analysis incorporates the effects of terrain. Please see response to comment 044-1.
044	5	The Day-Night Average Sound Level (DNL) metric requires events between the hours of 10 p.m. and 7 a.m. to each be weighted/penalized by 10 dB. The penalty is applied to the (single-event) Sound Exposure Level (SEL) of the specific aircraft type, given its power setting, altitude, and airspeed at the point of interest. Total DNL nighttime (10 p.m. to 7 a.m.) operations for the proposed action would increase by 718 per year (or 68%) relative to the No Action Alternative. If the mix of aircraft does not change and accounting for daytime and nighttime operations, the proposed action would represents an increase in DNL of 1.3 dB relative to the No Action Alternative. Total DNL nighttime (10 p.m. to 7 a.m.) operations for the proposed action would decrease by 77 per year (or 4%) relative to the baseline condition. If the mix of aircraft does not change and accounting for daytime and nighttime operations, the proposed action would represent an increase in DNL of 1.4 dB relative to baseline, even though the nighttime operations would decrease for the proposed action relative to baseline. However, the aircraft mix would change and these rules of thumb would not apply. For ease of comparison, the DEIS reported the overall DNL, accounting for changes in aircraft mix, numbers of flight and run-up operations, the period of day in which they (would) occur, etc., for the baseline, No Action Alternative and proposed action.
044	6	With the proposed action, King Intermediate would be outside the 55 dB DNL contour (see Figure 3-4). The EIS analyzed potential impacts of aircraft emissions (see section 3.4),

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		concluding that emissions from the proposed aircraft would be well below the applicable regulatory threshold for a single stationary source and would be readily dispersed, and therefore, would not significantly affect National or State Ambient Air Quality Standards.
044	7	The introduction of P-8s was evaluated in a Final EIS dated November 2008. C-17 operations are an existing use at MCB Hawaii Kaneohe Bay. As described in Chapter 5, Cumulative Impacts, the Air Force is preparing an EA for C-17 training, including several alternative sites in Hawaii.
044	8	See socioeconomic analysis is presented in section 11. With the proposed action, all public schools in the region are outside the 55 dB DNL contour (Figure 3-4).
045	1	Regarding your request that flight tracks "stay out 2 to 3 miles at sea," as shown in the EIS, normal approach and departure flight tracks are over the ocean (see Appendix D-1.2).
045	2	Marine Corps Air Station (MCAS) Kaneohe Bay is operating in compliance with the accident potential zones (APZs), as illustrated in Figures 2-16 and 3-13 of the DEIS. The DEIS discloses that the proposed action would not result in significant airfield safety impacts. All airfield improvements at MCAS Kaneohe Bay would be designed to comply with Department of the Navy and Department of Defense for runway clear zones, APZs, and transitional surfaces.
046		Comments noted.
047		(Paper copy of the DEIS was provided to requestor at the time of request.)
048		Thank you for your comment.
049	1	Approximately 28 percent of the total flight operations at MCAS Kaneohe Bay would be from based MV-22 and H-1 aircraft. Projected changes in aircraft noise associated with the new squadrons at the points of interest (POI) are shown in the EIS—ranging from 1.3 to 3.0 dB DNL compared to baseline, and from 0.3 to 1.1 dB DNL compared to the No Action Alternative. Changes of 3 dB and less are generally not detected by the human ear. Areas exposed to 65 dB DNL or greater would primarily include water and MCB Hawaii Kaneohe Bay. The only public areas on land encompassed by the 65 dB DNLwould be the northern portion of Coconut Island and the tip of Kealohi Point. Fixed wing aircraft (transient jet aircraft such as C-5s and C-17s, and transient Hornet aircraft) would continue to be the primary contributors to noise in the environs.
050	1	Please see response to comment 002-1. To address your concern about home values, the history of single family home sales in Kaneohe from 1985 onwards was reviewed, comparing average annual sales in the regions near the bay (i.e., makai of Kamehameha Highway) with sales further upland (for Tax Map Key sections 1-4-4 through 1-4-6), and with islandwide averages. Until the late 1990s (during a period when Hawaii was experiencing a recession and when jets were based at the Marine Corps Air Station), average sale prices in both parts of Kaneohe were well below the island average. Since the late 1990s, sale prices for homes in the area near the bay have risen to about the same level as islandwide averages. Inland Kaneohe prices have not risen. While many factors contribute to property values, the data suggest that the noise levels associated with current operations do not depress home values near Kaneohe Bay. Since the increase in noise associated with the proposed action is small compared to historic levels, no impact on property values is expected.

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051	1	The computer modeling for the EIS is for the purposes of the Day-Night Average Sound Level (DNL) metric which considers noise during two periods of the day -- daytime and nighttime. The nighttime period spans 10 p.m. to 7 a.m. The only P-3 Orion run-ups reported/modeled during the DNL nighttime period are: lower power "Ops Checks" on the flight line (aircraft parking areas) – only 10 percent of these operations during the nighttime, and low power run-ups at the Combat Aircraft Loading Area (CALA) – only 5 percent of these during the nighttime period. The high-power run-ups for the P-3 are only conducted during the DNL daytime period. Therefore, total P-3 nighttime (10 p.m. to 7 a.m.) runups are 17 per year with durations varying from 5 to 30 minutes each. It is estimated that P-3 nighttime run-ups generate a range of outdoor instantaneous maximum sound level (Lmax) or time-averaged Equivalent Sound Level (Leq) of 47 dB to 55 dB at your residence. For the No Action and proposed action scenarios, most P-3 Orion operations would be replaced by P-8 Poseidon operations. The P-3 is a 4-engine relatively large turboprop aircraft, whereas the P-8 is derived from a Boeing 737, 2-engine jet. During the DNL nighttime period, the P-8 would perform approximately 18 low power runups per year on the flight line (i.e., the same parking area currently used for the based P-3 aircraft) for durations up to 12 minutes each. It is estimated that P-8 nighttime run-ups would generate an outdoor Lmax or Leq of 51 dB at your residence. Although DoD has not yet established significance criteria for noise impacts related to speech interference for use in NEPA studies, the Environmental Protection Agency (EPA) suggests typical speech interference begins at Lmax or Leq exceeding 60 dB. Using this threshold, speech interference is/would not be anticipated at your residence due to P-3 or P-8 nighttime runups. For the proposed action, MV-22 and H-1 aircraft are not anticipated to conduct run-ups at MCB Hawaii Kaneohe Bay. Regarding projected aircraft noise, see response to comment 049-1. Regarding night operations, approximately two percent of total flight operations would be during the DNL nighttime (10 p.m. to 7 a.m.) period.
051	2	Any abatement would be identified when the details of construction activities are developed. Applicable rules and regulations will apply to construction activities.
052	1	Flight tracks and annual landing events are provided in the EIS for MCB Hawaii Kaneohe Bay and for Marine Corps Training Area Bellows (MCTAB). Sound levels were modeled from the sources of greatest aircraft activity and aircraft sound levels (MCB Hawaii Kaneohe Bay and to a much lesser extent, MCTAB) in the DEIS to evaluate the potential effect of the Proposed Action. This quantitative analysis encompassed the areas where the greatest potential impacts (change in sound level and land use incompatibility) are likely to occur. Understanding that the change in sound levels in the modeled area were not appreciable (e.g., 0.3 to 1.1 dB DNL compared to the No Action Alternative from MCB Hawaii Kaneohe Bay) and cumulative sound levels would remain compatible with land uses, it can be deduced that sound levels would be less in the areas farther away, e.g., Kailua, and compatible.
052	2	Flight tracks for the proposed MV-22 and H-1 aircraft are defined and shown in Volume 1, Appendix D-1.2 for Kaneohe and Appendix D-2.2.1.2 for Bellows. Approaches and departures generally occur over the ocean and the Marine Corps installations. If required, flights over inhabited areas would be at a minimum altitude of 500 feet above ground level, in accordance

Appendix A-5
Responses to Draft EIS Comments

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		with FAA regulations covering uncontrolled airspace.
052	3	Please see response to comment 002-1. The issue of aviation safety is addressed in Section 3.10.3 of the DEIS.
053	1	Please see response to comment 040-1.
053	2	Please see response to comment 005-6.
053	3	Please see response to comment 053-2.
053	4	Thank you for your comment. In generally, the evaluation of potential impacts uses established criteria applied throughout U.S. by DoD. Please see response to comment 006-3, which describes why the resources in the area are not expected to be impacted by the Proposed Action's use of the existing airport.
053	5	Please see response to comment 029-6.
053	6	Please see response to comment 006-2. With the infrequent use of the existing airport, housing values are not expected to be affected.
054	1	Thank you for your comments. Please see response to comment 098-1.
054	2	Please see response to comment 098-2.
054	3	Please see response to comment 098-3.
054	4	Please see response to comment 098-4.
054	5	Please see response to comment 098-5.
054	6	Please see response to comment 098-6.
054	7	Please see response to comment 098-7.
054	8	Please see response to comment 098-8.
054	9	Please see response to comment 098-9.
054	10	Please see response to comment 098-10.
054	11	Please see response to comment 098-11.
054	12	Please see response to comment 098-12.
055		Letter not included; internal DoD letter.
056	1	Regarding EO 12898, see the analysis in Section 4.11 of the EIS. Regarding the DEIS public review period, see response to comment 037-12.
056	2	Regarding aviation safety, see Section 3.10.3 of the EIS.
056	3	The term "legally mandated" in Section 1.3, Purpose and Need, refers to the III MEF

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		operational commander's responsibilities. The mandate is stated in the law which defines the composition and functions of the U.S. Marine Corps (Title 10, U.S. Code Section 5063, cited in the footnote). It does not define Marine Corps responsibilities with regard to threatened and endangered species, migratory birds, coral reefs, Environmental Justice, environmental health and safety risks, etc. The Marine Corps is subject to federal laws covering these and other issues. For a list of key applicable government permits, consultations, laws, and executive orders, see Section 1.7 of the EIS.
056	4	As described under "Public Access" in Section 4.2.3 of the DEIS, the proposed action would have no impact on existing public access at MCTAB and Bellows.
056	5	Two State airports are currently used by the Marine Corps (and other DoD services) for night vision training: Kalaupapa Airport on Molokai and Dillingham Airport on Oahu. Other airports may be suitable. The Marine Corps Base (MCB) Hawaii is consulting with Native Hawaiian organizations, the National Park Service, and other parties participating in the National Historic Preservation Act Section 106 consultation process, which addresses the proposed use of Kalaupapa. The results from this process will be documented in the Programmatic Agreement.
057	1	Your comment regarding certain flight paths toward Eagle or Boondocker have been noted and forwarded to the MCB Hawaii Community Plans and Liaison Officer (CPLO). The noise analysis did consider impacts on the Kaimalino neighborhood. It shows that the Kaimalino neighborhood and Aikahi Elementary School are outside the 55 DNL noise contour in all three scenarios: 2009 baseline conditions, No Action, and the proposed action. See Figures 3-3 and 3-4, on pages 3-30 and 3-33 of the DEIS, respectively. If required, flights over inhabited areas would be at a minimum altitude of 500 feet above ground level, in accordance with FAA regulations covering uncontrolled airspace. A monitoring system to inspect the flight paths of the pilots is not planned under this Proposed Action; however, please see response to comment 002-1 should you observe flight concerns.
058	1	See responses to 031-6 and 031-7 above. The notice of availability of the DEIS was published in the *Molokai Dispatch* on November 16, 2011, and in the *Garden Isle News* on November 10 and 13, 2011. (Note: The *Molokai Dispatch* publishes once a week.)
058	2	Please see response to comment 025-4.
058	3	Moving the entire MAGTF to Okinawa or Guam is not an option in the EIS. The action under review in this document is the basing of three aviation squadrons, not the location of Marine Corps forces in the Pacific. The purpose and need for the basing of the squadrons is addressed in Section 1.3 of the EIS, and the issue of alternative locations for the squadrons is addressed in Section 2.3.
058	4	The Marine Aviation Plan, published annually, provides an overall strategy and schedule for Marine Corps aviation. It is not subject to NEPA review. As strategies are translated into specific actions or projects, those actions/projects may be subject to environmental review, for example, when facilities development is proposed. The estimated planning horizon for the subject EIS starts in the year 2018, so the action is being evaluated within an approximate seven-year timeframe to account for the complete transition timeline, including potential cumulative impacts.
058	5	Aircraft are free to use State airports in coordination with civilian airport authorities, in

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		accordance with FAA procedures. No additional environmental review is required to evaluate impacts of routine flight operations on facilities and nearby residents. The State DOT Airports Division periodically updates master plans and environmental documents for its facilities. See Section 2.4.2.2 of the FEIS for more information.
058	6	See response to comment 058-4.
058	7	See response to comment 058-5.
058	8	No.
058	9	High-altitude landing zones are not critical to either the VMM or the HMLA squadrons for training.
058	10	Thank you for your comments.
058	11	Please see response to comment 058-1.
058	12	Please see response to comment 058-5. Likewise, routine or administrative use of Department of Defense airfields does not require additional environmental review. Also see response to comment 058-5.
058	13	Section 1.3, Purpose and Need, explains that the rationale for the Hawaii basing location, due to military need. See also Section 2.3, which summarizes the screening process used to develop the Hawaii basing alternatives in the EIS. It is outside of this NEPA scope of effort to analyze "how much of the decision to base aircraft and personnel in Hawaii" is "due to a wish to contribute to Hawaii's economy."
058	14	Because fuel storage and transportation procedures are not proposed to change, associated risks were not the focus of this EIS. Fuel would be obtained locally, for example, at Molokai Airport. No fuel would be stored at the Molokai facility. Any fuel storage at PTA would be in facilities designed for such use, including measures for spill prevention and safety.
058	15	In February 2011, the V-22 program exceeded 100,000 total flight hours since program inception. The Osprey has been one of the safest rotorcraft ever fielded by the DoD. For the Marines, over the last ten years, the MV-22 has the lowest class A mishap rate of any currently fielded tactical rotorcraft (see Section 3.10.3.3 of the DEIS). Regarding readiness, all newly introduced aircraft face readiness challenges early in the operational phase. MV-22 readiness rates are on par with other types of aircraft at similar periods. A clear roadmap is in place to further increase readiness levels. Regarding the statement that MV-22s in Iraq completed missions in a "low-threat theater of operations," the MV-22B and CV-22 flew into all threat zones in Iraq, including "black zones"—the most dangerous areas. It performed extremely well across the full range of assault support missions, including raids and heliborne assault, exceeding the capabilities of legacy helicopters in speed, agility, and survivability. Every mission flown in Iraq and Afghanistan was/is a combat mission. A combination of performance and tactics unique to the MV-22B keep the aircraft outside much of the threat envelope during transit. During ingress and egress, when the aircraft must penetrate the threat envelope, the speed, agility, and low aural signature of the MV-22B combined to reduce exposure to threats and improve survivability. Ballistic tolerance protects crews and passengers in case of engagement.

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		In addition, the aircraft is able to operate in extreme conditions. VMM-162 completed all mission tasks in Iraq throughout the summer of 2008, when ambient temperatures ranged well above 120 degrees. The aircraft operated in dust storms with ¼-mile visibility when other rotorcraft could not.
058	16	Please see response to comment 058-5.
058	17	Use of the Keamuku LZs is evaluated in the various resource sections of the EIS in Chapter 4. The areas that you mention are called out on the map for context, to show where the proposed landing zones are located in relation to other areas. None of these areas would be used for aviation training. The red dots shown on the map (Figure 2-10) within the installation boundaries are proposed for use by the new squadrons. These are existing facilities, currently being used by Army and Marine Corps aircraft, as well as others. There will be increased use of PTA by the Marine Corps attributed to the new squadrons, a total of approximately 9,370 operations annually (Table 4-15). However, with a reduction in the number of CH-53s, the projected number of CH-53 annual operations at PTA would be substantially less (44% fewer operations). The only construction at PTA under the proposed action is the improvement and enlargement of the Bravo helipads at Bradshaw Field.
058	18	The operations estimates in the airspace section are conservative, assuming that the squadrons are in Hawaii, not deployed. When the squadrons are deployed, either in the Western Pacific under the Unit Deployment Program (UDP; see page 1-13 of the DEIS) or in Afghanistan, the number of operations in Hawaii would be less.
058	19	See response above (058-18).
058	20	No public meeting was conducted on Maui since the activities proposed at the HIARNG facility would be "administrative," generally limited to aircraft landing and taking off, with no significant impacts. Confined area landings (CALs) are described in Table 2-4. They are landings conducted in areas with obstacles, such as trees or buildings. "Risk mitigation" is addressed through standing operating procedures. One of the purposes of training is to assure that troops are able to successfully and safely engage in these activities in realistic settings.
058	21	A Programmatic Agreement (PA), developed through Section 106 consultation, stipulates mitigation measures, including archaeological monitoring. Monitoring will be conducted in areas where it has been determined by a qualified archaeologist that there is a potential for buried cultural deposits.
058	22	There would be no change in public access at Upolu Airport. The issues of BASH, invasive species, and wildland fires at PTA and Upolu were all addressed in the DEIS.
058	23	Issues of national fiscal policy are outside the scope of this EIS.
058	24	As described in Section 3.11, the relatively small size of the population associated with the Proposed Action (2,206 active-duty personnel and their dependents) would not affect the existing police service (civilian and on-base military). There is no reason to suggest that the crimes you mentioned would be affected. Attempts to address these crimes with respect to the Proposed Action would be highly speculative and not useful for this NEPA evaluation.

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058	25	The information in Section 3.8.3 of the DEIS explains that the relative risk of grass fires ignited by the V-22 is based on incidences. Because the risk of fire depends on the environmental conditions, the key value in evaluating these incidences is gaining an understanding of the causes of the fires so that they can be prevented. For this reason, implementing measures to prevent risk of fires, such as avoiding landing on vegetated areas are emphasized. Given the use of exhaust deflectors and additional operational measures (described on page 3-58-59 of the DEIS), as well as implementation of the Army's Integrated Wildland Fire Management Plan, the risk of fire caused by MV-22 exhaust is unlikely. See 031-2 for more information.
058	26	The EIS evaluates impacts of the alternatives as described in section 2.4. Transiting aircraft may fly in uncontrolled airspace as long as they follow FAA procedures.
058	27	Please see response to comment 058-1.
058	28	MV-22 and H-1 aircraft would not be landing on Kaula Island. Impacts of training operations at Kaula Island and the PMRF water ranges by the Marine Corps are being evaluated in the Hawaii-Southern California Training and Testing EIS/OEIS. This document is in progress.
058	29	Yes (assuming that the proposed rule is approved).
058	30	The number of operations shown in Table 4-18 (Final EIS) does not translate directly into number of flights, trips, or time spent at the LZ. The numbers represent the number of proposed operations per training event type to be carried out by pilots at the installation. Pilots are required annually to successfully complete specific numbers of different types or categories of training activities. For example, a pilot may fly his/her helicopter to a training area to meet qualifications for several types of activities. Depending on how each type of activity is counted in terms of operations, a pilot typically accomplishes multiple operations during a single "trip" or "flight." The training activities summarized in the table would generally occur within PTA boundaries. No training or construction would occur within or in the vicinity of palila critical habitat. People seeking cultural, spiritual, or wilderness experiences near Pohakuloa would not be significantly affected by aircraft noise (see Section 4.5.2.3 of the Final EIS). Note that the new Marine Corps squadrons would add approximately 9,400 operations to PTA. The operations of the new squadrons would be approximately 20 percent of the projected total for PTA under the proposed actions.
058	31	Please see response to comment 058-30.
058	32	The issue of visual impacts is addressed in Section 4.2.3 of the DEIS. As PTA is an existing training area, the visual impact would be similar to existing conditions.
058	33	That sites are often related to other sites is taken into account in the management of cultural resources. For analysis of impacts to cultural resources, the ROI is also referred to as the Area of Potential Affect, or APE. The APE for cultural resources was developed in consultation with Native Hawaiian organizations, Advisory Council on Historic Preservation (ACHP), State Historic Preservation Officer (SHPO), National Park Service, and other interested parties. No appreciable impacts are anticipated outside of the ROI identified in the DEIS.
058	34	Since conditions within the study area (proposed airport expansion areas) have remained

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		unchanged, and since no construction or habitat modification is proposed as part of the proposed action, the data from the earlier EA was determined to be valid. If construction had been proposed, as it is at PTA, updated surveys would have been conducted. As explained in Section 2.7 of the DEIS, NEPA specifies that impacts should be discussed in proportion to their potential significance; in other words, criteria are used to determine the appropriate level of analysis. It was determined that given the infrequent use of Upolu Airport, new surveys were not warranted.
058	35	For both cultural and natural resources, the analysis in the EIS specified a 350-foot (107-meter) area around the landing zone (LZ) perimeter for MV-22 downwash effects. See Appendix F-2 of the DEIS. At paved LZs, no soil erosion effects are expected. At unpaved LZs, there is a potential for soil erosion due to aircraft downwash. As discussed in section 4.6.3 of the DEIS, erosion is less likely at PTA, where soils are mainly rocky and poorly developed.
058	36	See response to 058-35.
058	37	The aviation operations and minor construction activities planned at this existing training area under the Proposed Action would not affect soil and groundwater resources. Existing protective measures serve to prevent soil and groundwater contamination.
058	38	Evidence does not suggest that the "sight and sound" of aircraft has a significant adverse effect on animals. For example, nene at PTA are found mainly in the impact area, and measures are required at airports to address the risk of bird aircraft strike hazard.
058	39	The findings in the EIS regarding the Hawaiian hoary bat are based not only on the surveys conducted in May 2011, but on earlier surveys as well. Section 4.8.2.3 of the DEIS cites these surveys.
058	40	The known rare plant populations at PTA are largely located in the established conservation areas and areas supporting intact native vegetation that are subject to minimal disturbances. According to PTA environmental staff, drought conditions in the saddle area have resulted in a temporary reduction in the known rare plant occurrences at PTA. Except for LZ X-ray and some of the survey buffer areas, the LZs proposed for use are not located in areas that support intact native vegetation types, and they are subject to routine ungulate browsing and military training maneuvers. Therefore, the immediate project areas do not support suitable habitat conditions for rare plants. Considering this, the botanical surveys were sufficient to confirm the absence of rare plants in those areas. LZ X-ray and some of the survey buffer areas do support remnant native vegetation types that could support rare plant occurrences. The drought conditions may have affected the potential for rare plant occurrences in these areas; however, these areas are not proposed for disturbance. Furthermore, the Army has been conducting surveys at PTA for more than 15 years, and the EIS analysis is based on data from these surveys as well.
058	41	This issue is addressed in the Cumulative Impacts chapter of the DEIS, Section 5.3.7.
058	42	The issue of wildland fires is addressed in existing management measures, including the Army's Integrated Wildland Fire Management Plan.
058	43	Please see response to comment 098-8.
058	44	Please see response to comment 058-25.

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058	45	Given the low frequency of operations, no additional mitigation is required.
058	46	This issue is outside the scope of the EIS. Surveys of the firing range at PTA are not the responsibility of the Marine Corps.
058	47	This section provides the cultural context for each training area and focuses on existing conditions within the area of potential effect (APE), which is defined as the 350-foot (107-meter) buffer around the perimeter of each landing zone. Previous archaeological and cultural surveys within or in the vicinity of the APEs are summarized and resources are described. This level of detail is sufficient. See Section 3.9.1 of the DEIS for a discussion of statutory and regulatory requirements that guided the methodology followed in the EIS.
058	48	Please see response to comment 058-35.
058	49	Please see responses to 058-33 and 058-35.
058	50	Please see responses to 058-33 and 058-35.
058	51	Comment noted.
058	52	An extensive list of references is presented in Chapter 9. It is sufficient for the EIS to present bibliographic information for sources cited in the text. Archaeological survey reports are not provided to the public for review and are subject to the Archaeological Resources Protection Act (ARPA) 1979 which "prohibits public disclosure of information concerning the nature and location of archeological resources…"
058	53	As explained in the EIS, additional surveys are proposed before use by MV-22 aircraft. This is addressed in the Programmatic Agreement in Appendix K of the Final EIS.
058	54	Several of the landing zones have been identified as having potential for additional sites. These probability assessments are based on archaeological monitoring and an analysis of survey data. Some of the landing zones may require additional archaeological surveys before they are used by the MV-22 aircraft. Procedures for additional surveys are addressed in the Programmatic Agreement in Appendix K of the Final EIS.
058	55	Please see response to comment 001-6.
058	56	Please see response to 001-6.
058	57	No, the proposed aircraft do not contain radioactive materials.
058	58	Regarding downwash effects on personnel, there is a misconception that excessive MV-22 downwash prohibits hoisting, fastrope, and overwater hover work. Rotor downwash of the MV-22 is similar to that of the CH-53E. After incorporating lessons learned from earlier operational test periods, procedures have been developed to effectively mitigate downwash effects on personnel working below or in the vicinity of the aircraft, as well as personnel exiting the aircraft via fastrope, rappel, or helocast operations. These procedures are safe, effective, and in use today.
058	59	Please see response to comment 058-24.
058	60	Please see responses to 058-41 and 058-42.

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058	61	No, military housing and a military exchange are not planned on Hawaii Island under this Proposed Action.
058	62	Comment noted.
058	63	The carrying capacity of each island and the state as a whole for military use is outside the scope of the EIS. The issue of capacity with regard to infrastructure and public services to accommodate the proposed basing of the squadrons at MCB Hawaii Kaneohe Bay is addressed in Chapter 3.
058	64	Regarding the contention that MV-22 exhaust damages the flight decks of Navy ships, when the MV-22 nacelles are positioned vertically for takeoff, engine exhaust gases are directed toward the flight deck. As a precautionary measure, portable heat shields were used aboard LSD and LPD class ships during the first MV-22 deployments. Subsequent testing and analysis determined that instead of these heat shields, a nacelle modulation technique (the nacelles are periodically rotated a few degrees) was a more suitable and effective method to protect the flight deck. Using this method prevents heat buildup in the deck plating and negates any chance of damage.
058	65	High winds are an acknowledged condition at PTA and other training areas in Hawaii and elsewhere. The MV-22 exhaust deflector system and other precautionary measures, including fire risk management measures at training areas, serve to reduce the risk of wildland fires.
058	66	The findings described in Appendix F-2 regarding downwash are still valid.
058	67	Please see responses to comments 058-38, -39, -40, -41, and -42..
058	68	The findings in the EIS regarding the botanical resources are based not only on the surveys conducted in May 2011, but on earlier surveys as well.
058	69	Please see response to comment 058-52.
059	1	Thank you for your comments. Please see response to comment 002-1 and the following. Introduction of the new squadrons would increase the number of operations at MCAS Kaneohe Bay. As disclosed in the EIS, changes in aircraft noise levels at noise sensitive areas would rangr from 0.3 to 1.1 DNL compared to No Action, and from 1.3 to 3.0 compared to baseline (2009). Changes of 3 dB and less are generally not detected by the human ear. Fixed wing aircraft would continue to be primary contributors (approximately 90%) to noise in the environs. Forecasted changes in aircraft noise levels attributed to the MV-22 and H-1 aircraft at noise sensitive areas would be very small. See Figures 3.3 and 3-4 in the EIS. The contours encompassing the shoreline on the maps for all three conditions (baseline, proposed action, and No Action) are the 55 dB DNL contours. The DNLs at the Kaneohe Bay shoreline are relatively quiet, well below the Department of Defense's land use compatibility criteria of 65 dB DNL, and are expected to remain so. The 55 dB DNL noise level is typical in "normal suburban residential areas." (Source: U.S. Environmental Protection Agency, 1974)
060	1	The Marine Corps considered split basing at either Joint Base Pearl Harbor-Hickam or at Wheeler Army Airfield. Findings of this analysis are summarized in section 2.3, Alternatives Development Process. See also Section 2.5, Alternatives Considered but not Carried Forward

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		for Analysis.
060	2	The issue of aviation safety is addressed in Section 3.10.3 of the DEIS.
060	3	Please see response to comment 050-1.
061	1	Thank you for your comments. Based on the information in your comments, it seems that you missed the video (on continuous loop on a laptop) comparing noise contours of various aircraft approaching and departing from MCB Hawaii Kaneohe Bay at the public meeting. Introduction of the new squadrons would increase the number of operations at MCAS Kaneohe Bay. As disclosed in the EIS, changes in aircraft noise levels at noise sensitive areas would range from 0.3 to 1.1 dB DNL compared to No Action, and from 1.3 to 3.0 dB DNL compared to baseline (2009). Changes of 3 dB and less are generally not detected by the human ear. Fixed wing aircraft would continue to be primary contributors to noise in the environs.
062		Thank you for your comments.
063		Thank you for your comments.
064	1	Please see response to comment 016-6 regarding humpback whales. If monk seals frequent the area, they would not be affected by routine operations at the existing airport.
064	2	Please see response to comment 010-1.
064	3	The DEIS did not suggest that "jet fuel run off and the dropping of fuel over the ocean and land" would be allowed. Please see response to comments 005-1 and 016-6.
065	1	Please see response to comment 059-1.
066		Thank you for your comments.
067	1	See response to 065-1 regarding projected noise levels in 2018. Approximately two percent of total flight operations in 2018 would be during the nighttime period (10:00 p.m. to 7:00 a.m.). Regarding existing operations, see response to comment 002-1.
068	1	Please see response to comment 059-1 regarding projected noise levels in 2018.
069	1	Thank you for your comments.
070	1	Please see response to comment 059-1 regarding projected noise levels in 2018. See also response to 041-1. Regarding home values, see response to comment 050-1. Please see response to comment comment108-8. With regard to children's health and development, much of the data is inconsistent and unsubstantiated, and suffers from confounding effects inherent in the published studies. As a result, the Defense Noise Working Group (DNWG) finds that the current state of scientific knowledge cannot yet support inference of a causal or consistent relationship between military aircraft noise exposure and non-auditory health consequences for exposed residents (see Findings/Conclusions in the DNWG Technical

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		Bulletin on the Non-Auditory Health Effects of Aircraft Noise, August 2011).
070	2	There is no evidence to suggest effects on wildlife due to either the proposed aviation operations or the proposed facilities construction. With existing natural resource management measures, the proposed aviation activities would not significantly affect listed species. For more information, refer to MCB Hawaii's Integrated Natural Resources Management Plan (INRMP), described on page 3-52 of the DEIS.
071	1	Potential impacts to water quality from the Proposed Action were evaluated in the DEIS in Section 4.7.
072	1	The Marine Corps does maintenance on the MV-22 and H-1 aircraft with the engines running, and the sound is identical to when the aircraft are preparing to takeoff. Engine-running maintenance is done almost entirely during the daytime. This work cannot be done in the hangar. Proposed arrival and departure flight tracks are shown in Appendix D-1.2 of the DEIS. Your comments have been forwarded to the MCB Hawaii Community Plans and Liaison Officer (CPLO). Thank you.
073	1	The computer noise modeling for the DEIS considered aircraft operations from Runway 04/22 in addition to helipads such as Pads 7, 8, 101, and the West Field area at MCB Hawaii Kaneohe Bay. P-8 Poseidon flight and run-up operations were included in the No Action and Proposed Action scenarios as listed in the tables of Appendix D of the DEIS. While "revving" of engines (run ups) and hovering were reflected for appropriate aircraft types in the modeling, the proposed MV-22 and H-1 aircraft are not anticipated to conduct run ups at MCB Hawaii Kaneohe Bay. Your other concerns are addressed in responses to 041-1, 044-1, and 051-1.
073	2	Treated sewage effluent from the base secondary wastewater facility is combined with treated effluent from the Kailua regional wastewater treatment facility (WWTF), and the combined treated effluent is discharged via the County treated effluent pump station and ocean outfall at Kailua Bay. Base sewage is not routed through or treated by the Kailua WWTF. The Kailua WWTF, its treated effluent discharge pump station, and its ocean outfall were not included in the August 2010 consent decree. The consent decree covers several force mains, including the force main from the Kaneohe pre-treatment/pump station facility to the Kailua WWTP. The Kailua WWTF and its UV system do not treat base sewage.
073	3	Please see response to comment 050-1.
073	4	The area consists mainly of single-family residential use. Figure 3-1 in the DEIS shows the area fronting Kaneohe Bay dominated by "low density residential."
073	5	Please see response to comment 108-8. DoD has not yet established significance criteria for noise impacts related to speech interference for use in NEPA studies. MCO 11010.16 suggests the compatibility of residential land use for bands of Day-Night Average Sound Levels (DNL). As residences outside of the MCB Hawaii boundary are/would be exposed to DNL less than 60 dB, MCO 11010.16 suggests these residences are/would be compatible with existing and proposed/alternative aircraft noise. Because their compatibility designation would not change due to the proposed action or alternatives, the DEIS did not assess the change in the potential for speech interference.

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074	NR	Thank you for your comments.
075	1	Yes, the Marine Corps currently follows and will follow measures in its Integrated Natural Resources Management Plan (INRMP) to prevent the spread of invasive species. The document contains specific management actions to identify invasive species threats and to implement strategies to address them. One of the issues highlighted in the EIS is the ongoing effort to prevent the transport and spread of fountain grass, which is prevalent on the Big Island but rare of Oahu. When operating at Pohakuloa Training Area, the Marine Corps would continue to comply with the Army's standing operating procedures (SOPs) to avoid or minimize the spread of invasive species.
075	2	Prior to going to PTA for training exercises, all Marines are briefed by Cultural Resources Managers from USAG-HI PTA regarding protection, preservation, and management of cultural resources at PTA. In addition, MCB Hawaii Operations & Training, in concert with natural and cultural resource managers, hold similar sessions for all unit leaders who supervise training on MCB Hawaii controlled ranges and training areas. During these sessions, Marines are briefed on training areas available for their use statewide, including USAG-HI training areas on Oahu and at PTA.
076	1	Thank you for sharing the Healthy Community Design Smart Growth Checklist.
077		Thank you for your comment.
078		Thank you for your comment.
079	1	Please see response to comment 059-1 regarding projected noise levels. Regarding home values, see response to comment 050-1 above.
080	1	Comment noted. The DEIS states that MCB Hawaii Kaneohe Bay proposes to improve procedures at the entry gates to increase efficiency and capacity.
081	1	Please see response to comment 064-1.
081	2	Regarding humpback whales, see response to comment 016-6.
081	3	Please see response to comment 005-6.
081	4	There would be no "groups of very large aircraft in unspecified numbers." Use of Upolu Airport by the VMM and HMLA squadrons would be infrequent. Night operations may be required if emergency situations occur at night.
081	5	Please see response to comment 025-4.
081	6	There would be no "regular military flight missions" at Upolu Airport. See response to comment 064-1.
081	7	Please see response to comment 009-2. The public meetings on the Big Island were announced in *West Hawaii Today* and the *Hilo Tribune* on November 10 and 13, 2012, providing almost three weeks notice. In addition, press releases issued by the Marine Corps resulted in the publication of news articles about the EIS and the scheduled meetings. The public was given 47 days to submit comments. Although

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		requests for extension of the deadline were denied, the Marine Corps responded to these requests with a statement such as the following: "We are unable to extend the December 27 deadline, but please encourage your neighbors to give us their comments as soon as they can. We will make every reasonable effort to consider all comments in the Final EIS."
081	8	Please see response to comment 017-2.
081	9	Given the infrequency of flight operations, the impacts listed in your comment are highly unlikely. See responses to comments 006-2 and 013-7.
081	10	See response to comment 081-9. The distance of Upolu Airport from the resorts in South Kohala makes such impacts highly unlikely.
081	11	Given infrequent use of the existing airport for routine flight operations, no additional surveys are required. No construction is proposed. Please also see response to comment 005-3.
081	12	No additional impacts associated with the Proposed Action would be introduced to the existing airport. Infrequent flights operating within the parameters of the existing airport would not impact sea life and ocean habitats.
081	13	Please see response to comment 081-12.
081	14	No impacts are expected on the threatened green sea turtle due to infrequent flight operations at the existing airport.
081	15	Please see response to comment 081-12.
081	16	Please see response to comment 081-12. The proposed action would not affect existing public access, including known use of the area by fishermen.
081	17	Flight operations on the paved runway would not cause erosion. The areas that have experienced erosion are outside the buffer identified for MV-22 downwash impacts.
081	18	The DEIS correctly states that the North Kohala fire station is in Kapaau. As for your suggestion that priorities in providing fire and other emergency services for civilian and military populations would be needed, that is unfounded. Rather, should there be an emergency at the airfield, the Marine Corps is available to provide assistance. The MV-22 has fire bucket operations capability and both the MV-22 and H-1 are designed to carry personnel, including medical evacuations. The County of Hawaii Fire Department had no comments on the EIS.
081	19	Upolu Airport would be used only by aviation squadrons, not by ground combat units.
081	20	No; the normal approach and departure would be over the ocean, not over the windmills. Please also see 016-6.
081	21	Infrequent operations at the existing airport would not affect domesticated animals in the area. See response to comment 006-2.
081	22	Please see response to comment 081-10.
081	23	It is not in the tsunami evacuation zone. Since the airfield is not in a low-lying area, it is not

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		vulnerable to tsunami.
081	24	No pollution or radiation impacts would occur from the infrequent flight operations proposed at the existing airport.
081	25	The value of Upolu Airport is as a diversion airfield in case of emergencies, which could occur during the daytime and nighttime hours.
081	26	Given the infrequent flight operations anticipated at the existing airport, no additional studies are needed. Please see responses to your previous comments on biological resources, erosion, noise, emergency services, and other concerns.
081	27	Thank you for your comments.
081	28	Please see response to comment 081-7.
081	29	Please see response to comment 081-7.
082	1	Thank you for your comments. .
082	2	Thank you for your comments.
082	3	Regarding extending the public comment period, see response to comment 081-7.
083	1	Thank you for your comments. Regarding projected aircraft noise levels, see response to comment 059-1.
084	1	Infrequent use of an existing airport is unlikely to result in land compatibility issues with respect to existing noise compatibility criteria and thresholds. Hence, noise modeling was not conducted. For further information, see response to comment 142-5.
084	2	Comment noted. In addition to the past military aviation activities described in the EIS, Upolu Airport was used in 2011 by the Army's Combat Aviation Brigade for training exercises. Please know that confined area landings (CALs) training is no longer proposed and that the site would primarily be used as a diversionary airport when weather is poor at PTA or for emergency situations.
084	3	Please see response to comment 005-6.
084	4	Infrequent operations at the existing airport would not result in adverse economic impacts. See also 006-2.
084	5	Infrequent operations at the existing airport would not affect wildlife. Regarding humpback whales, see response to comment 016-6. No additional environmental review is required for routine use of an existing State airport or for aircraft flying in transit, in uncontrolled airspace, as long as FAA procedures are followed. See Section 2.4.2.2 of the FEIS.
084	6	As stated above, routine and infrequent operations at the existing airport would not affect wildlife. Regarding bird aircraft strike hazard, see response to comment 005-3.

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084	7	Please see response to comment 005-8.
085	1	For the source of the conclusion given in Section 4.9.3.4 of the DEIS, see the description of archaeological and cultural surveys on pages 4-152 and 153.
085	2	Comment noted.
085	3	Infrequent operations at the existing airport would not affect offshore marine resources. No additional surveys are required.
085	4	Established criteria/levels use to evaluate potential impacts on resources and communities (e.g., agriculture, residential) are used. To introduce subjective exceptions in these evaluations would introduce bias.
086		Thank you for your comment.
087		Thank you for your comment. As requested, your department has been removed from the list of further distributions pertaining to this project.
088	1	Thank you for your comment. Please see response to comment 059-1.
089	1	Thank you for your comment. Please see response to comment 013-1.
090		Thank you for your comment.
091	1	That there are no Department of Water Supply facilities at PTA is acknowledged. Regarding Upolu Airport, your understanding is correct that the proposed aviation use would be transient and not affect water demand at this facility.
092	1	Thank you for your comments. Please see responses to comments 059-1 and 002-1.
093	1	Thank you for your comments. Please see responses to comments 059-1 and 131-4.
094	1	To clarify, the proposed action does not include use of jet fighter aircraft. Please also see responses to comments 059-1 and 002-1.
094	2	The large buildings referred to in your letter are historic hangars, eligible for listing on the National Register of Historic Places. New facilities on the base would be designed and constructed to be consistent in appearance with existing facilities.
095	1	Please see response to comment 002-1.
095	2	MBC Hawaii Kaneohe Bay operates within applicable laws and regulations associated with jet fuel. Benzene and other volatile organic compounds tend to volatilize and disperse, and are not likely to accumulate in the bay and groundwater. Special studies to evaluate the accumulation of benzene in the bay and groundwater are not appropriate for this NEPA document.
095	3	See responses to 041-1 and 131-4.
095	4	The issue of basing location is addressed in Chapter 1, Purpose and Need. The squadrons are needed to provide aviation support to existing ground troops based at MCB Hawaii Kaneohe Bay.

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095	5	The noise analysis presented in the DEIS incorporates noise from aircraft currently using MCB Hawaii Kaneohe Bay. See Appendix D-1.1 for the list of aircraft types included in the analysis. Baseline levels of noise are characterized in the study and illustrated in the noise contours shown in Figure 3-3. Regarding chemical contamination, see the evaluation of hazardous materials/waste in Section 3.10.2.
096	1	The Marine Corps representatives appreciated being invited to attend the meeting at Kalaupapa. In preparation for the EIS scoping process, the Marine Corps considered holding a public meeting on Molokai, either in Kaunakakai—close to where the Marine Corps' facility is located (adjacent to Molokai Airport)—or at Kalaupapa. A decision was made to hold the meeting in Kaunakakai, which was accessible to the largest number of the island's residents. During scoping, the Marine Corps conducted community assessment interviews to inform stakeholders about the proposed action and to obtain input. Mr. Steve Prokop, Superintendent of Kalaupapa National Historic Park, was one of the interviewees. See Appendix A-3 in the DEIS for a summary of comments received from these interviews.
096	2	Two State airports are currently used by the Marine Corps (and other DoD services) for night vision training: Kalaupapa Airport on Molokai and Dillingham Airport on Oahu. Other airports may be suitable, and a review of the list of State airports on page 2-2 of the DEIS indicates that they would be on the neighbor islands. The Marine Corps will investigate the feasibility of other sites for night vision training. DNL noise levels from proposed MV-22 and H-1 aviation operations would continue to be compatible with affected land uses. As shown in Figure 4-2, the 65 dB DNL contour would remain within the immediate airport vicinity. The settlement at Kalaupapa would be outside the 50 dB DNL.
096	3	The National Historic Preservation Act (NHPA) Section 106 handout was not intended to be comprehensive. It was used as an informational "fact sheet" during the Section 106 public input portion of the public meetings/open houses. One of the objectives of the public meetings/open houses was to inquire whether any meeting attendees wished to request Section 106 consulting party status. The EIS lists the National Park Service as a consulting party in the NHPA Section 106 process. NPS actively participated in the process—in particular, to assure that "special consideration" was given to protect the National Historic Landmark and that appropriate measures were incorporated into the Programmatic Agreement.
096	4	Please see response to comment 096-2.
096	5	The area of potential effect (APE) was established in consultation with the State Historic Preservation Officer (SHPO). The comment to include a vertical height of 500 feet was considered as part of the NHPA Section 106 consultation process.
096	6	Your concern about the endangered humpback whale is acknowledged. The Department of the Navy (DoN) also understands that the coastal waters fronting Kalaupapa Airport are not designated as part of the Hawaiian Islands Humpback Whale National Marine Sanctuary, which is located off the south coast of Molokai. According to the EA prepared by NPS for the Kalaupapa dock structures project (August 2010), humpback whales observed off Molokai are most frequently found in waters off the northeast coast of the island. Furthermore, humpback

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		whales at Kalaupapa have generally not been seen in water depths less than 30 feet and are more likely to be found in depths greater than 45 feet. This information has been added to the EIS. That beaches on the peninsula serve as monk seal habitat is acknowledged, and has been added to the FEIS. Both beaches would be outside the 65 dB DNL noise contour under the proposed action. As a comparison, note that monk seals use the beach fronting Pacific Missile Range Facility (PMRF) on Kauai with existing aircraft operations and missile exercises. Aviation operations at PMRF are substantially more frequent than Kalaupapa Airport, and the runway is used by much larger and noisier aircraft. In addition, the occurrence of threatened green sea turtles in nearshore waters at Kalaupapa has been acknowledged, and has been added to the FEIS. Green sea turtles are found within the flight corridors of airfields with frequent operations by aircraft that generate high noise levels, e.g., Honolulu International Airport. Green sea turtles also thrive in Kaneohe Bay, site of the airfield at MCB Hawaii Kaneohe Bay (see Section 3.8.2 of the EIS).
096	7	Regarding migratory birds, the proposed aviation activities would have no impact on coastal vegetation used by Pacific golden plover (kolea) for feeding and foraging. Pacific golden plovers are common in open grassy areas adjacent to airstrips and frequent similar airports thought the state. Likewise, the proposed activities would have no impact on Black noddy (noio) nesting along the eastern side of the peninsula. The DEIS discloses that the 65 DNL noise contour for the proposed action would remain within the airport and its immediate vicinity. With regard to the threatened Newell’s shearwater and endangered Hawaiian petrel, the DoN acknowledges that they may transit the airport area. The DoN understands that a major threat to these species results from their attraction to lights, which causes them to become disoriented and to crash. This would not be an issue with night vision training at an unlighted airport.
097	1	Regarding current operations, see response to comment 002-1. Regarding projected aircraft noise, see response to comment 059-1.
097	2	Black dust/pollution is typically associated with products of combustion, not unburned jet fuel. Your comments have been forwarded to the MCB Hawaii Community Plans and Liaison Officer (CPLO).
097	3	Regarding home values, see response to comment 050-1.
098	1	It is not the Marine Corps' intent to "discount noise impacts due to aircraft operations 'not in proximity to residential or noise sensitive land uses'." The EIS considers and analyzes the potential noise impacts in a manner that is appropriate for the issue of concern. Modeling was therefore conducted in areas where the greatest concerns for land use incompatibility might occur. While the Marine Corps recognizes the objectives of the Wilderness Act, under which the Volcanoes National Park Wilderness Area was designated, there are no criteria resulting from this Act wherein further quantitative evaluations could be compared and assessed. The EIS does address potential noise impacts to cultural resources, recreational users and wildlife. As you are aware, the following are programs and laws that address them: Section 106 of the National Historic Preservation Act (NHPA), DoD's Air Installation Compatibility Use Zones (AICUZ) Program, and Section 7 of the Endangered Species Act. It is acknowledge that the southern boundary of PTA and northern boundary of HVNP are

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		approximately four miles from each other, at their closest proximity, separated by Mauna Loa Forest Reserve land. (PTA and HVNP do not share a boundary.)
098	2	Please see response to comment 098-1.
098	3	The Marine Corps will consider providing advance notice of aerial gunnery and live fire activities so you may post information at trailheads.
098	4	The subject of the EIS is proposed training by MV-22 and H-1 aircraft. Hence, the focus of the following remarks are on noise generated by aircraft, as ground activities are not part of the Proposed Action. The Marine Corps understands that NPS is concerned about noise from low flying aircraft that may be adjacent to or in close proximity to the park's designated wilderness, specifically the Mauna Loa Summit Trail and associated backcountry cabins. For clarification purposes, the summit trail runs parallel to the Forest Reserve boundary, not the PTA boundary. The southernmost corner of the PTA parcel is approximately 5.5 miles from the summit trail where it passes Pohaku Hanalei (the closest distance between the trail and the PTA/forest reserve boundary). The landing zones at PTA proposed for use by the MV-22s and H-1s are located in the northern part of PTA, within the Keamuku area and the area immediately south of Bradshaw Field, as shown in Figure 2-10 in the EIS. The H-1 aircraft would conduct live fire training within the designated impact area located in the central portion of the installation. As the crow flies, the summit trail near Pohaku Hanalei is approximately 18 miles from Bradshaw Field. As stated in Section 4.5.2.3 of the DEIS, operational noise impacts are not anticipated at PTA, so detailed modeling of noise was not conducted. The Marine Corps based this determination on the substantial distance between the landing zones/training areas and residential and other noise sensitive land uses. Depending on weather conditions, low-flying aircraft within PTA (between 500 and 1,000 feet above ground level) may be visible and possibly (barely) audible from certain points along the trail and from the Red Hill and summit cabins, with viewers looking down at aircraft in flight, 18 miles away. In addition to the horizontal distance, there is a large difference in elevation between the summit trail and cabins and the aircraft operating within PTA at Bradshaw Field, the landing zones, and the impact area-between 7,000 and 10,000 feet. Although the MV-22 and H-1 may have more flight operations associated with their introduction than existing helicopters, their single-event noise footprint would likely be similar to, if not less than, the noise footprint of the existing helicopters utilizing PTA.

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098	5	Please see response to comment 098-1.
098	6	Please see response to comment 098-1. FAA Order 1050.1E does not apply to DoD EISs. The supplemental noise metrics guidelines recently promulgated by the DoD and cited by the commenter, were designed to address noise sensitive areas adjacent to airfields and special use airspace, but not the special conditions that exist in National Parks.
098	7	Please see responses to comments 098-1 and 098-4. Low-altitude flights would occur mainly within the designated impact area at PTA. Ground training activities are not part of the proposed action, as stated above. Regarding the increase in annual operations, this would typically be spread out over the year as it is now, with the exception being major exercises such as RIMPAC, which are incorporated into the annual operational numbers. Regarding travel routes, noise was modeled to evaluate the potential impact of overflights associated with low altitude training (LAT) and ingress/egress to specific LZs/training areas for the proposed MV-22 and H-1 aircraft. Findings are presented in Section 4.5.3, p.4-49, of the DEIS, represent single-event levels (in dB), and address potential noise impacts at the aircraft's lowest altitude (represent highest noise levels). Specific travel routes were not identified as these aircraft are allowed to operate within FAA-controlled airspace and travel routes could vary. However, the overland route is generally described in Section 4.3, p. 4-15, of the DEIS as one that "would be flown over non-residential areas as much as possible, or flown at higher altitudes."
098	8	This statement about threatened and endangered species at PTA refers to faunal species only; the summary statement on page 6-28 has been corrected to be consistent with the statement on page 4-85. The scientific name for the nene has been corrected on page 4-139. Regarding the surveys, the Department of the Navy (DoN) acknowledges that they were conducted at one point in time. However, the analysis also included the following: • Review of USAG-HI natural resource surveys and GIS data, including efforts conducted to support the 2004 Stryker Brigade Team EIS, and consultation with USAG-HI natural resources staff to identify ESA-listed species and locations and critical habitat at PTA. These data were used to determine the scope of work for the surveys conducted in 2011 as part of the EIS. • Review of reports of USAG-HI's numerous fauna and flora surveys, as well as monitoring, for the presence of ESA-listed species at PTA. See list of sources in Section 4.8.2.3 of the EIS on page 4-84. These sources were used to characterize the natural environment at PTA. • Review of reports of surveys and monitoring for the Hawaiian hoary bat conducted at PTA, listed in Section 4.8.2.3 on pages 4-85 and 4-86.

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098	9	The DoN acknowledges that the endangered Hawaiian petrel and ESA-candidate species band-rumped storm- petrel may occur in transit at PTA. The Hawaiian petrel has been sighted at PTA (Appendix F-3 of the EIS). In response to your comment about noise, vibrations, and visual intrusions generated by ground activities and low-flying aircraft, the DoN wishes to clarify that ground activities are not part of the proposed action. The subject of the EIS is proposed training by MV-22 and H-1 aircraft. Hawaiian petrels and band-rumped storm-petrels are burrow or crevice-nesting seabird species. There is no indication that these two species, or any other burrow/crevice-nesting seabirds, flush from their burrows in response to noise or vibrational disturbance. The DoN would expect these species to remain in their nests in response to noise or vibrations caused by aircraft flying overhead. Breeding behavior would not be impacted by aircraft overflights. Surveys for the Hawaiian petrel (*Pterodroma sandwichensis*) were conducted in May and June 2007 and repeated in June and July 2008, as well as June and July 2009. No birds were encountered during four nights of monitoring from sunset to 9:00 p.m.
098	10	Marine Corps aviation operations at PTA are not proposed in areas known to be frequented by nene. The majority of nene at the installation are present within Training Area 1 (impact area). None of the LZs to be used by the squadrons are within PTA's Training Area 1. Arrival and departure vectors for nene to and from Training Area 1 are known to cross over or near LZ Boogie. LZ Boogie is not proposed for use by the VMM and HMLA squadrons. The DoN has made a "no effect" determination for the nene at PTA. Results of the informal ESA Section 7 consultation with the U.S. Fish and Wildlife Service (USFWS) are presented in Appendix J. Regarding wildland fire risk, see response to comment 031-2.
098	11	Comment noted. This statement is based on our assessment that if there are impacts, all impacts could be mitigated, including those reviewed with the USFWS and with the State Historic Preservation Officer (SHPO) and NHPA Section 106 consulting parties.
098	12	Thank you for this information.
099		Thank you for your comment.
100	1	Noise levels would not increase "dramatically," as described in your comment. Please see response to comment 059-1.
101	1	The Marine Corps takes its obligations and responsibilities under NEPA seriously and strives to provide appropriate and correct analyses of potential environmental consequences of its proposed actions. To address the issues/resources potentially affecting the communities surrounding MCB Hawaii Kaneohe Bay, please see the following: • Regarding projected aircraft noise, see response to comment 059-1. • Regarding the WWTP, see Section 3.12.4 of the DEIS. Potential impacts to wastewater systems from projected increases in on-base and off-base populations would be minimal. • Regarding quality of life, see Section 3.11 of the DEIS. No significant impacts are expected with regard to housing, the economy, community organization, schools, recreation facilities, or public safety and health services. • Regarding human health effects, see Section 3.10 of the DEIS. Introduction of the

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		VMM and HMLA squadrons would not result in significant health and safety impacts with regard to natural hazards, hazardous materials/waste, aviation safety, or ordnance safety. The EIS addresses EO 12898 and concludes that the proposed action would not result in disproportionately high and adverse human health or environmental effects on minority or low-income populations. In addition, the EIS addresses EO 13045 and identifies no disproportionate environmental health or safety risks to children. • Regarding wildlife and conservation areas, see Section 3.8 of the DEIS. With existing natural resource management measures, the proposed aviation activities and construction projects would have no effect on listed species.
101	2	One of the objectives of the Marine Corps' EIS is to describe the potential environmental consequences of its Proposed Action, and in Section 3.3. of the DEIS, the proposed increase in aircraft activity is disclosed. While "quality of life" cannot be evaluated objectively, the Marine Corps evaluates issues and resources (including those affecting residences and wildlife) with established criteria/thresholds that can contribute to this end. An example is the use of thresholds to evaluate noise. Such evaluations help the Marine Corps manage its operations and minimize effects on the community, e.g., identification of flight tracks to minimize noise on the community while maintaining operational safety.
102	1	The noise analysis incorporated other aircraft operating at Kaneohe (both based and transient); please see the tables in Appendix D-1.1 of the DEIS.
102	2	The DEIS public comment period was conducted in accordance with standard practices for NEPA. Because of the timely nature of these Marine Corps actions, review periods cannot always be extended or planned to avoid everyone's holiday schedules. Although the December 27 deadline was not extended, the Marine Corps made every reasonable effort to consider all comments in the Final EIS.
102	3	Noise from the P-8s, as a function of anticipated frequency of operations, was modeled for the action alternatives and No Action Alternative.The tables in Appendix D-1.1 show annual flight operations for baseline, the action alternatives, and No Action; this data was used in the noise modeling. Discussion of the noise study methodology and assumptions is presented in Section 3.5.1.
102	4	The computer models used to estimate noise levels reflect many of the environmental factors in your comments. Regarding water, mountains, and run-ups, see responses to 044-1, 051-1 and 073-1. While the effect of wind on sound propagation was not modeled, the effect of wind on runway utilization was taken into account. Approximately 98 percent of all aircraft operations were modeled to land and depart on Runway 04.
102	5	Please see response to comment 120-6.
102	6	Please see response to comment 073-2.
102	7	In response to the concern about pollution, this issue is addressed in Sections 3.4 (air quality), 3.7 (drainage, hydrology, water quality), and 3.10.2 (hazardous materials and waste) of the EIS. Aviation activities would continue to adhere to applicable regulatory requirements, as well as operational procedures, to prevent pollution. Please also see response to comment 120-8.
102	8	Please see response to comment 120-9.

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102	9	Please see response to comment 108-8.
103	1	Please see response to comment 059-1.
103	2	See Section 2.3 of the EIS; the Marine Corps did evaluate other basing options.
104	1	Thank you for your comments. They have been forwarded to the MCB Hawaii Community Plans and Liaison Officer (CPLO). Please also see response to comment 002-1.
104	2	Please see response to comment 073-1.
104	3	Please see response to comment 050-1.
104	4	Please see response to comment 073-2.
105	1	Please see response to comment 084-1. Given infrequent use of the airport by the squadrons, no significant impacts are expected in these areas.
105	2	Please see response to comment 005-6.
105	3	Please see response to comment 029-6.
105	4	As stated in Section 2.7, NEPA specifies that impacts should be discussed in proportion to their potential significance; in other words, criteria are used to determine the appropriate level of analysis. It was determined that in the case of natural resources, given the minimal change in flight operations within the context of an existing airport, new surveys were not warranted.
105	5	Please see response to comment 105-4.
105	6	Regarding the public meeting venue, see response to comment 009-2. Regarding the comment deadline, see response to comment 120-3.
106	1	Please see response to comment 084-1. The aircraft would land on and take off from the paved runway. Flight operations on the paved runway would not cause erosion. The areas that have experienced erosion are outside the buffer identified for MV-22 downwash impacts.
106	2	The DEIS describes the proximity of the Kamehameha Birthsite and Mookini Heiau to the airport. The sites would not be physically affected by the squadrons' use of Upolu Airport, which would be consistent with normal airport activities (e.g., landings and takeoffs). Confined area landings (CALs) are no longer proposed at Upolu Airport.
106	3	Please see response to comment 025-4. Also, see Section 1.4.1 of the DEIS which summarizes how the Notice of Availability was publicized. Regarding the public meeting venue, see response to comment 009-2.
106	4	NEPA specifies that impacts should be discussed in proportion to their potential significance; in other words, criteria are used to determine the appropriate level of analysis. (See Section 2.7 of the EIS.) Given normal flight operations within the context of an existing airport, new surveys or detailed analyses were not warranted. The community efforts to restore native coastal vegetation and to acquire coastal land for cultural preservation and public access would not be affected by infrequent use of the airport by the squadrons.

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106	5	As transient users of the airport, the squadrons would not require water or wastewater facilities.
106	6	Use of the airport would not affect existing public access.
106	7	Thank you for your comments.
106	8	Please see response to comment 106-1.
106	9	Thank you foryour comments.
106	10	Thank you for this information
106	11	The EIS discloses the importance of Upolu Point as an important roosting site for kolea wintering in North Kohala and cites the higher number of birds counted in the October survey (250, compared to 23 in July).
106	12	See responses to 106-1 and 106-4.
106	13	Please see response to comment 106-1.
106	14	See responses to 106-4 and 029-6. Please also know that in accordance with NHPA Section 106 consultation procedures, the APE was established in consultation with the SHPO. Attempts to identify and consult with parties having interest in historic properties have been made (including notices in newspapers and the DEIS public meetings). A brief description of the NHPA Section 106 consultation process is found in Section 3.9.1 of the DEIS.
106	15	See responses to 106-4 and 040-4.
106	16	Thank you for this information. Please also see the response to 106-4.
106	17	Proposed operations at the airport would occur only on the paved runway within the fenced portion of the property. Anything outside the perimeter fence would be outside the area of potential effect (APE) identified for the MV-22 to evaluate aircraft downwash impacts on natural and cultural resources. See also response to 005-4 regarding the weight/size of aircraft allowed to use Upolu Airport.
106	18	Thank you for your comment. The APE was defined in consultation with NHPA Section 106 consulting parties.
106	19	Routine operations at the existing airport—expected to be infrequent—would not result in adverse cultural impacts.
106	20	BASH risk would be managed through compliance with procedures by air crews to avoid high-hazard situations and determine whether to alter or discontinue operations. When using Upolu Airport (or any other State airport), the squadrons would comply with applicable DOT Airports Division requirements.
106	21	Regarding infrastructure, see response to comment 106-5. Conditions of the grassy area around the tarmac should not affect use of the airport. Moreover, the proposed use of the airport will not affect the grassy area. Regarding high winds, Marine Corps pilots check on weather conditions prior to flights.

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106	22	Thank you for this information.
106	23	Please see response to comment 106-1.
106	24	Please see response to comment 029-6..
107	1	Please see response to comment 064-1.
108	1	As discussed in the EIS, energy conservation measures would be incorporated into projects associated with the proposed action, including roof-top solar thermal and/or photovoltaic technologies and other measures related to reducing loads for building lighting and ventilation/air conditioning. A net-zero energy use discussion will be added to the EIS. Depending on the type of facility, achieving net-zero energy use may not be possible with every new facility. However, on a cumulative basis, MCB Hawaii Kaneohe Bay may be able to achieve net-zero energy use for facilities with development of a biofuel power plant, expansion of the offshore wave energy technology buoys, and other measures. Base-wide net zero energy use will need to consider all new facility construction as well as upgrades and renovations to existing facilities that go beyond those projects planned to support the VMM and HMLA squadrons.
108	2	As stated in Section 4.13.3, the use of aviation biofuels by DoD is in the developmental stage. Issues such as high cost and limited production sources need to be resolved. The Marine Corps is planning to regularly use aviation biofuels, which have been successfully tested in the MV-22, and analyzed and recommended for use in the H-1. In response to your request to provide a best estimate of GHG mitigation for biofuels use, the Marine Corps is not aware of efforts that involve calculating GHG (or any) emissions of petroleum-based fuel versus bio-based fuel. The Secretary of the Navy has announced five energy targets for the Navy and Marine Corps which includes bio-based fuels.
108	3	Additional quantification of estimated GHGs is presented in the FEIS.
108	4	No impaired water bodies have been identified in the vicinity of areas proposed for construction and/or training activities. There are no impaired water bodies near the landing zones at Schofield Barracks East Range or Kawailoa Training Area. This information has been added to the water quality section of the EIS. Treatment features such as bio-swales and open grassed areas that can mitigate hydrocarbon residues from pavements would be developed during project design. Design solutions are expected to be tailored to specific projects, including site conditions.
108	5	The FEIS has been revised to include commitments to ensure compliance with LID requirements, as appropriate. This information will be reflected in the Record of Decision (ROD).
108	6	Since construction contract specifications are not normally presented in a FEIS, the Marine Corps will provide the coordination needed to assure that details on water conservation, as well as other measures to be incorporated into projects, are included in construction plans and specifications.
108	7	Additional estimates of non-regulated sources of criteria pollutant emissions associated with construction and operations have been made and presented in the FEIS.

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		It is not yet known which sources associated with the proposed action would be subject to permitting. As described in Section 3.4.3, stand-by generators are likely sources, and any stationary sources would be controlled through the existing regulatory permit process. References to the "Clean Air Act and Amendments" have been added to this section.
108	8	Table C-1 of Appendix D of the DEIS has been renamed to Table D-1 in the FEIS for consistency with the Appendix naming. While DoD has not yet established significance criteria for noise impacts to schools for use in NEPA studies, MCO 11010.16 suggests the compatibility of educational land use for bands of outdoor Day-Night Average Sound Levels (DNL). DoD guidelines for identifying the potential for (negative) classroom learning effects suggest a school-day Equivalent Sound Level (Leq) of 60 dB as a first-order screening, which for aircraft operations at MCB Hawaii Kaneohe Bay corresponds to a 24-hour DNL of between 55 and 60 dB. As all schools are/would be exposed to DNL less than 55 dB, MCO 11010.16 suggests these schools (including the Hawaii Institute of Marine Biology on Coconut Island exposed to DNL between 60 and 62 dB) are/would be compatible with existing and proposed aircraft noise, and DoD guidelines would not recommend further analysis of these schools. Similarly, DoD has not yet established significance criteria for noise impacts to residential awakenings for use in NEPA studies. MCO 11010.16 suggests the compatibility of residential land use for bands of Day-Night Average Sound Levels (DNL). As residences outside of the MCB Hawaii boundary are/would be exposed to DNL less than 60 dB, MCO 11010.16 suggests these residences are/would be compatible with existing and proposed/alternative aircraft noise. Because their compatibility designation would not change due to the proposed action or alternatives, the DEIS did not assess the change in residential awakenings.
108	9	MCB Hawaii Kaneohe Bay is still in the early planning stages for the projects proposed for development to support the new squadrons. It is too early in the MILCON process to estimate total quantities of segregated C&D waste streams. Likewise, making decisions on conditions to be placed on contractors would occur later in the process. Based on the 30 percent design submittal for the MV-22 hangar and infrastructure project, 75 percent of non-hazardous C&D waste would be recycled and/or salvaged. The Marine Corps uses the Unified Facilities Guide Specifications (UFGS) for all of its projects, including section 01 74 19, Construction and Demolition Waste Management.
109	1	While the number of operations from the proposed action would increase, the effect/change on noise is unlikely to be audible. See response to comment 059-1.
109	2	Please see response to comment 050-1.
109	3	No upgrade to the WWTP is required due to introduction of the squadrons. See Section 3.12.4 of the DEIS.
110	1	Thank you for your comments. While noise and risk of mishaps are associated with all aircraft, measures to minimize these effects are continuously being sought and evaluated. The EIS shares information on noise and mishaps associated with the proposed MV-22 and H-1 aircraft. Please see response to comment 049-1 for a summary of potential noise impacts associated with the Proposed Action and the response to comment 002-1 should you have further concerns about existing aircraft noise. The latest information on MV-22 and H-1 mishaps has been incorporated into Section 3.10.3 of the FEIS.

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110	2	Wastewater disposal is discussed in Section 3.12.4 of the DEIS. Please also see 073-2.
111	1	See responses to 002-1 and 059-1.
111	2	Please see response to comment 002-1.
112	1	Please see response to comment 002-1.
112	2	The former NAS Barbers Point, now a State airport, is not available as either a basing or training site for the VMM and HMLA squadrons. The former Naval base was closed and transferred to the State and others as part of the base realignment and closure process.
113	1	Thank you for your comments.
113	2	Please see responses to comments 002-1 and 108-8.
113	3	Please see response to comment 050-1.
114	1	See responses to 002-1, 041-1, 073-1, and 073-5. Regarding projected aircraft noise levels, see response to comment 059-1. The statement describing the area as low population refers to housing density; the area consists mainly of single-family residential use. Refer to Figure 3-1, which shows the area fronting Kaneohe Bay dominated by "low density residential." Regarding home values, see response to comment 050-1.
114	2	Please see response to comment 095-2.
114	3	No sewage pollution would be associated with the proposed action. See Section 3.12.4 of the EIS for an evaluation of impacts on the wastewater system.
115	1	The proposed action involves tilt-rotor (MV-22) and rotor (H-1) aircraft. No jets or other fixed-wing aircraft, e.g., P-3, which would continue to be the primary contributors to aircraft noise and other concerns in your letter, are proposed as part of this action. Please see response to comment 059-1.
115	2	Please see response to comment 050-1.
116	1	Please see response to comment 059-1. Regarding existing aircraft operations, see response to comment 002-1.
117	1	The statement gives refueling as an example of the type of support that Marine Corps aircraft could rely on at State airports. It does not imply that such support is available at all State facilities. The MV-22 and H-1 aircraft would use the airport on an infrequent basis, mainly when needing to divert from PTA due to weather conditions.
117	2	The runway length criteria presented in Section 2.3 of the DEIS is applicable only to basing locations, not to facilities used on a transient basis. Likewise, the 65-NM range is applicable only to basing locations. As discussed in Section 2.3, potential basing locations need to meet different and more stringent conditions than training locations, e.g., accessibility to airfields and seaports supporting global deployment, proximity to where the ground units are based, and

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		facility capacity.
117	3	The normal flight path between Bradshaw Field and Upolu Airport would not be over Mauna Kea, North Kohala, or the "Gold Coast" resorts. From Upolu Airport, MV-22 would fly at high altitude over the ocean to the vicinity of Kawaihae and then inland (still at high altitude) to PTA. H-1s would follow the same flight path, flying at lower altitude.
117	4	No low-altitude training would occur in the vicinity of Upolu Airport or the nearby wind turbines. Please see response to comment 005-7. Regarding high winds, Marine Corps pilots check on weather conditions prior to flights.
117	5	The MV-22 safety record is addressed in Section 3.10.3.3 of the DEIS. Responding to your question about the length of the MV-22's development cycle is outside the scope of this EIS.
117	6	State airports are listed in the EIS to disclose that they would be used by the MV-22 and H-2 aircraft, as the Marine Corps' CH-53s currently use them for routine flight operations. The new aircraft would not be "widely deployed" to State airports, and aviation training as described in Section 2.4.2.2 and 2.4.2.3 of the DEIS would occur at the designated training areas, most under Department of Defense ownership or control.
117	7	The 118 dB noise level refers only to proposed MV-22 operations at its lowest altitude above ground level (50 feet or 15 meters) during TERF. TERF is conducted over designated Army training areas; therefore, exposure to such levels is unlikely and any exposure is anticipated to be substantially less (see Section 4.5.3 of the DEIS for more information). The possibility of a crash is highly unlikely (see Section 3.10.3.3 of the DEIS), and as explained in response to 117-3, the normal flight paths would not be over heavily populated residential areas.
118	1	Thank you for your comments. Please know that jets are not included in the proposed action and that response to comment 002-1 describes how to share your concerns about existing aircraft operations, including jets. Response to comment 059-1 summarizes the anticipated changes in noise from the proposed aircraft. Regarding existing aircraft operations, see response to comment 002-1.
119	1	Please see response to comment 059-1, which summarizes the anticipated changes in noise from the proposed aircraft. . Regarding existing aircraft operations, see response to comment 002-1. Your comments have been forwarded to the Community Plans and Liaison Officer (CPLO).
119	2	The EIS discloses that there would be no effect on threatened or endangered species due to the proposed construction and operations at MCB Hawaii Kaneohe Bay (see Section 3.8 of the DEIS). Please also see response to comment 101-1.
120	1	Please see response to comment 018-4. The process use to systematically evaluate potential basing locations for use as reasonable alternatives in the EIS was detailed in Section 2.3 of the DEIS.
120	2	See Chapter 5, Cumulative Impacts. Additionally, certain resource/issue areas that are inherently cumulative, e.g., noise, include activities that you mentioned, e.g., P-8s. Please see Section 3.5.2.

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120	3	In addition to formal announcements in the Federal Register, notices were published in local newspapers on all islands where training is proposed to announce the DEIS public meetings and how copies of the DEIS could be obtained. As provided in the notices, hard copies of the DEIS, including source documents in the appendix, were available at 22 public libraries on Kauai, Oahu, Molokai, Maui, and Hawaii islands. All individuals who requested hard copies were accommodated. In addition, the PDF of the document was available on the project website and on the State Office of Environmental Quality Control (OEQC) website. The DEIS public comment period was conducted in accordance with standard practices for NEPA. Because of the timely nature of these Marine Corps actions, review periods cannot always be extended or planned to avoid everyone's holiday schedules.
120	4	The August 2010 consent decree did not include the Kailua Regional Wastewater Treatment Facility (WWTF). The consent decree covers several force mains, including the force main from the Kaneohe pre-treatment/pump station facility to the Kailua WWTF. Treated effluent from the base secondary WWTF is combined with treated effluent from the Kailua regional WWTF, and the combined treated effluent is discharged via the County treated effluent pump station and ocean outfall at Kailua Bay. Base sewage is not routed through or treated by the Kailua regional WWTF. Base treated wastewater is discharged through the deep ocean outfall at Kailua Bay. It does not discharge into Kaneohe Bay. With resumption of treated wastewater effluent reuse on the base and future planned increases to base treated effluent reuse, discharge of treated sewage effluent off the base would be significantly reduced. Treated sewage effluent reuse is part of overall base goals and Department of Defense programs to reduce use of potable water sources.
120	5	Please see response to comment 73-1.
120	6	The DoD recognized the uniqueness of helicopter noise and adopted the Rotorcraft Noise Model (RNM) which was utilized for the subject analysis as mentioned in the DEIS. RNM accounts for the spectral directivity of helicopter and tiltrotor noise and allows more detailed flight profile modeling with regard to aircraft attitude (e.g., roll and angle of attack). Specifically for the MV-22, it accounts for the change in nacelle angle as it departs and lands. The annoyance from helicopter noise has not been fully substantiated by means of community noise survey research. Military and civil helicopter annoyance assessments use the same acoustic methodology adopted for fixed-wing airplanes with no distinction for a helicopter's different noise characteristics. Until additional research proves otherwise, DoD will continue to rely upon the widely accepted DNL as its primary noise descriptor for airport and heliport land use planning, and will also continue the use of supplemental noise descriptors for evaluation of helicopter noise issues.
120	7	Please see response to comment 037-11.
120	8	Existing regulations and practices serve to limit primary pathways of exposure and have been addressed. Please see response to comment 102-7. Other pathways of exposure may exist but are unlikely to present a substantial risk, considering the relatively low incremental impact associated with the Proposed Action. For this reason, a human health impact evaluation from potential contaminants from the Proposed Action accumulating in marine sources of food, e.g. limu and fish, would not be an appropriate level of evaluation for this NEPA document.
120	9	Much of the data regarding effects of noise on health is inconsistent and unsubstantiated, and

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		suffers from confounding effects inherent in the published studies. As a result, the Defense Noise Working Group (DNWG) finds that the current state of scientific knowledge cannot yet support inference of a causal or consistent relationship between military aircraft noise exposure and non-auditory health consequences for exposed residents (see Findings/Conclusions in the DNWG Technical Bulletin on the Non-Auditory Health Effects of Aircraft Noise, August 2011).
120	10	Please see response to comment 120-9.
120	11	Please see response to comment 120-9.
120	12	The Department of Defense policy on this topic identifies 80 dB of Day-Night Average Sound Level (DNL) as a screening threshold for the potential for hearing loss. At MCB Hawaii Kaneohe Bay or at the modeled LZs, no off-station/airfield civilian residents would be exposed to 80 dB DNL for the proposed alternatives. Therefore, hearing loss impacts are not anticipated. (Source: Memo from Ashton B. Carter, Undersecretary of Defense, on methodology for assessing hearing loss risk and impacts in DoD environmental impact analysis, June 16, 2009. The potential hearing loss methodology is defined in EPA Report No. 550/9-28-105, Guidelines for Noise Impact Analysis.)
120	13	Regarding projected aircraft noise levels, see response to comment 059-1. See also responses to 073-5 and 108-8. Regarding existing aircraft operations, see response to comment 002-1.
120	14	See responses to 070-1 and 108-8. Regarding impacts on learning in the classroom, the noise analysis disclosed that public schools in the vicinity would be outside the 55 DNL contour under both the proposed action and the No Action Alternative (see Figure 3-4 in the DEIS).
120	15	The EIS evaluates and discloses that there would be no effect on listed species due to the proposed construction and operations at MCB Hawaii Kaneohe Bay. Please see Section 3.8 of the DEIS.
121	1	Regarding MV-22 safety, see response to comment 001-4. Regarding the proposed use of Upolu Airport, please see responses to comments 005-4 and 005-7.
121	2	Established criteria/levels used to evaluate potential impacts on resources and communities (e.g., agriculture, residential) are used. To introduce subjective exceptions in these evaluations would introduce bias. To address your concern about tourism, with the proposed use of the airport, which would be consistent with FAA procedures, no impacts on tourism are expected.
122	1	Regarding projected aircraft noise levels, see response to comment 059-1. Regarding existing aircraft operations, see response to comment 002-1. Regarding home values, see response to comment 050-1.
123	1	See responses to comments 005-6 and 006-8.With the proposed use of the existing airport, which would be consistent with FAA procedures, no impacts are expected.
123	2	See responses to comments to 005-6, 006-8, and 121-2.

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124	1	To allow for advance planning, the Marine Corps will provide updates to your office as the assignment of personnel moves forward.
125		No response needed.
126	1	Please see response to comment 107-1. With infrequent use of the airport, consistent with FAA procedures, no significant impacts are expected. Regarding humpback whales, see response to comment 016-6.
127	1	Please see response to comment 041-1. Although the baseline noise exposure is presented in the DEIS, the baseline aircraft operations are different from the aircraft operations for the No Action Alternative. It is the difference between the proposed action and No Action noise environments which is used to assess the potential for impacts to land use compatibility.
127	2	Please see response to comment 065-1.
127	3	Please see response to comment 102-7.
127	4	Please see response to comment 120-15.
127	5	Please see response to comment 050-1.
128	1	Regarding projected aircraft noise levels, see response to comment 059-1. Regarding existing aircraft operations, see response to comment 002-1.
128	2	The Department of the Navy (DoN) acknowledges your comments but cannot respond regarding civilian aircraft noise or noise from transient military aircraft not under control of the Marine Corps Air Station tower.
128	3	See responses to comments 108-8 and 120-9.
129	NR	Thank you for your comments.
130	1	Please see response to comment 108-8.
130	2	Regarding projected aircraft noise levels, see response to comment 059-1.
130	3	Regarding projected aircraft noise levels, see response to comment 059-1.
130	4	Please see response to comment 044-1.
130	5	Please see response to comment 130-2.
130	6	Please see response to comment 102-7.
130	7	See responses to 120-4. In addition, other City sewer facilities, including gravity sewer mains, pump stations/force mains, and treatment facilities, do not handle and thus are not impacted by base sewage. Hawaii taxpayers would not be affected as indicated.
130	8	MBC Hawaii Kaneohe Bay operates within applicable laws and regulations associated with jet

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		fuel. Your comments pertaining to odors have been forwarded to the MCB Hawaii Community Plans and Liaison Officer (CPLO).
131	1	MCBH Hawaii Kaneohe Bay Public Affairs Officer (PAO) responded to requests.
131	2	MCBH Hawaii Kaneohe Bay Public Affairs Officer (PAO) responded to requests.
131	3	MCBH Hawaii Kaneohe Bay Public Affairs Officer (PAO) responded to requests.
131	4	Regarding the use of supplemental noise metrics, see responses to comments 006-9 and 041-1. The Day-Night Average Sound Level (DNL) metric is not intended to analyze the potential for sleep disturbance but does include a 10 dB penalty to noise occurring during the typical sleep period – 10 p.m. to 7 a.m. – to account for the increased intrusiveness of noise events and recognizing the phenomena of lower background/ambient sound levels in that period. Yes, the DNL metric does not provide a good indication of single event noise. DNL is not intended to indicate single event noise. However, DNL is based on single event noise levels such as Sound Exposure Level (SEL) and Maximum Sound Level (Lmax) to compute DNL. It is not true DNL is insensitive to very loud, isolated events. In fact, DNL is more often times controlled by relatively infrequent but loud noise events. For example, the existing/baseline DNL environment at MCB Hawaii Kaneohe Bay is dominated by only 12 percent or less of its flight operations – the transient fighter/attack jet aircraft and transient large jets such as the C-5/An-124 and C-17 aircraft. The percentage reduces to 10 percent if the nighttime penalty is taken into account. Regarding uniqueness of helicopter noise in modeling, see response to comment 120-6.
131	5	Please see response to comment 041-1. The comparison made by the commenter between Day-Night Average Sound Level (DNL) and single-event measurements (assumedly Maximum Sound Level (Lmax) and possibly a 4-hour Equivalent Sound Level (Leq)) recorded by the commenter is invalid. DNL is a 24-hour sound level (consider it a weighted 24-hour Leq), whereas Lmax is an instantaneous (i.e., fraction of a second) sound level. Furthermore, DNL is based on annual average daily aircraft activity, whereas the events measured by the commenter pertain to one particular 4-hour period.
131	6	See section 2.7 of the EIS. Not every issue or resource requires in-depth evaluation in an EA or EIS. The decision on whether to conduct noise modeling depended on proximity of the landing zone to noise sensitive receptors and the frequency of operations.
131	7	Please see response to comment 002-1.
131	8	The noise modeling conducted for the DEIS includes noise from run ups and hovering. Please see responses to 073-1 and 051-1. There would be a 49 percent increase in airfield operations with the Proposed Action (relative to the baseline 2009 condition) and a 29 percent increase in airfield operations with the Proposed Action (relative to the No Action Alternative). However, the relationship between these "operations" and resulting "noise" is not linear; hence to a 49 percent increase in airfield operations does not result in a similar increase in noise. Noise is a function of many factors, as described in Appendix D-3, Noise Effects, of the DEIS.

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131	9	See responses to 073-5 108-8, and 120-9.
131	10	Please see response to comment 070-2.
131	11	Please see response to comment 050-1.
131	12	Please see response to comment 018-4.
131	13	The discussion in Chapter 5, Cumulative Impacts, gives reasons why each action or project was considered and which resources are potentially affected.
131	14	Please see response to comment 120-3.
132		Thank you for your comments.
133	1	The Marine Corps has no jurisdiction over Kaneohe Bay Drive, as responsibility for enforcement of traffic laws on public roadways lies with the Honolulu Police Department (HPD), City and County of Honolulu. The military police (MP) can only control traffic on the base; HPD has concurrent jurisdiction giving them some authority on base. Regarding vehicles speeding out the Mokapu Gate, the MPs have addressed this and so has HPD. Marine Corps Community Services (MCCS) provides a monthly "new arrival orientation" that covers a wide variety of topics, including public affairs. If there's a specific issue that needs to be addressed, the Public Affairs Officer could pass it on to the units and consider bringing it up at the orientation.
133	2	Thank you for your comments. Your comments have been forwarded to the Deputy Public Works Officer at MCB Hawaii Kaneohe Bay.
133	3	Thank you for your comments. Your comments have been forwarded to the Deputy Public Works Officer at MCB Hawaii Kaneohe Bay.
134	1	The Marine Corps presently does not plan to use Upolu Airport for confined area landings (CALs) training, as described in the DEIS. Proposed use of Upolu Airport, presented in the FEIS, would be consistent with normal airport activities (e.g., landings and takeoffs) and limited to the use of the existing runway. Use is anticipated to be infrequent. Sites located outside of the airport, including the Kamehameha Birthsite and Mo'okini Heiau, would not be affected by use of the runway. For the source of the conclusion given in Section 4.9.3.4 of the DEIS, see the description of archaeological and cultural surveys on pages 4-152 and 153.
134	2	Comment noted.
134	3	Routine operations at the existing airport—expected to be infrequent—would not affect offshore marine resources. No additional surveys are required.
134	4	Comment noted.
135	1	The proposed action is not to replace existing helicopters (CH-53s) with jets. The proposed action is the introduction of MV-22 and H-1 aircraft. CH-53s would continue to operate at MCB Hawaii Kaneohe Bay. Replacement of most of the existing P-3Cs with P-8As was addressed in an EIS finalized in 2008 (see page 5-3 and 5-4 in the Cumulative Impacts chapter). Regarding projected aircraft noise levels, see response to comment 059-1.

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		Regarding home values, see response to comment 050-1.
136	1	Regarding population density, see response to comment 073-4. Regarding projected aircraft noise levels, see response to comment 059-1. Test flights and noise measurements have not been made at MCB Hawaii Kaneohe Bay. See responses to 073-5 and 041-1.
136	2	The issue of light emissions is addressed in the EIS. At MCB Hawaii Kaneohe Bay, outdoor lights are shielded when possible to minimize attraction to seabirds such as shearwaters. Regarding home values, see response to comment 050-1.
137	1	As stated in the EIS, public access to the coast would not change.
137	2	See responses to 005-6 and 006-1.
138	1	Regarding the deadline for submittal of comments, see response to comment 102-2. Potential impacts on the areas listed were either directly or indirectly evaluated. Regarding projected aircraft noise levels, see response to comment 059-1. Regarding impacts on health, wastewater, and wildlife, see responses to 101-1 above. Regarding impacts on quality of life, see response to comment 018-3. Regarding children and education, all of the public schools in the vicinity are outside the 55 DNL noise contour. Regarding home values, see response to comment 050-1.
139	1	Regarding projected aircraft noise levels, see responses to comments 059-1 and 131-8. Regarding home values, see response to comment 050-1.
140	1	Regarding projected aircraft noise levels, see response to comment 059-1. Regarding existing aircraft operations, see response to comment 002-1.
140	2	Potential impacts on the areas listed were either directly or indirectly evaluated. Regarding projected aircraft noise levels, see response to comment 059-1 above. Regarding impacts on health, wastewater, and wildlife, see responses to 101-1. Regarding impacts on quality of life, see response to comment 018-3.
140	3	The issue of aviation safety is addressed in Section 3.10.3 of the DEIS. Please also see response to comment 110-1. Regarding home values, see response to comment 050-1.
140	4	Regarding alternative basing locations, see response to comment 018-4.
141	1	Introduction of the new squadrons would not change the mission of MCB Hawaii Kaneohe Bay. The squadrons would support the existing ground combat units at the base. Regarding alternative basing locations, see response to comment 018-4.
141	2	The population associated with the VMM and HMLA squadrons would be approximately 1,000 active duty personnel, 22 civilian personnel, and 1,106 dependents. However, the existing HMH squadrons flying CH-53s would be reduced from a total current population (active duty plus dependents) of approximately 1,400 to 750 in the year 2018. Therefore, the *net* increase in population on the island attributed to the aviation units (HMH, VMM, and HMLA squadrons) in

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		2018 is estimated at 1,428. In addition, roughly a third of the Marines in the squadrons would be deployed off-island for combat, scheduled training exercises, or unit rotations as part of the Unit Deployment Program. Some dependents of deployed Marines stay on-island, while others move elsewhere, often back to the continental U.S. to stay with families. Section 3.11 of the DEIS indicates that new housing demand would have impacts but not reach an unacceptable level. Within the base, the proposed action includes provision of some 608 new bachelor housing units.
141	3	Regarding air quality, existing regulatory controls would minimize construction-related impacts, as well as emissions from generators and other stationary sources. Emissions from the proposed aircraft would be well below thresholds established for stationary sources. With the dispersive nature of aircraft emissions and dispersive nature Hawaii's atmospheric environment, emissions are therefore unlikely to be concentrated and would not significantly affect National or State ambient air quality standards. Emissions from additional vehicles would not significantly degrade air quality because of the relatively low cumulative number of vehicles per hour the dispersive nature of atmospheric environment in Hawaii, and measures proposed to improve traffic flow on the base. See Section 3.4 of the EIS for more details. Regarding projected aircraft noise levels, see response to comment 059-1. Fuel dumping from aircraft does not occur at MCB Hawaii Kaneohe Bay. Regarding potable water demand and wastewater disposal, potential impacts due to projected increases in population would be minimal. See Section 3.12.3 and 3.12.4 of the DEIS for more details.
141	4	Shifting the runway as suggested is outside the scope of the EIS and would require a separate study.
141	5	As shown in Figure 34-4 of the EIS, all public schools in the vicinity would remain outside the 55 DNL noise contour. No mitigation is required.
141	6	Repair of the WWTP is the responsibility of the City.
141	7	The base currently has a water conservation program. The EIS states that a number of factors would contribute to reduced water usage, including programs to reduce water consumption, installation of low flow water fixtures in housing and other facilities, and metering and user payment for utility usage to encourage housing occupants to reduce consumption. In addition, improvement to the base's water reclamation facility would allow greater irrigation reuse of treated effluent. Furthermore, the Department of the Navy (DoN) requires that new facilities be designed to Leadership in Energy and Environmental Design (LEED) silver performance rating, and the Proposed Action includes incorporating low impact development (LID) features into new and renovated facilities.
141	8	MCB Hawaii is committed to its stewardship responsibilities for conserving cultural resources at all its installations. Access by Native Hawaiians to MCB Hawaii properties, including the Mokapu peninsula, is reviewed on a case by case basis, and the base is committed to and has a long history of finding ways to accommodate rather than deny such requests for access. The MCB Hawaii Cultural Resources Managers and the Environmental Department Director can always be reached, via phone at 808-257-6920, to discuss Native Hawaiian cultural access to its installations.
141	9	Thank you for your suggested short-term mitigation. MCB Hawaii completed the requisite

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		repatriation of the Mokapu Native Hawaiian human skeletal remains, or iwi, to 21 culturally affiliated Native Hawaiian Organization (NHO) claimants in 1998. Since that time, MCB Hawaii has been working towards reburial of the Mokapu iwi with these NHO claimants, and the base has agreed to their request for a moratorium on all discussions regarding reburial with anyone other than the claimants themselves. Thank you also for your suggested long-term mitigation regarding the establishment of a cultural advisory council. The MCB Hawaii Cultural Resources Managers (CRM) are working with the base's Community Plans and Liaison Officer (CPLO) regarding further outreach, such as you suggest, with leaders in the Native Hawaiian community. The Koolaupoko Hawaiian Civic Club will be included in any such future plans implemented by the base.
141	10	Please see response to comment 141-9.
142	1	Please see response to comment 018-4.
142	2	The EIS addresses cumulative impacts; see Chapter 5.
142	3	The purpose of Section 2.7 was to help the EIS team determine which issues or resources should receive in-depth evaluation in the document. For example, certain issues/resources were not carried forward for more study because they are addressed by measures mandated by statute, regulation, permit conditions, etc. In other cases, further study was not warranted because construction was not proposed, or the resource was not found in the area (e.g., wetlands, historic buildings). Regarding wastewater, the team had to identify existing wastewater system capacity (both on-base and off-base), calculate estimated wastewater flows attributed to new personnel and their dependents, and then determine whether existing facilities are adequate to handle the projected flows. Assumptions and calculations are presented in Appendix I-4. Regarding the consent decree and the Kailua Regional Wastewater Treatment Facility, see response to comment 120-4.
142	4	As explained in response to 142-3, the EIS team determined that it had to analyze potential impacts of the proposed action with regard to those particular resources or issues. The further analysis was conducted as part of the EIS evaluation and does not refer to future studies.
142	5	Two factors were considered in deciding whether noise modeling was warranted: proximity of the landing zone to noise sensitive receptors, such as residential areas and schools, and the projected frequency of aviation operations. Land use and other maps were reviewed to identify potential receptors. Because many of the LZs are located within military training areas, away from such receptors, modeling was not warranted. And if the number of annual operations was low, modeling was also not warranted.
142	6	Kalaupapa Airport is currently used and has been used for many years by the Marine Corps for night vision training. It is one of several "dark" airports in the state suitable for such training and is advantageous given its relatively short distance from Oahu. Dillingham Airport in Mokuleia is another suitable airport, and it has long been used by the Army and Marine Corps for aviation training. The Marine Corps is considering other airports in the state suitable for night training.
142	7	Data on ESA- and MBTA-listed plant and animal species are provided for all of the proposed training areas, focusing on the region of influence (ROI) for each landing zone (see section

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		4.8.1 of the DEIS). In addition, information regarding invasive species, critical habitat, jurisdictional wetlands, and coral reefs are presented, along with descriptions of existing natural resource management measures at each training area. As explained in Section 4.8.2.2, USAG-HI provided up-to-date natural resource data for the Army's Oahu training areas, which identified the location of listed plants and animals, as well as designated critical habitat within the subject training areas. Two LZs were originally considered for use and subsequently deleted because of their proximity to elepaio critical habitat. See pages 4-82 and 4-83 of the DEIS for a discussion of USAG-HI's current bird aircraft strike hazard (BASH) prevention program. In addition, BASH risk is managed through aircrew compliance with established Marine Corps aviation safety procedures, including avoiding high-hazard situations and determining if altering or discontinuing operations are required.
142	8	This statement regarding migratory bird management refers to an existing program described in the Integrated Natural Resources Management Plan (INRMP) for Army training areas on Oahu. It references BASH risk from migratory birds at airfields but concludes that the risk is low at the landing zones not located at airfields.
142	9	The palila critical habitat at PTA is what is referred to as "unoccupied" critical habitat, meaning that the area contains forests which play an essential role in the survival of this endangered species, but no populations of palila have been recorded here. "Incidental usage" refers to occasional or transient use, for example, flying through the area. The meaning is not the same or related to the term "incidental take." Any palila flying through the critical habitat would not encounter aircraft, as these areas are off limits to aviation operations.
142	10	"May affect but not likely to adversely affect" means that the species may be affected but it would not be an adverse effect. As stated in the biological evaluation in Appendix J of the DEIS, if bats are present within a buffer zone, the greatest anticipated disturbance by aircraft rotor wash would be the bat leaving the area. Rotor wash would not be strong enough to knock bats from roosting within the buffer zone. No trees or bushes would be cleared at the landing zones; therefore, pupping bats and juveniles would not be affected. Informal ESA Section 7 consultation was initiated with a letter to USFWS dated November 14, 2011. A draft of this letter was presented in Appendix J of the DEIS, along with the biological evaluation and other supporting information. The final letter, sent four days after distribution of the DEIS, was not substantively different from the draft version. This final letter and results of the consultation are incorporated into the FEIS text and Appendix J.
142	11	Please see response to comment 142-9.
142	12	USFWS's response to the November 14th letter is included in the FEIS. The normal process is for the DEIS to provide information for USFWS to use in its evaluation of effects of the proposed action on listed species and for the response letter to be included in the FEIS.
142	13	Regarding further analysis, see responses to 142-3 and 142-4. Detailed evaluations of cultural resources—including archaeological resources and historic buildings—were conducted as part of the EIS. Findings are in Sections 3.9 and 4.9, as well as Appendix G, of the DEIS.
142	14	See responses to 142-3, 142-4, and 142-13.
142	15	The correct numbers of NRHP buildings proposed for demolition and renovation are

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		summarized in Table 6-1 of the DEIS. Seven facilities are proposed for demolition in Alternative A, and 15 facilities are proposed for demolition in Alternative B. Under both Alternative A and Alternative B, nine NRHP-eligible facilities are proposed for renovation.
142	16	Your request to become a consulting party under NHPA Section 106 has been approved by MCB Hawaii. The Waimanalo Neighborhood Board is currently a consulting party. No other neighborhoods boards requested consulting party status, but Native Hawaiian organizations from these communities are participating as consulting parties.
142	17	The Department of Navy (DoN) has made determinations of "no effect" or "may affect but not likely to adversely affect" for all ESA-listed species that occur within the action area (and the USFWS concurred with these determinations). No formal species management/implementation plans have been prepared in association with this EIS or informal ESA Section 7 consultation; however, The DoN will abide by the management plans and Biological Opinion implementation plans prepared by the Army for PTA and the Oahu training areas. Implementation plans for U.S. Army Garrison Hawaii (USAG-HI) are currently in effect and are available for download from the web at www.garrison.hawaii.army.mil/sustainability/NaturalResources.aspx. In addition, USAG-HI's Integrated Natural Resources Management Plans (INRMPs) for the Oahu installations and training areas and for PTA address ESA-listed species found in these areas. Copies of the INRMP documents can be found at the same website. INRMPs are available for public review during the draft stage of the management plan. INRMPS are updated and reviewed every five years. The MCB Hawaii INRMP can be found at www.mcbh.usmc.mil/g4/environ/natural/ManPlans.htm.
143	1	Please see response to comment 073-1.
143	2	See section 3.12.4 of the DEIS. Potential impacts to wastewater systems from projected increases in on-base and off-base populations would be minimal.
143	3	Please see response to comment 050-1.
143	4	Please see response to comment 065-1.
143	5	Please see responses to comments 073-5, 108-8, and 120-9.
143	6	Extensive data is provided on existing biological resources at MCB Hawaii Kaneohe Bay and potential impacts; see Section 3.8 of the EIS.
144	1	Regarding projected aircraft noise levels, see response to comment 059-1. The proposed action does not include jet aircraft. P-8A operations were covered in a separate EIS finalized in 2008. However, projected P-8A operations have been included in the noise modeling to develop the noise contours shown in the subject EIS. Regarding property values, see response to comment 050-1.
144	2	Regarding wastewater, see responses to 073-2 and 143-2.
145	1	Please see response to comment 110-1.
145	2	Regarding projected aircraft noise levels, see response to comment 059-1.

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		Regarding existing aircraft operations, see response to comment 002-1. Regarding impacts on wildlife, see response to comment 143-6.
146	1	Thank you for this information.
146	2	Regarding humpback whales, see response to comment 016-6. Regarding monk seals, see response to comment 064-1.
146	3	Please see response to comment 009-2.
146	4	NEPA specifies that impacts should be discussed in proportion to their potential significance; in other words, criteria are used to determine the appropriate level of analysis. (See Section 2.7 of the EIS.) Given normal flight operations within the context of an existing airport, new surveys or detailed analyses were not warranted.
146	5	This issue is relevant if the proposed action involves the irreversible conversion of prime or unique farmland to nonagricultural use. This is not the case.
146	6	The EIS does not state that "jet fuel run off and fuel dumping over the ocean and land would occur." See responses to 064-1 and 146-4.
146	7	Please see response to comment 010-1.
146	8	See responses to 006-1 and 006-2.
146	9	Please see response to comment 005-8. Access to these or other sites would not be restricted in any way.
146	10	Routine aviation operations would have no impact on groundwater. The County of Hawaii Department of Water Supply acknowledged that transient use would not increase water demand at the airport (see comment letter 091).
146	11	The issue of wildland fire is addressed in the EIS. Regarding wind conditions with respect to aircraft, see response to comment 005-1.
146	12	Please see response to comment 005-6.
146	13	Please see response to comment 146-4.
147	1	Please see responses to comments 006-2 and 009-2.
147	2	Please see response to comment 146-4.
147	3	The EIS does not state that "jet fuel run off and fuel dumping over the ocean and land would occur." Regarding humpback whales, see response to comment 016-6. Regarding monk seals, see response to comment 064-1 above. Given routine operations at an existing airport, no effects on other biological resources are likely.
147	4	Please see response to comment 010-1.

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147	5	See responses to 006-1 and 006-2.
147	6	Please see response to comment 005-8. Access to these or other sites would not be restricted in any way.
147	7	Routine aviation operations would have no impact on groundwater. The County of Hawaii Department of Water Supply acknowledged that transient use would not increase water demand at the airport (see comment letter 091).
147	8	The issue of wildland fire is adequately addressed in the EIS. Regarding wind conditions for aircraft, see response to comment 005-1.
147	9	Please see response to comment 005-6.
147	10	Please see response to comment 146-4.
148	1	Potential effects on the environment would not be "disastrous." Regarding projected aircraft noise, see response to comment 059-1. Regarding wastewater, see response to comment 143-2. Regarding population density, see response to comment 037-11. The EIS evaluated impacts within the appropriate "region of influence" (ROI) for each resource or issue. For most of the resources/issue, the ROI did not extend into uninhabitable mountain areas. Hiking trails would be an exception (in the analysis of impacts on recreation resources). Regarding potential impacts of noise on health, see response to comment 070-1. As stated in responses above, every reasonable effort to consider all comments in the Final EIS was made.
149	1	Please see response to comment comment 148-1.
150	1	Regarding projected aircraft noise, see response to comment 059-1. No jet fighter aircraft are included in the proposed action. The issue of BayFest noise is outside the scope of the EIS.
151	1	Please see response to comment 064-1 above. To address the concern about the Hawaiian hoary bat, the following information is offered. Bats roost in trees and are common near the edges of forests; however, the open grassland area of Upolu Airport is not prime habitat for the Hawaiian hoary bat. The Hawaiian hoary bat feeds on insects that are attracted to light sources, but no outdoor lighting is present or planned with the proposed use of Upolu Airport. Hence, the proposed use of the existing airport by the squadrons is not likely to adversely affect the bats as the airstrip is not in prime roosting or foraging habitat to cause adverse effects to the population. . For responses to the other comments, see 016-6 and 106-21.
152	1	Please see response to comment 064-1 regarding infrequent operations. Regarding humpback whales, see response to comment 016-6.

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152	2	Please see response to comment 006-3.
152	3	There would be no "frequent large planes taking off and landing." Please see response to comment 013-7 regarding property values.
152	4	Aviation operations consistent with existing use of the airport would have no impact on cultural resources in the vicinity.
153	1	Please see response to comment 106-21.
153	2	Please see response to comment 016-6.
153	3	Please see response to comment 058-34.
154	1	Thank you for this information. In reviewing the NPS management plan for the trail, there is no description of physical remains of a trail at this location. Aviation activities would be consistent with existing airport operations which are not anticipated to have impacts on cultural resources in the area. Marine Corps use of Upolu Airport would be limited to flight operations currently carried out at State airports, in coordination with civilian airport authorities and in accordance with FAA procedures. Upolu Airport's main value to the squadrons would be as a diversion airfield, for example, due to weather conditions. The EIS has been revised to reflect this type of use, which would be infrequent.
154	2	Thank you for this information.
154	3	Please see response to comment 154-1.
154	4	Please see response to comment 154-1 above. Regarding humpback whales, see response to comment 016-6.
154	5	Marine Corps Base (MCB) Hawaii is complying with the NHPA Section 106 review and consultation process regarding the proposed undertaking identified as the Hawaii basing and operations of MV-22 and H-1 aircraft at MCB Hawaii. MCB Hawaii initiated this Sec 106 process in November 2010 and continued consultation with site visits, face-to-face meetings, conference calls, and written correspondence through 2011 to the present. Consulting parties have included the Hawaii SHPO, ACHP, NHOs, and other interested parties. Applicable correspondence, including with the ACHP, are included in the appendix of the FEIS. In addition, the first hour of the DEIS public meetings/open houses held on Oahu and Hawaii Islands in November and December 2011, including those in Waimea and Hilo, were set up specifically for Sec 106 input with existing consulting parties and the public. All attendees at these public meetings were given the opportunity to request participation in the Section 106 process as a consulting party. Lastly, the Department of the Army is participating in this Section 106 consultation process as a cooperating agency because the majority of MV-22 and H-1 aircraft training would occur on Army training areas on Oahu and Hawaii Islands. To further reach out to NHOs and consulting parties involved in Section 106 with USAG-HI (including PTA), the MCB Hawaii Cultural Resources Manager (CRM) attended the PTA Community Advisory Committee monthly meeting in July 2011. As a result of the November/December 2011 public meetings/open houses, four additional consulting parties have been added to this Section 106 consultation process. The list of consulting parties is included in Attachment 15 of the Programmatic Agreement (PA), presented in Appendix K of the FEIS.

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		The Marine Corps presently does not plan to use Upolu Airport for confined area landings (CALs) training, as described in the DEIS. Instead, use of Upolu Airport as described in the FEIS would be limited to flight operations currently carried out at State airports, in coordination with civilian airport authorities in accordance with FAA procedures. For instance, normal approach and departure at Upolu Airport would be over the ocean, and if required, flights over inhabited areas would be at a minimum altitude of 500 feet above ground level, in accordance with FAA procedures covering uncontrolled airspace. Upolu Airport's main value to the squadrons would be as a diversion airfield, for example, due to weather conditions or emergencies. PTA would be the main training area on the island of Hawaii for the MV-22 and H-1 aircraft. The EIS has been revised to reflect this type of infrequent use of Upolu Airport. If the Marine Corps plan to use Upolu or any other State airport for specific exercises, similar to the Army and other services, it would follow the procedures for requesting approval from the State DOT Airports Division. MCB Hawaii acknowledges that besides the physical impacts of MV-22 and H-1 aircraft use of Upolu Airport, you believe that other types of impacts would result from such use. Furthermore, MCB Hawaii notes that you believe the APE for Upolu Airport is too narrowly defined and that the APE should include the entire area affected by the visual and physical impacts of MV-22 and H-1 aircraft use of this airport. MCB Hawaii believes that impacts from aircraft use of Upolu Airport upon the historic properties (Mookini Heiau, the Kamehameha Birthsite/Birthstones, and segments of the Ala Kahakai National Historic Trail) in the vicinity of Upolu Airport would be minimal due to the following: (1) the MV-22 and H-1 aircraft normal approach and departure at Upolu Airport would be over the ocean, thus farther away from the historic properties; and (2) use of Upolu Airport would be infrequent and limited to flight operations currently carried out at this and other State airports in accordance with FAA procedures.
155	0	Duplicate letters. See letters and associated responses to 011, 013, and 081.
156	1	Thank you for your comments. Please see response to comment 058-34. Response to 154-1 characterizes the infrequent, proposed use of the existing Upolu Airport by the MV-22 and H-1 aircraft.
156	2	Please see responses to comments 058-34 and 031-5.
156	3	The EIS discloses the potential BASH risk associated with wintering kolea at Upolu Airport. As stated in Section 4.8.3.4, this risk would be managed through compliance with Marine Corps aviation safety procedures and State DOT Airports BASH control measures. No further study or mitigation is required. Please also see response to comment 151-1 for further information about the Hawaiian hoary bat.
156	4	No training or construction would occur within or in the vicinity of palila critical habitat. None of the landing zones proposed for use are within palila critical habitat.
156	5	Potential impacts on the Hawaiian hoary bat at PTA were evaluated in the EIS (see Section 4.8.2.3 and 4.8.3 and Appendix J of the DEIS). Endangered Species Act (ESA) Section 7 informal consultation has been conducted with the U.S. Fish and Wildlife Service (USFWS), and the outcome of the consultation is presented in Appendix J the FEIS. USFWS concurs with Department of the Navy's determination that proposed training may affect but is not likely to adversely affect the Hawaiian hoary bat.

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156	6	Chapter 343, HRS, is not applicable. As a federal agency, the Marine Corps is subject to the National Environmental Policy Act (NEPA).
157	1	Use of the existing Upolu Airport would be infrequent. Please see response to comment 154-1, 006-2, and 081-17.
158	NR	Thank you for your comments.
159	1	As you have stated, the meeting on December 13, 2011 was the regular monthly meeting held by the State Department of Health. It was not a public meeting for the MV-22/H-1 EIS. The Marine Corps was invited by DOH staff to attend the meeting to share information about the proposed action with and to obtain input from the group, in particular with regard to cultural resources as part of the National Historic Preservation Act (NHPA) Section 106 consultation process. Your comment about visual aids is acknowledged. PowerPoint presentations were not provided at the public meetings/open houses conducted on Oahu and the Big Island. A limited number of hard copies of the DEIS were available upon request, and all requests were accommodated. The Marine Corps staff who attended the meeting appreciated the opportunity to visit with you and other members of the Kalaupapa community.
160	1	Given MTSF's location adjacent to Molokai Airport, along with the projected low frequency of operations (occasional use), it was determined that noise modeling was not warranted, i.e., the infrequent use would yield model results that would show noise levels compatible with land uses in the area.
160	2	The Pulehunui project is included in the list of projects in Chapter 5, Cumulative Impacts, although not identified by name. More information about this project has been added to Chapter 5 of the FEIS.
161	1	Please see response to comment 154-1. Given routine, infrequent use of an existing airport, there would be no effects on natural resources. No fuel hauling or road use is proposed with the proposed use of the existing airport.
161	2	Please see response to comment 081-17. No vehicular traffic would be associated with aviation use.
161	3	Regarding the dairy and wind farm, see response to comment 010-1. As stated above, no vehicular traffic would be associated with aviation use. There would be no need for fuel to be hauled in and out of the airport.
162	1	Please see response to comment 154-1. Given infrequent, routine use of an existing airport, noise and other impacts, if any, would be minimal. See responses to 005-8, 010-1, and 012-1.
163	1	Thank you for confirming these land use designations.
163	2	The Department of the Navy (DoN) is aware that kolea frequent many airfields in the state, including Molokai Airport. As site improvements would be minor, no impacts on kolea or other biological resources are expected.

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163	3	The Marine Corps has consulted with the State Historic Preservation Division and the State Historic Preservation Officer (SHPO) as part of the National Historic Preservation Act (NHPA) Section 106 process.
164		Thank you for your comments.
165	1	Please see response to comment 154-1. Given infrequent, routine use of an existing airport, impacts—if any—would be minimal. There would be no impact on wind conditions. The aircraft would land on and take off from the paved runway. Areas outside the airport boundaries are outside the buffer identified for MV-22 downwash impacts. No mitigation is required.
166	1	Marine Corps Base (MCB) Hawaii is complying with the NHPA Section 106 review and consultation process regarding the proposed undertaking identified as the Hawaii basing and operations of MV-22 and H-1 aircraft at MCB Hawaii. MCB Hawaii initiated this Sec 106 process in November 2010 and continued consultation with site visits, face-to-face meetings, conference calls, and written correspondence through 2011 to the present. Consulting parties have included the Hawaii SHPO, ACHP, NHOs, and other interested parties. Applicable correspondence, including with the ACHP, are included in the appendix of the FEIS. In addition, the first hour of the DEIS public meetings/open houses held on Oahu and Hawaii Islands in November and December 2011, including those in Waimea and Hilo, were set up specifically for Sec 106 input with existing consulting parties and the public. All attendees at these public meetings were given the opportunity to request participation in the Section 106 process as a consulting party. Lastly, the Department of the Army is participating in this Section 106 consultation process as a cooperating agency because the majority of MV-22 and H-1 aircraft training would occur on Army training areas on Oahu and Hawaii Islands. To further reach out to NHOs and consulting parties involved in Section 106 with USAG-HI (including PTA), the MCB Hawaii Cultural Resources Manager (CRM) attended the PTA Community Advisory Committee monthly meeting in July 2011. As a result of the November/December 2011 public meetings/open houses, four additional consulting parties have been added to this Section 106 consultation process. The list of consulting parties is included in Attachment 15 of the Programmatic Agreement (PA), presented in Appendix K of the FEIS.
166	2	The Marine Corps presently does not plan to use Upolu Airport for confined area landings (CALs) training, as described in the DEIS. Instead, use of Upolu Airport would be limited to flight operations currently carried out at State airports, in coordination with civilian airport authorities in accordance with FAA procedures. For instance, normal approach and departure at Upolu Airport would be over the ocean, and if required, flights over inhabited land areas would be at a minimum altitude of 500 feet above ground level, in accordance with FAA procedures covering uncontrolled airspace. Upolu Airport's main value to the squadrons would be as a diversion airfield, for example, due to weather conditions or emergencies. PTA would be the main training area on the island of Hawaii for the MV-22 and H-1 aircraft. The EIS has been revised to reflect this type of infrequent use of Upolu Airport. If the Marine Corps plans to use Upolu or any other State airport for specific exercises, similar to the Army and other services, it would follow the procedures for requesting approval from the State DOT Airports Division. Thank you for sharing your extensive knowledge, history, and traditions of Mookini Heiau and the Kamehameha Birthsite/Birthstones, including other nearby areas closely associated with Kamehameha's birth, such as Umi Wai Bay and the Kapakai canoe-landing area. Attachment 14 of the PA shows the locations of the two significant historic properties, Mookini Heiau and Kamehameha Birthsite/Birthstones, in relation to Upolu Airport consistent with the distances

Appendix A-5
Responses to Draft EIS Comments

Letter ID	Comment ID	Response
		you provided. MCB Hawaii acknowledges that besides the physical impacts of MV-22 and H-1 aircraft use of Upolu Airport, you believe that other types of impacts would result from such use. Furthermore, MCB Hawaii notes that you believe the APE for Upolu Airport is too narrowly defined and that the APE should include the entire area affected by the visual and physical impacts of MV-22 and H-1 aircraft use of this airport. MCB Hawaii believes that impacts from aircraft use of Upolu Airport upon the two historic properties referenced above would be minimal due to the following: (1) the MV-22 and H-1 Aircraft normal approach and departure at Upolu Airport would be over the ocean, thus farther away from the historic properties; and (2) use of Upolu Airport would be infrequent and limited to flight operations currently carried out at this and other State airports. Please recall, however, that MCB Hawaii has determined that the proposed undertaking for the Hawaii basing and operations of MV-22 and H-1 aircraft at MCB Hawaii may result in adverse effects to historic properties. Also MCB Hawaii has developed a PA, in consultation with the consulting parties listed in the PA's Attachment 15, to seek ways to avoid, minimize, and mitigate impacts to the historic properties in the vicinity of Upolu Airport. Therefore, although MCB Hawaii believes impacts would be minimal as stated above, your suggestion of looking at the Department of Interior's defined limits of airspace for aircraft flying over National Parks and other sacred sites is appreciated, and MCB Hawaii will consider the relevance of employing such airspace limits as a way to further minimize and/or mitigate impacts to historic properties in the vicinity of Upolu Airport.
166	3	The rumor of live-firing around Upolu Airport is not true. State airports are routinely used by existing Marine Corps aviation squadrons for flight operations, refueling, and similar activities, coordinating with civilian airport authorities in accordance with FAA procedures. The new squadrons would similarly use Upolu Airport, primarily for diversions such as emergency situations or when weather conditions are poor at PTA. See Sections 2.2 and 2.4.2.2 of the FEIS for the description of use of Upolu Airport.
167	1	Thank you for your comments. All proposed construction would be carried out in compliance with applicable fire protection standards.
167	2	The Marine Corps will coordinate with HFD with regard to Marine Corps Training Area Bellows (MCTAB). The other training areas outside of MCB Hawaii Kaneohe Bay on Oahu are under Army jurisdiction.
168	NR	Thank you for your comments.
169	1	Thank you for your comments.
170	1	The Marine Corps presently does not plan to use Upolu Airport for confined area landings (CALs), as described in the DEIS. As described in the FEIS, use of Upolu Airport by the squadrons would be infrequent. State airports are routinely used by existing Marine Corps aviation squadrons for flight operations, refueling, and similar activities, coordinating with civilian airport authorities in accordance with FAA procedures. The new squadrons would similarly use Upolu Airport, primarily for diversions such as emergency situations or when weather conditions are poor at PTA. If the Marine Corps plans to use Upolu or any other State airport for specific exercises, similar to the Army and other services, it would follow the procedures for requesting approval from the State Department of Transportation (DOT) Airports

Appendix A-5
Responses to Draft EIS Comments

Letter ID	Comment ID	Response
		Division. Pohakuloa would continue to be the primary training area on the Big Island for Marine Corps aviation training. Regarding air quality impacts, see response to comment 017-2. Regarding noise impacts and other environmental issues, see response to 011-1.
170	2	Thank you for your comments.
171		Thank you for your comments.
172		Thank you for your comments.
173	1	Please see response to comment 170-1 regarding infrequent use of Upolu Airport by the squadrons. Fuel tanker trucks would not be required.
173	2	The issue of invasive species is evaluated in Sections 3.8 and 4.8 of the EIS; existing management measures are in place to control the introduction of these species.
174	1	Safety issues at MCTAB are addressed in Sections 4.10.2.1 and 4.10.3. See also Section 3.10.3 for more information about aviation safety. Regarding aircraft noise, see Section 4.5 in the EIS. At MCTAB, no areas outside of the installation would experience sound levels equal to or greater than 65 dB DNL under the proposed action, which is similar to the No Action Alternative. Regarding air pollution, see Section 4.4; emissions are unlikely to impact national or state air quality standards. Regarding hazardous materials and waste, See Sections 4.10.2.1 and 4.10.3. Construction and operations would be carried out in compliance with applicable regulatory requirements and standing operating procedures to avoid or minimize impacts during construction and training.
175	1	Comments noted.

APPENDIX B

Landing Zones (LZ)

B-1
Surface Characteristics

B-2
Aerial Imagery

Appendix B Landing Zones
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Appendix B Landing Zones

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Landing Zones Surface Characteristics

Island	Facility/Installation	Name	Elevation (feet)	Area[1] (acres)	Area (square meters)	Vegetation Cover[2] (percent)	Description[3]
Oahu	MCBH Kaneohe Bay	GP 216	23.2	2.97	12,024	100	The LZ is located on an active military base in an open area (parade field). The LZ is surrounded by several buildings, trees and light poles. Surface conditions consist of loose dirt and grass up to 0.3 m (1.0 ft) in height.
Oahu	MCBH Kaneohe Bay	Rifle Range	73.2	2.22	8,991	100	The LZ is located on an active military base, situated at the base of a large mountain within a firing range. Surface conditions consist of loose dirt and grass up to 0.3 m (1.0 ft) in height.
Oahu	MCBH Kaneohe Bay	Boondocker	128.3	6.59	26,662	100	The LZ is located on an active military base within an obstacle training area. Surface conditions consist of uneven terrain, loose dirt, and grass up to 0.3 m (1.0 ft) in height.
Oahu	MCBH Kaneohe Bay	Eagle	22.2			100	The LZ is located on an active military base in an open field near residential housing area. Surface conditions consist of uneven terrain, loose dirt, and grass up to 0.3 m (1.0 ft) in height.
Oahu	Marine Corps Training Area Bellows	Hawk	24.4	5.48	22,195	Negligible	The LZ is located within a deactivated military base and utilizes an old runway system. Surface conditions consist of severely deteriorated asphalt, loose gravel, and grass up to 0.3 m (1.0 ft) in height.
Oahu	Marine Corps Training Area Bellows	Noni	24.4	2.25	9,125	Negligible	The LZ is located within a deactivated military base and utilizes an old runway system. Surface conditions consist of severely deteriorated asphalt, loose gravel, and grass up to 0.3 m (1.0 ft) in height.
Oahu	Marine Corps Training Area Bellows	Gull	24.4	2.62	10,603	Negligible	The LZ is located within a deactivated military base and utilizes an old runway system. Surface conditions consist of severely deteriorated asphalt, loose gravel, and grass up to 0.3 m (1.0 ft) in height.
Oahu	Marine Corps Training Area Bellows	Owl	24.4	8.34	33,752	Negligible	The LZ is located within a deactivated military base and utilizes an old runway system. Surface conditions consist of severely deteriorated asphalt, loose gravel, and grass up to 0.3 m (1.0 ft) in height.
Oahu	Marine Corps Training Area Bellows	Tiger	24.4	4.83	19,529	Negligible	The DZ is located within a deactivated military base and utilizes an old runway system. Surface conditions consist of loose powdery soil and grass up to 0.3 m (1.0 ft) in height.
Oahu	Puuloa Training Range	Bravo Range	21.3	2.46	9,955	Negligible	The LZ is located on an active military base within a firing range. Tall berms line the western and eastern perimeters. The area has evidence of water erosion due to periods of rain. Surface conditions consist of loose dirt and grass up to 0.3 m (1.0 ft) in height.
Oahu	Ford Island	Ford	20	25.25	102,193	Hardscape	The helipad is located on an old aircraft parking apron on Ford Island. Surface conditions consist of concrete surrounded by asphalt.

Landing Zones Surface Characteristics

Island	Facility/Installation	Name	Elevation (feet)	Area[1] (acres)	Area (square meters)	Vegetation Cover[2] (percent)	Description[3]
Oahu	Dillingham Military Reservation	Albatross (Apron)	13.4	6.52	26,404	50	The LZ is located within a deactivated military base and utilizes an open field. Surface conditions consist of uneven terrain, loose dirt and grass up to 0.3 m (1.0 ft) in height.
Oahu	Dillingham Military Reservation	Blue Jay (New)	9.1	1.26	5,086	50	The LZ is located within a deactivated military base and utilizes an old runway system. Surface conditions consist of severely deteriorated asphalt, loose gravel, dirt, grass up to 0.9 m (3.0 ft) in height, and small trees up to 1.5 m (5.0 ft) in height.
Oahu	Dillingham Military Reservation	Dillingham Airfield Runway	3	15.50	62,710	Hardscape	The runway is located on an active civilian airport. Surface conditions consist of asphalt.
Oahu	Dillingham Military Reservation	Dillingham DZ	6.1	8.98	36,340	75	The DZ is located within a deactivated military base and utilizes an open field located in between the runway system. The area has evidence of flooding during periods of rain. Surface conditions consist of loose dirt and grass up to 1.2 m (4.0 ft) in height.
Oahu	Dillingham Military Reservation	Finch	9.1	6.22	25,176	Negligible	The LZ is located within a deactivated military base and utilizes an old runway system. Surface conditions consist of severely deteriorated asphalt, loose gravel, dirt, and grass up to 0.3 m (1.0 ft) in height.
Oahu	Dillingham Military Reservation	Rooster (Taxiway)	9.1	1.05	4,253	25	The LZ is located within a deactivated military base and utilizes an old runway system. Surface conditions consist of severely deteriorated asphalt, loose gravel, dirt, and grass up to 0.9 m (3.0 ft) in height.
Oahu	Wheeler AAF	WAAF Runway	255.1	32.71	132,387	Hardscape	The runway is located on an active military airport. Surface conditions consist of asphalt.
Oahu	Kahuku Training Area	X Strip	190.5	7.02	28,416	75	The LZ is located on top of a ridgeline. The area has evidence of water erosion due to periods of rain. A drainage ditch running north and south down the center of the LZ creates a 'V' causing the east and west sides to slope toward the center. Surface conditions consist of uneven terrain, loose dirt, and grass up to 0.9 m (3.0 ft) in height.
Oahu	Kahuku Training Area	Kahuku Split Rock	171.9	1.89	7,635	25	The LZ is located on top of the ridgeline. The area has evidence of water erosions due to periods of rain. The LZ is also divided into two areas by several trees and bushes. Surface conditions consist of uneven terrain, loose dirt, and grass up to 0.3 m (1.0 ft) in height.
Oahu	Kahuku Training Area	Kanes	125	29.03	117,497	75	The DZ is located in a valley with large ridge lines running along the east and west perimeters. The area has evidence of water erosion due to periods of rain. Surface conditions consist of uneven terrain, loose dirt, grass up to 0.3 m (1.0 ft) in height, and small trees up to 1.8 m (6.0 ft) in height are scattered throughout the DZ.
Oahu	Kawailoa Training Area	Elephants Foot	278	0.42	1,715	25	The LZ is located on the top of a plateau in a valley. There are large and tall mountain ridges on both northern and southern perimeters. Surface conditions consist of uneven terrain, loose dirt, and grass up to 0.3 m (1.0 ft) in height.

Landing Zones Surface Characteristics

Island	Facility/Installation	Name	Elevation (feet)	Area[1] (acres)	Area (square meters)	Vegetation Cover[2] (percent)	Description[3]
Oahu	Kawailoa Training Area	Nixon	332.8	0.10	397	50	The LZ is located on top of a ridgeline. The area has evidence of water erosion due to periods of rain. Several drainage trenches have been dug to help with water runoff and are located throughout the LZ. Surface conditions consist of uneven terrain, loose dirt, grass up to 0.3 m (1 ft) in height and a dirt road running along the eastern perimeter of the LZ.
Oahu	Kawailoa Training Area	Red	502	0.72	2,895	25	The LZ is located on top of a ridgeline. The area has evidence of water erosion due to periods of rain. Several drainage ditches are located throughout the LZ. Surface conditions consist of uneven terrain, loose dirt, and grass up to 0.9 m (3.0 ft) in height.
Oahu	Kawailoa Training Area	Black	432.5	7.12	28,815	25	The LZ is located on top of a plateau. The area has evidence of water erosions due to periods of rain. Surface conditions consist of uneven terrain, loose dirt, and grass up to 0.9m (3.0 ft) in height.
Oahu	Kawailoa Training Area	Non Stop	466.3	4.40	17,798	25	The LZ is located on top of a ridgeline. The area has evidence of water erosion due to periods of rain. The LZ is also divided into two areas by several trees and bushes. Surface conditions consist of uneven terrain, loose dirt, grass up to 0.3 m (1.0 ft) in height, and small trees up to 1.5 m (5.0 ft) in height scattered throughout the LZ.
Oahu	Kawailoa Training Area	Puu Kapu	396.2	38.94	157,576	25	The LZ is located on top of a ridgeline. The area has evidence of water erosion due to periods of rain. Several drainage ditches are located throughout the LZ. Surface conditions consist of uneven terrain, loose dirt, grass up to 0.9 m (3.0 ft) in height, and small trees up to 2.4 m (8.0 ft) in height scattered throughout the northern portion of the LZ.
Oahu	SB East Range	Italy	393.8	1.36	5,492	50	The LZ is located on top of a ridgeline. The area has evidence of water erosion due to periods of rain. The surface conditions consist of uneven terrain, loose dirt, and grass up to 1.5 m (5.0 ft) in height.
Oahu	SB East Range	Ku Tree	400.8	11.63	47,045	25	The LZ is located on top of a ridgeline with a dirt road running through the center of the LZ. The area has evidence of water erosion due to periods of rain. Several drainage trenches have been dug to help with water runoff and are located throughout the LZ. Surface conditions consist of uneven terrain, loose dirt, grass up to 1.2 m (4.0 ft) in height.
Oahu	SB East Range	Lightning	346.3	54.06	218,762	25	The DZ is located on top of the ridgeline and incorporates LZ Upper 36 and LZ Lower 36. The area has evidence of water erosion due to periods of rain. Several drainage trenches have been dug to help with water runoff and are located throughout the LZ. Surface conditions consist of uneven terrain, loose dirt, grass up to 0.3 m (1.0 ft) in height, and a dirt road along the eastern perimeter of the DZ.

Landing Zones Surface Characteristics

Island	Facility/Installation	Name	Elevation (feet)	Area[1] (acres)	Area (square meters)	Vegetation Cover[2] (percent)	Description[3]
Oahu	SB East Range	Lower 36	335.9	31.39	127,021	25	The LZ is located on top of a ridgeline and is also part of DZ Lightning. The area has evidence of water erosion due to periods of rain. Several drainage trenches have been dug to help with water runoff and are located throughout the LZ. Surface conditions consist of uneven terrain, loose dirt, grass up to 0.3 m (1 ft) in height and a dirt road running along the eastern perimeter of the LZ.
Oahu	SB East Range	Lower 72	388.6	1.84	7,464	50	The LZ is located on top of a ridgeline. The area has evidence of water erosion due to periods of rain. Several drainage trenches have been dug to help with water runoff and are located throughout the LZ. Surface conditions consist of uneven terrain, loose dirt, grass up to 0.3 m (1 ft) in height and a dirt road running along the eastern perimeter of the LZ.
Oahu	SB East Range	Upper 36	363	12.30	49,767	50	The LZ is located on top of a ridgeline and is part of DZ Lightning. The area has evidence of water erosion due to periods of rain. Several drainage trenches have been dug to help with water runoff and are located throughout the LZ. Surface conditions consist of uneven terrain, loose dirt, and grass up to 0.3 m (1.0 ft) in height.
Oahu	SB East Range	Upper 72	427.3	1.75	7,094	25	The LZ is located on top of a ridgeline. The area has evidence of water erosion due to periods of rain. Several drainage trenches have been dug to help with water runoff and are located throughout the LZ. Surface conditions consist of uneven terrain, loose dirt, and grass up to 0.9 m (3.0 ft) in height.
Oahu	SB Main Post	Dragon X	288	10.49	42,440	75	The LZ is located on an active military base and utilizes an open field. Surface conditions consist of loose dirt and grass up to 0.3 m (1.0 ft) in height.
Oahu	Camp Smith	Camp Smith	260.3	0.23	929	Hardscape	The helipad is located on an active military base. Surface conditions consist of concrete.
Molokai	Kalaupapa Airport	Kalaupapa Runway	7	3.72	15,050	Hardscape	The runway is located in a public airport. Surface conditions consist of asphalt.
Molokai	Molokai Training Support Facility	FARP	161.5	3.02	12,212	100	The FARP is located approximately 193.2 m (634.0 ft) southeast from Runway (RWY) 05/23. Surface conditions consist of loose gravel and dirt. Several small trees up to 3.0 m (10.0 ft) in height are located throughout the FARP.
Kauai	Pacific Missile Range Facility	Barking Sands Runway	3	20.66	83,613	Hardscape	The runway is located in an active military airport. Surface conditions consist of asphalt.
Kauai	Pacific Missile Range Facility	Barking Sands Helipads 1 to 3				Hardscape	The helipads are located on active military base. Surface conditions consist of asphalt with a 3.0 m (10.0 ft) dust abatement of asphalt and concrete.
Maui	Army National Guard (Puunene)	Armory	21.3	0.38	1,533	Hardscape	The LZ is located at the Hawaii Army National Guard Armory. Surface conditions consist of concrete and asphalt.

Landing Zones Surface Characteristics

Island	Facility/Installation	Name	Elevation (feet)	Area[1] (acres)	Area (square meters)	Vegetation Cover[2] (percent)	Description[3]
Hawaii	Pohakuloa Training Area	Bradshaw AAF	1,871.5			Hardscape	The runway is located on an active military base. Surface conditions consist of asphalt.
Hawaii	Pohakuloa Training Area	Bradshaw AAF Alpha		1.00	4,061	Negligible	The helipads are located on an active military base. Surface conditions consist of asphalt and Airfield Matting - 1. Vegetation up to 0.6 m (2.0 ft) in height are encroaching the helipads.
Hawaii	Pohakuloa Training Area	Bradshaw AAF Bravo		2.41	9,755	Negligible	The helipads are located on an active military base. Surface conditions consist of asphalt and Airfield Matting - 1. Vegetation up to 0.9 m (3.0 ft) in height are encroaching the helipads.
Hawaii	Pohakuloa Training Area	Bradshaw AAF Charlie		2.41	9,755	Negligible	The helipads are located on an active military base. Surface conditions consist of asphalt with a gravel sub-grade and Airfield Matting - 1. There are considerable deterioration throughout the primary area. A significant portion of both the west and east ends have reverted back to the gravel sub-grade allowing large area of vegetation to take over.
Hawaii	Pohakuloa Training Area	Brad	1,965.9	4.55	18,416	0	The LZ is located on an active military base. Surface conditions consist of compacted lava rock. The LZ has been dug out of an existing lava flow. Lava rock size varies up to 0.3 m (1 ft). Potential FOD issue due to loose rock.
Hawaii	Pohakuloa Training Area	Fisher DZ	1,760.2	33.53	135,701	100	The DZ is located on an active military base. Surface conditions consist of powdery soil and loose lava rock. Dry vegetation scattered throughout the DZ up to 1.2 m (4.0 ft) in height. There are several depressions caused by constant artillery fire, vehicle parts used as targets, and bunkers in the middle section of the DZ area.
Hawaii	Pohakuloa Training Area	Mikilua DZ	1,801.9	7.63	30,870	100	The DZ is located on an active military base. Surface conditions consist of powdery soil, loose lava rock and uneven terrain. Dry vegetation scattered throughout the DZ up to 1.2 m (4.0 ft) in height.
Hawaii	Pohakuloa Training Area	Rob	2,022.6	5.79	23,426	0	The LZ is located on an active military base. The LZ has been dug out of an existing lava flow. Surface conditions consist of compacted lava rock. Lava rock size varies up to 0.6 m (2 ft). Potential FOD issue due to loose rock.
Hawaii	Pohakuloa Training Area	Tango	1,946.1	2.05	8,300	0	The LZ is located on an active military base. Surface conditions consist of loosely compacted gravel (rock). The gravel size varies up to 0.3 m (1 ft).
Hawaii	Pohakuloa Training Area	Xray	1,613.3	2.48	10,020	100	The LZ is located on an active military base. The south, east, and west perimeters are bordered by fencing. Surface conditions consist of powdery soil, uneven terrain, and dry vegetation up to 1.8 m (6.0 ft) in height throughout the LZ. Due to the vegetation and slope the LP is positioned on the center of the access road. Potential fire hazard exists from vehicles and equipment utilized in the area due to extremely dry vegetation.

Landing Zones Surface Characteristics

Island	Facility/Installation	Name	Elevation (feet)	Area[1] (acres)	Area (square meters)	Vegetation Cover[2] (percent)	Description[3]
Hawaii	Pohakuloa Training Area	Yankee	1,699.6	13.36	54,085	100	The LZ is located on an active military base. Surface conditions consist of powdery soil, areas of uneven terrain, dry vegetation up to 1.8 m (6.0 ft) in height throughout the LZ and lava rocks up to 0.6 m (2.0 ft) in height scattered throughout the LZ.
Hawaii	Pohakuloa Training Area	Zulu	1,785.2	4.17	16,862	100	The LZ is located on an active military base. Surface conditions consist of powdery soil, slightly uneven terrain, dry vegetation up to 1.2 m (4.0 ft) in height throughout the LZ and a large depression on the south side of P1.
Hawaii	Pohakuloa Training Area	Noble	1,924.8	3.91	15,816	0	The LZ is located on an active military base and surrounded by elevated terrain. Surface conditions consist of loose powdery soil and rocks in sizes varying up to 0.3 m (1 ft). Potential FOD issue due to loose rock.
Hawaii	Pohakuloa Training Area	T11	1,895.2	6.14	24,828	0	The LZ is located on an active military base. Puu Menehue borders the southern perimeter and the telephone poles border the northern perimeter. Surface conditions consist of loosely compacted gravel (rock) and lava rock. The gravel size varies up to 0.6 m (2 ft).
Hawaii	Pohakuloa Training Area	FARP 12A	1,826.1	15.31	61,946		The FARP is located on an active military base. Surface conditions consist of compacted lava rock and landing pad constructed of Airfield Matting -2 with a gravel base. Holes located to the north of the landing pads create a safety hazard and should be filled in.
Hawaii	Pohakuloa Training Area	FARP 17	1,729.4				The FARP is located on an active military base. Surface conditions consist of dry powdery soil and landing pads constructed of concrete with a gravel base. All landing pad locations has evidence of cracks, chips and ground erosions. Several of the smaller landing pads were uneven due to settling.
Hawaii	Pohakuloa Training Area	FARP 18	1,907.1	13.03	52,719		The FARP is located on an active military base. All landing pad locations has evidence of cracks, chips and ground erosions around the west perimeter of each landing pad. Surface conditions consist of loosely compacted lava rock and landing pads constructed of concrete with a gravel base. Vegetation protrude through the concrete in several areas.
Hawaii	Pohakuloa Training Area Keamuku Parcel	Buzzard	900.9	0.84	3,411	100	The LZ is located on an active military base with a fence line running along the northwest perimeter and a rock ridge along the western edge of the LZ. Surface conditions consist of powdery soil, embedded and loose rock up to 0.6 m (2.0 ft) in size scattered throughout the LZ, dry vegetation up to 0.9 m (3.0 ft) in height within the LZ. An access road with deep ruts runs through the LZ.
Hawaii	Pohakuloa Training Area Keamuku Parcel	Chick	1,467.9	1.29	5,220	50	The LZ is located on an active military base in a valley surrounded by hills on all sides. Surface conditions consist of powdery soil, and embedded and dry grass up to 0.3 m (1.0 ft) in height.
Hawaii	Pohakuloa Training Area Keamuku Parcel	Dodo	1,323.7	0.71	2,884	75	The LZ is located on an active military base. Surface conditions consist of dry powdery soil, and grass up to 0.3 m (1.0 ft) in height.

Landing Zones Surface Characteristics

Island	Facility/Installation	Name	Elevation (feet)	Area[1] (acres)	Area (square meters)	Vegetation Cover[2] (percent)	Description[3]
Hawaii	Pohakuloa Training Area Keamuku Parcel	Dove	1,758.1	4.84	19,573	75	The LZ is located on an active military base in a valley with hillsides encroach into all four perimeters of the LZ. Surface conditions consist of powdery soil, and dry grassy vegetation up to 0.3 m (1.0 ft) in height throughout the LZ.
Hawaii	Pohakuloa Training Area Keamuku Parcel	Emu	1,472.5	2.50	10,113	75	The LZ is located on an active military base. Surface conditions consist of powdery soil, and dry grass.
Hawaii	Pohakuloa Training Area Keamuku Parcel	Finch	826.3	0.35	1,417	100	The LZ is located on an active military base and surrounded by elevated ground. The area has evidence of water runoff due to periods of rain. Surface conditions consist of powdery soil, scattered lava rock up to 0.3 m (1.0 ft) in size, dry vegetation up to 1.2 m (4.0 ft) in height within the LZ. Potential fire hazards exists from vehicles and equipment utilized in the area due to extremely dry vegetation.
Hawaii	Pohakuloa Training Area Keamuku Parcel	Gamecock	1,165.3	1.43	5,776	100	The LZ is located on an active military base and surrounded by hills on the northwest and south perimeter. Surface conditions consist of dry powdery soil, and grass up to 0.6 m (2.0 ft) in height. Potential fire hazards exists from vehicles and equipment utilized in the area due to extremely dry vegetation.
Hawaii	Pohakuloa Training Area Keamuku Parcel	Kiwi	1,417.6	2.25	9,088	100	The LZ is located on an active military base. Surface conditions consist of dry powdery soil, dry grass up to 0.3 m (1.0 ft) in height, and cattle ruts throughout the LZ up to 0.3 m (1.0 ft) deep. Potential fire hazards exists from vehicles and equipment utilized in the area due to extremely dry vegetation.
Hawaii	Pohakuloa Training Area Keamuku Parcel	Loon	1,279.8	1.70	6,887	100	The LZ is located on an active military base. Surface conditions consist of dry powdery soil, dry grass up to 0.3 m (1.0 ft) in height, and scattered lava rock up to 0.3 m (1.0 ft) in size. Potential fire hazards exists from vehicles and equipment utilized in the area due to extremely dry vegetation.
Hawaii	Pohakuloa Training Area Keamuku Parcel	Parrot Option	1,450.8	0.53	2,126	100	The LZ is located on an active military base and bordered by hills on the north, east, and south perimeters. Surface conditions consist of dry powdery soil and dry grassy vegetation up to 0.3 m (1.0 ft) in height throughout the LZ.
Hawaii	Pohakuloa Training Area Keamuku Parcel	Peacock	1,755	1.56	6,309	100	The LZ is located on an active military base. Surface conditions consist of dry powdery soil, dry grassy vegetation up to 0.6 m (2.0 ft) in height within the LZ perimeter, and lava rocks up to 0.3 m (1.0 ft) in size scattered throughout the LZ. Potential fire hazard exist from vehicles and equipment utilized in the area due to the extremely dry vegetation.
Hawaii	Pohakuloa Training Area Keamuku Parcel	Penguin	1,253	1.85	7,489	100	The LZ is located on an active military base. Surface conditions consist of dry powdery soil, dry grassy vegetation up to 0.6 m (2.0 ft) in height within the LZ perimeter, rocks up to 0.3 m (1.0 ft) in size scattered throughout the LZ, and several cattle ruts up to 0.3 m (1.0 ft) deep runs throughout the LZ.
Hawaii	Pohakuloa Training Area Keamuku Parcel	Robin	1,212.2	0.87	3,515	100	The LZ is located on an active military base in a valley surrounded by hills. The area has evidence of flooding during periods of rain. Surface conditions consist of powdery soil, ruts, and depressions.

Landing Zones Surface Characteristics

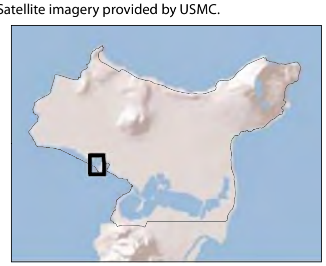
Island	Facility/Installation	Name	Elevation (feet)	Area[1] (acres)	Area (square meters)	Vegetation Cover[2] (percent)	Description[3]
Hawaii	Pohakuloa Training Area Keamuku Parcel	Rooster	1,932.7	3.31	13,392	100	The LZ is located on an active military base. Surface conditions consist of dry powdery soil and dry vegetation up to 0.3 m (1.0 ft) in height scattered throughout the LZ.
Hawaii	Pohakuloa Training Area Keamuku Parcel	Seagull	927.2	0.83	3,363	100	The LZ is located on an active military base. Surface conditions consist of powdery soil with embedded rock scattered throughout the LZ, and dry vegetation up to 1.2 m (4.0 ft) in height within the LZ perimeter. Potential fire hazards exists from vehicles and equipment utilized in the area due to dry vegetation.
Hawaii	Pohakuloa Training Area Keamuku Parcel	Turkey	869.6	2.01	8,130	100	The LZ is located on an active military base and approximately 541.1 m (1,775.0 ft) southwest of Puu Nohonaohae. Surface conditions consist of dry powdery soil, undulating terrain, and dry vegetation up to 0.9 m (3.0 ft) in height within the LZ perimeter. Potential fire hazard exist from vehicles and equipment utilized in the area due to the extremely dry vegetation.

[1] NAVFAC Pacific.

[2] Estimated vegetative cover is based on observations of the zone perimeter limited to the following descriptions; hardscape, negligible, 25, 50, 75, or 100.

[3] The Boeing Company, MV-22 Site Evaluation Report for US Army Garrison Hawaii, Prepared for Department of the Navy, 30 November 2009; The Boeing Company, MV-22 Site Evaluation Report for Marine Corps Base Hawaii – Volume I Island of Kauai, Hawaii, Maui, Molokai, and Lanai Landing Zone Survey, Prepared for Department of the Navy, 16 February 2011; The Boeing Company, MV-22 Site Evaluation Report for Marine Corps Base Hawaii – Volume II Island of Oahu Landing Zone Survey, Prepared for Department of the Navy, 16 March 2011.

Satellite imagery provided by USMC.



LEGEND

Zone Perimeter

Evaluation Area

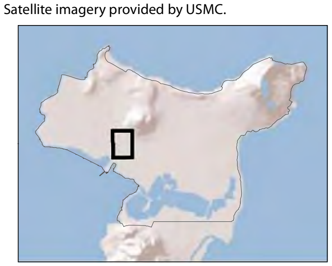
0 10 20 40
SCALE IN METERS

0 37.5 75 150
SCALE IN FEET

NORTH

KB - 1
MCBH KANEOHE BAY
101 HELIPAD

Satellite imagery provided by USMC.



LEGEND

Zone Perimeter

Evaluation Area

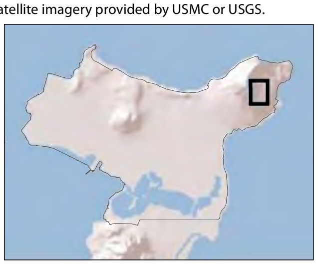
0 15 30 60
SCALE IN METERS

0 50 100 200
SCALE IN FEET

NORTH

KB - 2
MCBH KANEOHE BAY
GP 216

Satellite imagery provided by USMC or USGS.



LEGEND

Zone Perimeter

Evaluation Area

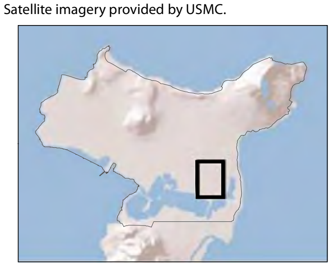
0 12.5 25 50
SCALE IN METERS

0 50 100 200
SCALE IN FEET

NORTH

KB - 3
MCBH KANEOHE BAY
RIFLE RANGE

Satellite imagery provided by USMC.



LEGEND

Zone Perimeter

Evaluation Area

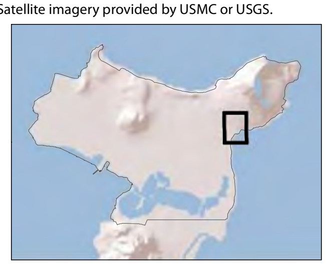
0 20 40 80
SCALE IN METERS

0 70 140 280
SCALE IN FEET

NORTH

KB - 4
MCBH KANEOHE BAY
BOONDOCKER

Satellite imagery provided by USMC or USGS.



LEGEND

Zone Perimeter

Evaluation Area

0 15 30 60

SCALE IN METERS

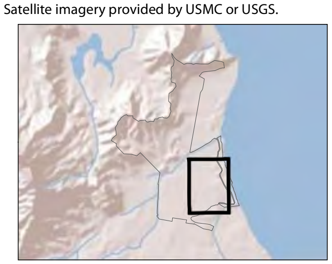
0 70 140 280

SCALE IN FEET

NORTH

KB - 5
MCBH KANEOHE BAY
EAGLE

Satellite imagery provided by USMC or USGS.



LEGEND

Zone Perimeter

Evaluation Area

0 30 60 120

SCALE IN METERS

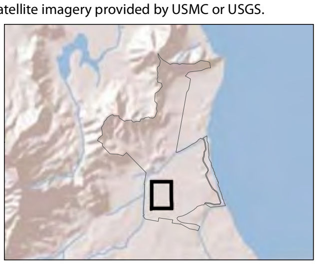
0 125 250 500

SCALE IN FEET

NORTH

MCTAB - 1
MARINE CORPS TRAINING AREA BELLOWS
HAWK

Satellite imagery provided by USMC or USGS.



LEGEND

Zone Perimeter

Evaluation Area

0 15 30 60

SCALE IN METERS

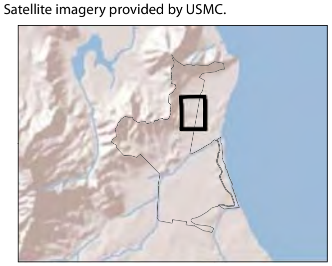
0 60 120 240

SCALE IN FEET

NORTH

MCTAB - 2
MARINE CORPS TRAINING AREA BELLOWS
NONI

Satellite imagery provided by USMC.



LEGEND

Zone Perimeter

Evaluation Area

0 20 40 80

SCALE IN METERS

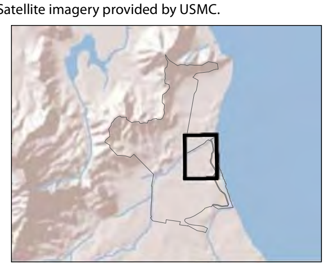
0 62.5 125 250

SCALE IN FEET

NORTH

MCTAB - 3
MARINE CORPS TRAINING AREA BELLOWS
GULL

Satellite imagery provided by USMC.



LEGEND

Zone Perimeter

Evaluation Area

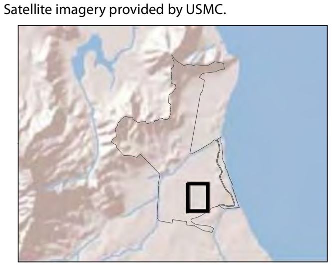
0 25 50 100
SCALE IN METERS

0 87.5 175 350
SCALE IN FEET

NORTH

MCTAB - 4
MARINE CORPS TRAINING AREA BELLOWS
OWL

Satellite imagery provided by USMC.



LEGEND

Zone Perimeter

Evaluation Area

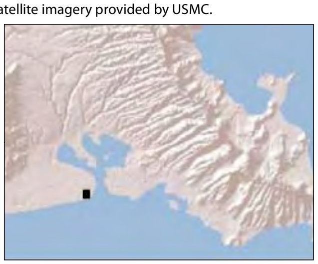
0 15 30 60
SCALE IN METERS

0 55 110 220
SCALE IN FEET

NORTH

MCTAB - 5
MARINE CORPS TRAINING AREA BELLOWS
TIGER

Satellite imagery provided by USMC.



LEGEND

Zone Perimeter

Evaluation Area

0 15 30 60

SCALE IN METERS

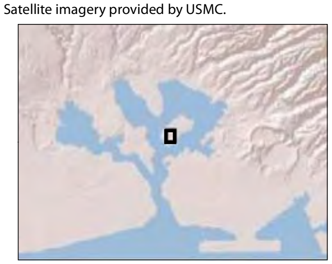
0 60 120 240

SCALE IN FEET

NORTH

PUULOA - 1
PUULOA TRAINING FACILITY
BRAVO RANGE

Satellite imagery provided by USMC.



LEGEND

Zone Perimeter

Evaluation Area

0 15 30 60

SCALE IN METERS

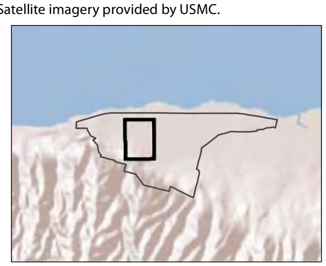
0 70 140 280

SCALE IN FEET

NORTH

FORD FIELD - 1
FORD ISLAND
FORD HELIPAD

Satellite imagery provided by USMC.



LEGEND

Zone Perimeter

Evaluation Area

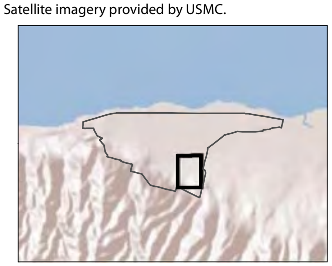
0 20 40 80
SCALE IN METERS

0 65 130 260
SCALE IN FEET

NORTH

DMR - 1
DILLINGHAM MILITARY RESERVATION
ALBATROSS (APRON)

Satellite imagery provided by USMC.



LEGEND

Zone Perimeter

Evaluation Area

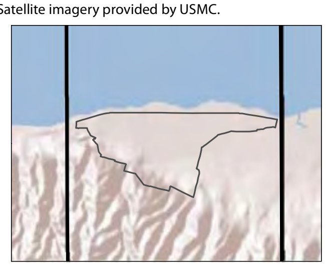
0 15 30 60
SCALE IN METERS

0 50 100 200
SCALE IN FEET

NORTH

DMR - 2
DILLINGHAM MILITARY RESERVATION
BLUE JAY (NEW)

Satellite imagery provided by USMC.



LEGEND

Zone Perimeter

Evaluation Area

0 155 310 620

SCALE IN METERS

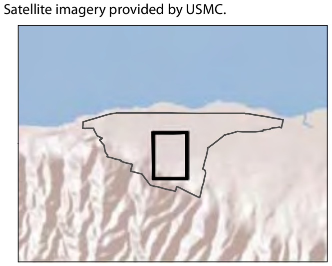
0 455 910 1,820

SCALE IN FEET

NORTH

DMR - 3
DILLINGHAM MILITARY RESERVATION
DILLINGHAM AIRFIELD RUNWAY

Satellite imagery provided by USMC.



LEGEND

Zone Perimeter

Evaluation Area

0 25 50 100

SCALE IN METERS

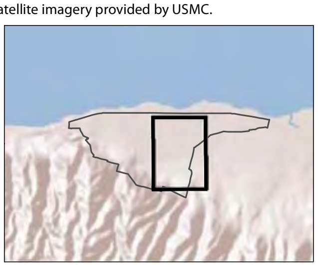
0 75 150 300

SCALE IN FEET

NORTH

DMR - 4
DILLINGHAM MILITARY RESERVATION
DILLINGHAM DZ

Satellite imagery provided by USMC.



LEGEND
Zone Perimeter
Evaluation Area

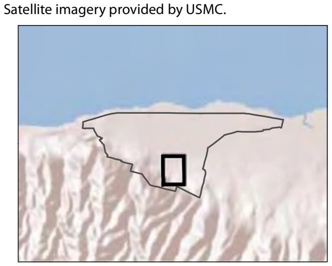
0 37.5 75 150
SCALE IN METERS

0 120 240 480
SCALE IN FEET

NORTH

DMR - 5
DILLINGHAM MILITARY RESERVATION
FINCH

Satellite imagery provided by USMC.



LEGEND
Zone Perimeter
Evaluation Area

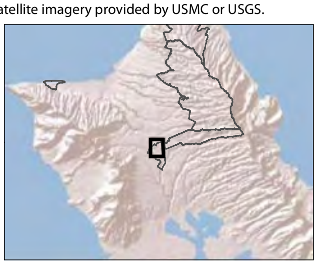
0 15 30 60
SCALE IN METERS

0 45 90 180
SCALE IN FEET

NORTH

DMR - 6
DILLINGHAM MILITARY RESERVATION
ROOSTER (TAXIWAY)

Satellite imagery provided by USMC or USGS.



LEGEND

Zone Perimeter

Evaluation Area

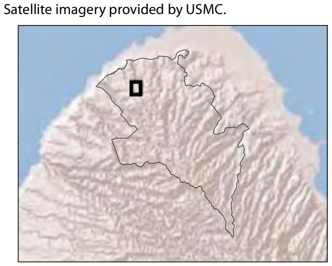
0 75 150 300
SCALE IN METERS

0 285 570 1,140
SCALE IN FEET

NORTH

WAAF - 1
WHEELER ARMY AIR FIELD
WAAF RUNWAY

Satellite imagery provided by USMC.



LEGEND

Zone Perimeter

Evaluation Area

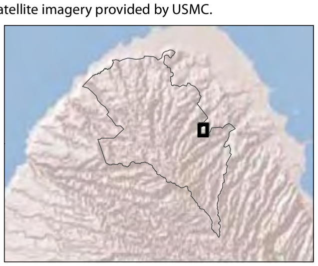
0 20 40 80
SCALE IN METERS

0 62.5 125 250
SCALE IN FEET

NORTH

KTA - 1
KAHUKU TRAINING AREA
X STRIP

Satellite imagery provided by USMC.



LEGEND

Zone Perimeter

Evaluation Area

0 15 30 60

SCALE IN METERS

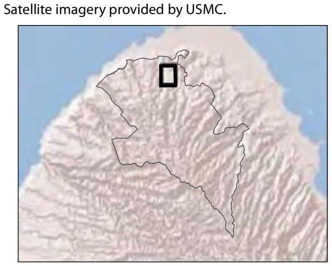
0 55 110 220

SCALE IN FEET

NORTH

KTA - 2
KAHUKU TRAINING AREA
KAHUKU SPLIT ROCK

Satellite imagery provided by USMC.



LEGEND

Zone Perimeter

Evaluation Area

0 30 60 120

SCALE IN METERS

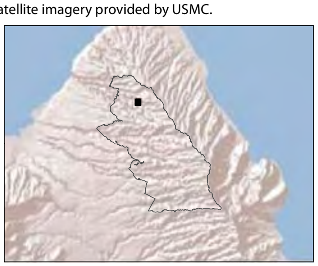
0 100 200 400

SCALE IN FEET

NORTH

KTA - 3
KAHUKU TRAINING AREA
KANES

Satellite imagery provided by USMC.



LEGEND

Zone Perimeter

Evaluation Area

0 12.5 25 50

SCALE IN METERS

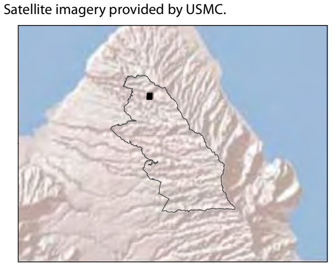
0 40 80 160

SCALE IN FEET

NORTH

KLOA - 1
KAWAILOA TRAINING AREA
ELEPHANTS FOOT

Satellite imagery provided by USMC.



LEGEND

Zone Perimeter

Evaluation Area

0 12.5 25 50

SCALE IN METERS

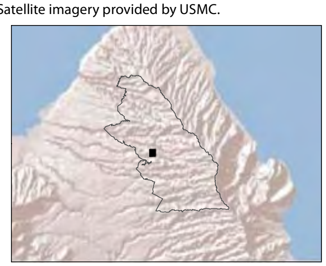
0 35 70 140

SCALE IN FEET

NORTH

KLOA - 2
KAWAILOA TRAINING AREA
NIXON

Satellite imagery provided by USMC.



LEGEND

Zone Perimeter

Evaluation Area

0 15 30 60

SCALE IN METERS

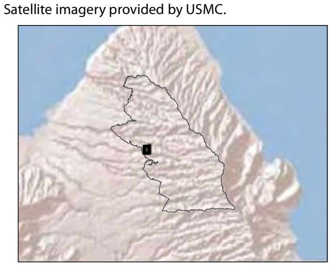
0 45 90 180

SCALE IN FEET

NORTH

KLOA - 3
KAWAILOA TRAINING AREA
RED

Satellite imagery provided by USMC.



LEGEND

Zone Perimeter

Evaluation Area

0 20 40 80

SCALE IN METERS

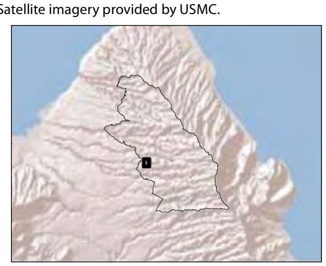
0 70 140 280

SCALE IN FEET

NORTH

KLOA - 4
KAWAILOA TRAINING AREA
BLACK

Satellite imagery provided by USMC.



LEGEND
Zone Perimeter
Evaluation Area

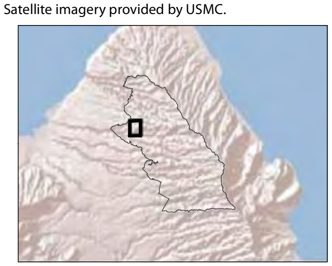
0 20 40 80
SCALE IN METERS

0 75 150 300
SCALE IN FEET

NORTH

KLOA - 5
KAWAILOA TRAINING AREA
NON STOP

Satellite imagery provided by USMC.



LEGEND
Zone Perimeter
Evaluation Area

0 50 100 200
SCALE IN METERS

0 150 300 600
SCALE IN FEET

NORTH

KLOA - 6
KAWAILOA TRAINING AREA
PUU KAPU

Satellite imagery provided by USMC.

LEGEND
Zone Perimeter
Evaluation Area

0 15 30 60
SCALE IN METERS
0 50 100 200
SCALE IN FEET
NORTH

SBER - 1
SCHOFIELD BARRACKS EAST RANGE
ITALY

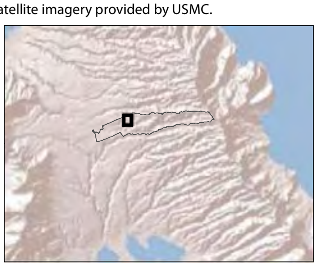
Satellite imagery provided by USMC.

LEGEND
Zone Perimeter
Evaluation Area

0 25 50 100
SCALE IN METERS
0 87.5 175 350
SCALE IN FEET
NORTH

SBER - 2
SCHOFIELD BARRACKS EAST RANGE
KU TREE

Satellite imagery provided by USMC.

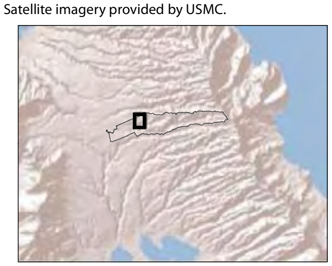


LEGEND
Zone Perimeter
Evaluation Area

0 30 60 120
SCALE IN METERS
0 100 200 400
SCALE IN FEET
NORTH

SBER - 3
SCHOFIELD BARRACKS EAST RANGE
LIGHTNING

Satellite imagery provided by USMC.

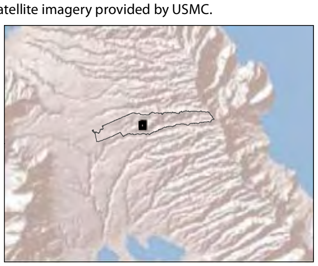


LEGEND
Zone Perimeter
Evaluation Area

0 45 90 180
SCALE IN METERS
0 135 270 540
SCALE IN FEET
NORTH

SBER - 4
SCHOFIELD BARRACKS EAST RANGE
LOWER 36

Satellite imagery provided by USMC.



LEGEND

Zone Perimeter

Evaluation Area

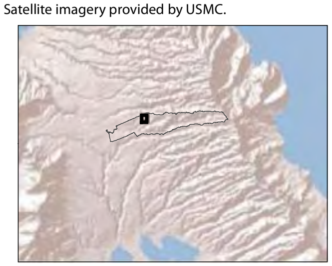
0 15 30 60
SCALE IN METERS

0 60 120 240
SCALE IN FEET

NORTH

SBER - 5
SCHOFIELD BARRACKS EAST RANGE
LOWER 72

Satellite imagery provided by USMC.



LEGEND

Zone Perimeter

Evaluation Area

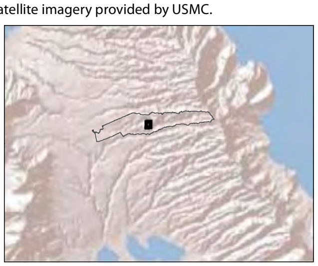
0 20 40 80
SCALE IN METERS

0 75 150 300
SCALE IN FEET

NORTH

SBER - 6
SCHOFIELD BARRACKS EAST RANGE
UPPER 36

Satellite imagery provided by USMC.



LEGEND

Zone Perimeter

Evaluation Area

0 20 40 80

SCALE IN METERS

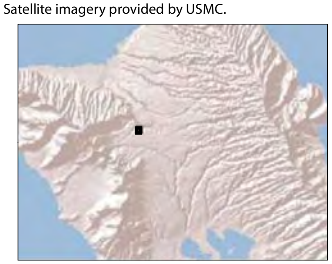
0 60 120 240

SCALE IN FEET

NORTH

SBER - 7
SCHOFIELD BARRACKS EAST RANGE
UPPER 72

Satellite imagery provided by USMC.



LEGEND

Zone Perimeter

Evaluation Area

0 15 30 60

SCALE IN METERS

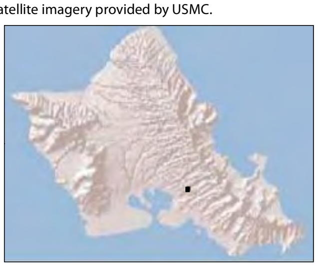
0 70 140 280

SCALE IN FEET

NORTH

SBMP - 1
SCHOFIELD BARRACKS MAIN POST
DRAGON X

Satellite imagery provided by USMC.



LEGEND

Zone Perimeter

Evaluation Area

0 12.5 25 50

SCALE IN METERS

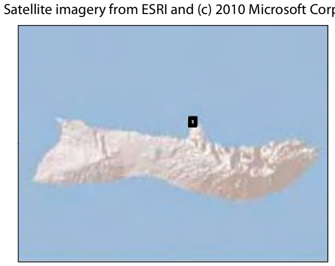
0 37.5 75 150

SCALE IN FEET

NORTH

CS - 1
MCB CAMP SMITH
CAMP SMITH

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

0 50 100 200

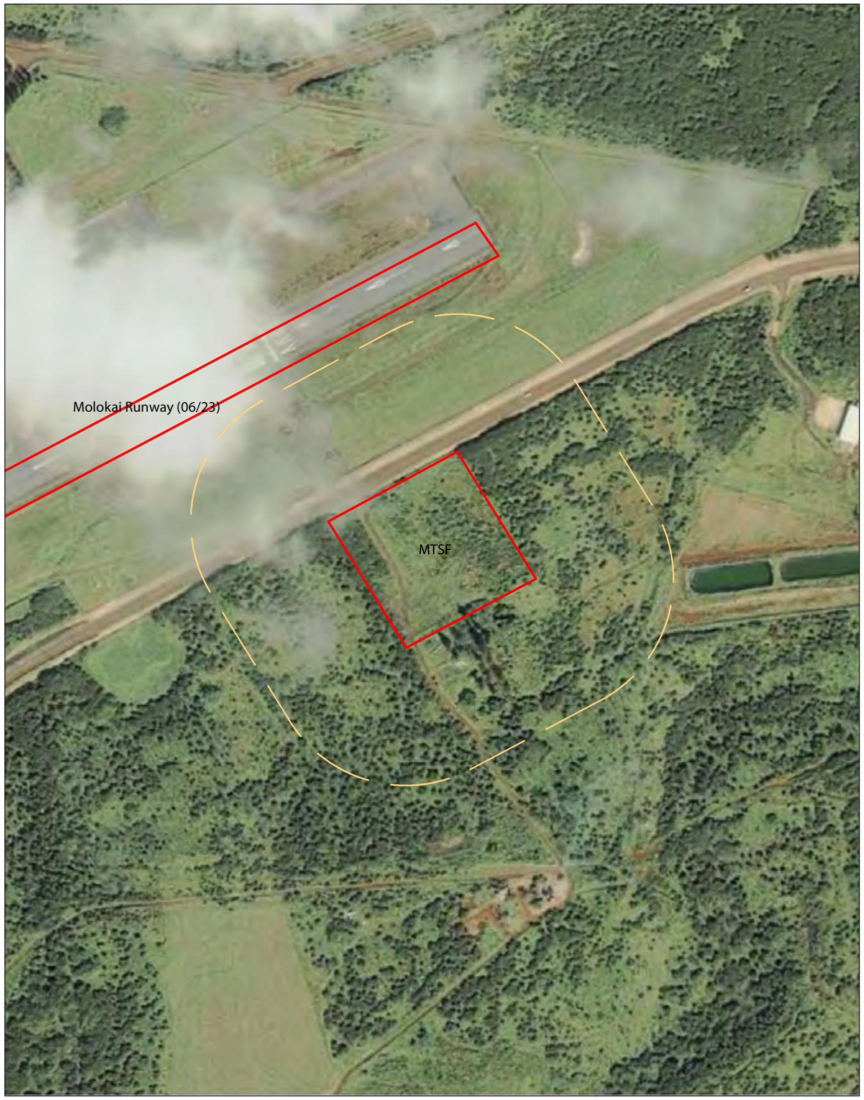
SCALE IN METERS

0 150 300 600

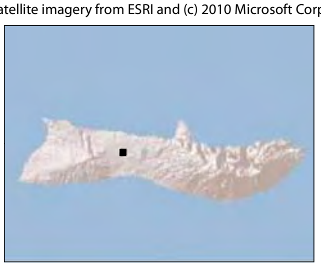
SCALE IN FEET

NORTH

KALAUPAPA - 1
KALAUPAPA AIRPORT
KALAUPAPA RUNWAY



Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

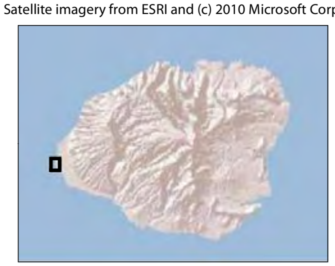
0 20 40 80
SCALE IN METERS

0 75 150 300
SCALE IN FEET

NORTH

MTSF - 1
MOLOKAI TRAINING SUPPORT FACILITY

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

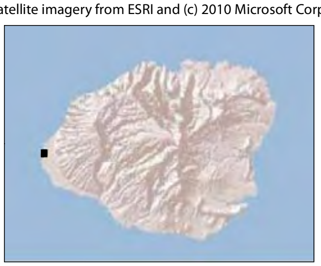
0 70 140 280
SCALE IN METERS

0 245 490 980
SCALE IN FEET

NORTH

PMRF - 1
PACIFIC MISSILE RANGE FACILITY
BARKING SANDS RUNWAY

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

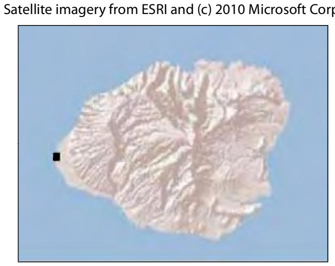
0 25 50 100
SCALE IN METERS

0 100 200 400
SCALE IN FEET

NORTH

PMRF - 2
PACIFIC MISSILE RANGE FACILITY
HELIPAD 1

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

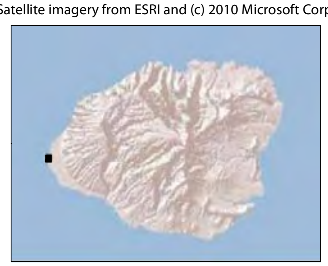
0 25 50 100
SCALE IN METERS

0 100 200 400
SCALE IN FEET

NORTH

PMRF - 3
PACIFIC MISSILE RANGE FACILITY
HELIPAD 2

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

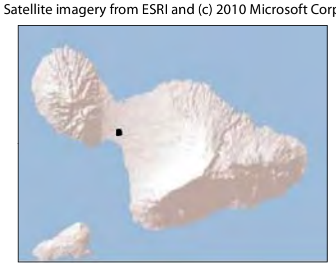
0 25 50 100
SCALE IN METERS

0 100 200 400
SCALE IN FEET

NORTH

PMRF - 4
PACIFIC MISSILE RANGE FACILITY
HELIPAD 3

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

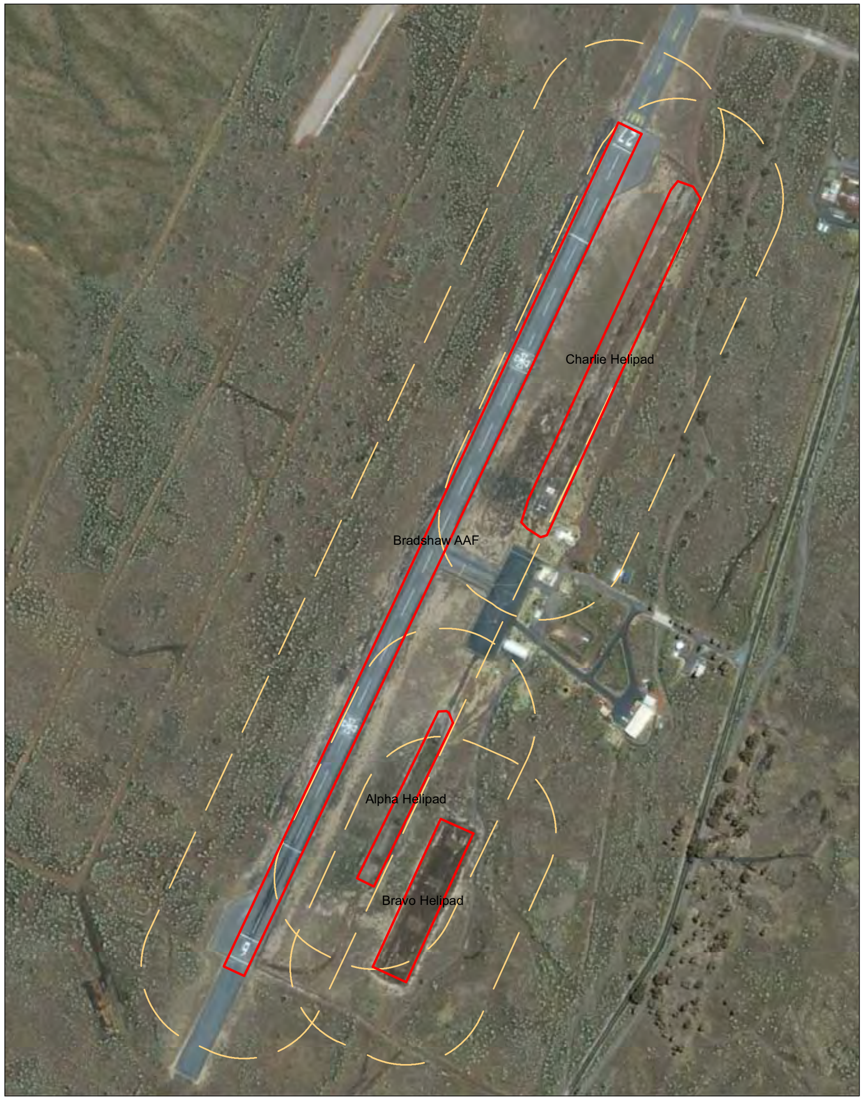
Evaluation Area

0 20 40 80
SCALE IN METERS

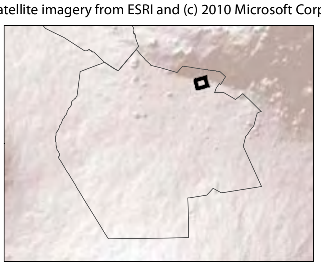
0 70 140 280
SCALE IN FEET

NORTH

HIARNG - 1
HAWAII ARMY NATIONAL GUARD
ARMORY



Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

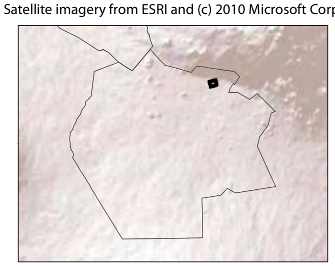
0 37.5 75 150
SCALE IN METERS

0 150 300 600
SCALE IN FEET

NORTH

BAAF - 1
BRADSHAW ARMY AIRFIELD
BRADSHAW AAF

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

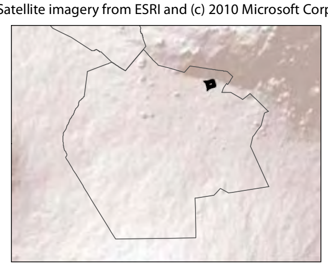
0 20 40 80
SCALE IN METERS

0 75 150 300
SCALE IN FEET

NORTH

BAAF - 2
BRADSHAW ARMY AIRFIELD
ALPHA HELIPAD AND BRAVO HELIPAD

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

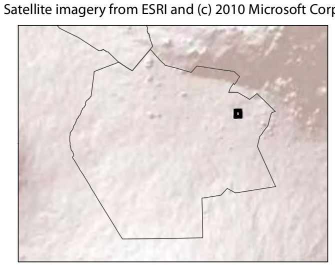
0 20 40 80
SCALE IN METERS

0 75 150 300
SCALE IN FEET

NORTH

BAAF - 3
BRADSHAW ARMY AIRFIELD
CHARLIE HELIPAD

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

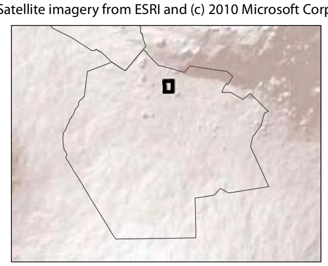
0 20 40 80
SCALE IN METERS

0 75 150 300
SCALE IN FEET

NORTH

PTA - 1
POHAKULOA TRAINING AREA
BRAD

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

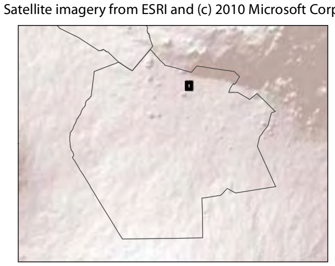
0 37.5 75 150
SCALE IN METERS

0 125 250 500
SCALE IN FEET

NORTH

PTA - 2
POHAKULOA TRAINING AREA
FISHER DZ

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

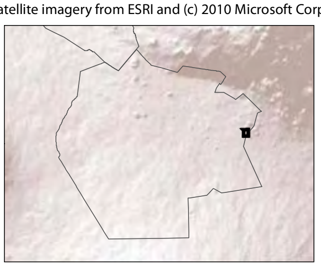
0 20 40 80
SCALE IN METERS

0 75 150 300
SCALE IN FEET

NORTH

PTA - 3
POHAKULOA TRAINING AREA
MIKILUA DZ

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

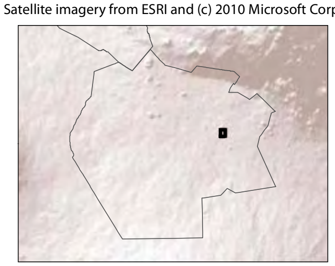
0 20 40 80
SCALE IN METERS

0 75 150 300
SCALE IN FEET

NORTH

PTA - 4
POHAKULOA TRAINING AREA
ROB

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

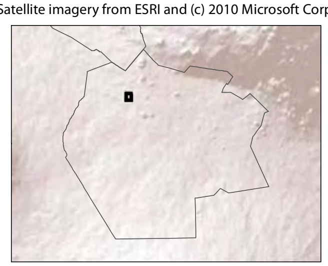
0 20 40 80
SCALE IN METERS

0 75 150 300
SCALE IN FEET

NORTH

PTA - 5
POHAKULOA TRAINING AREA
TANGO

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

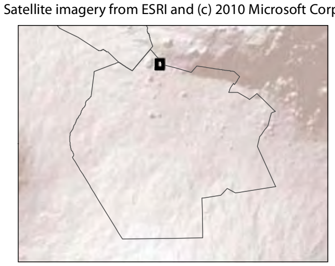
0 20 40 80
SCALE IN METERS

0 75 150 300
SCALE IN FEET

NORTH

PTA - 6
POHAKULOA TRAINING AREA
XRAY

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

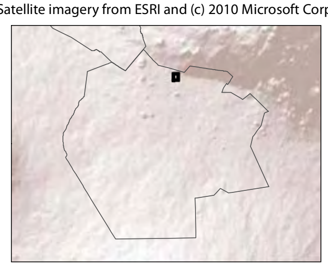
0 30 60 120
SCALE IN METERS

0 100 200 400
SCALE IN FEET

NORTH

PTA - 7
POHAKULOA TRAINING AREA
YANKEE

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

0 20 40 80

SCALE IN METERS

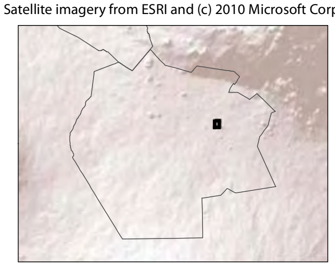
0 75 150 300

SCALE IN FEET

NORTH

PTA - 8
POHAKULOA TRAINING AREA
ZULU

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

0 20 40 80

SCALE IN METERS

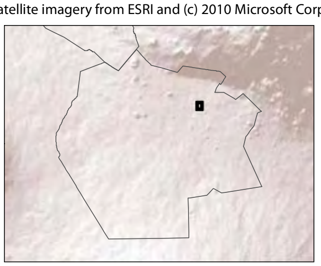
0 75 150 300

SCALE IN FEET

NORTH

PTA - 9
POHAKULOA TRAINING AREA
NOBLE

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

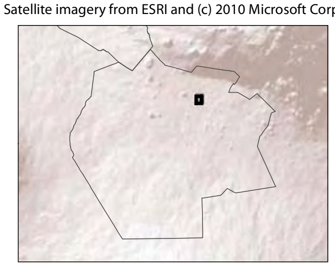
0 20 40 80
SCALE IN METERS

0 75 150 300
SCALE IN FEET

NORTH

PTA - 10
POHAKULOA TRAINING AREA
T11

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

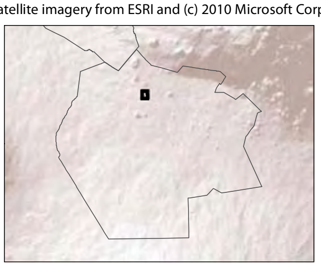
0 25 50 100
SCALE IN METERS

0 100 200 400
SCALE IN FEET

NORTH

PTA - 11
POHAKULOA TRAINING AREA
FARP 12A

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

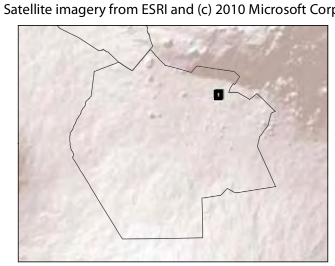
0 25 50 100
SCALE IN METERS

0 100 200 400
SCALE IN FEET

NORTH

PTA - 12
POHAKULOA TRAINING AREA
FARP 17

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

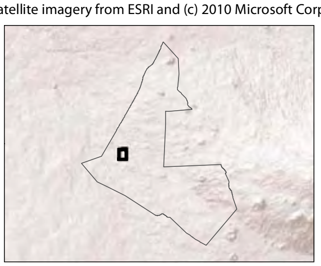
0 25 50 100
SCALE IN METERS

0 100 200 400
SCALE IN FEET

NORTH

PTA - 13
POHAKULOA TRAINING AREA
FARP 18

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

0 20 40 80

SCALE IN METERS

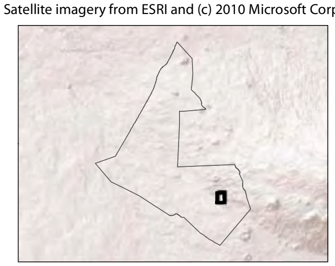
0 75 150 300

SCALE IN FEET

NORTH

PTA KEAMUKU - 1
POHAKULOA TRAINING AREA KEAMUKU PARCEL
BUZZARD

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

0 20 40 80

SCALE IN METERS

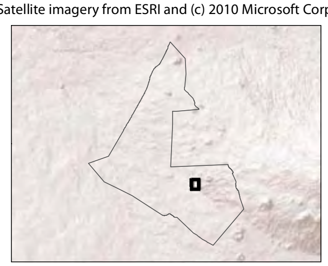
0 75 150 300

SCALE IN FEET

NORTH

PTA KEAMUKU - 2
POHAKULOA TRAINING AREA KEAMUKU PARCEL
CHICK

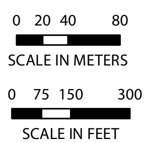
Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

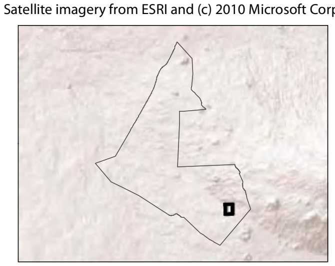
Zone Perimeter

Evaluation Area



PTA KEAMUKU - 3
POHAKULOA TRAINING AREA KEAMUKU PARCEL
DODO

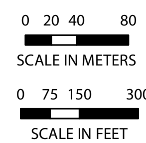
Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

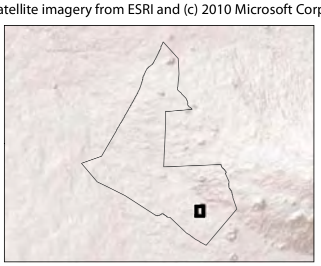
Zone Perimeter

Evaluation Area



PTA KEAMUKU - 4
POHAKULOA TRAINING AREA KEAMUKU PARCEL
DOVE

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

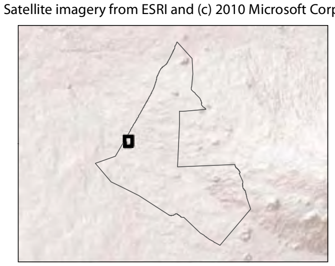
0 20 40 80
SCALE IN METERS

0 75 150 300
SCALE IN FEET

NORTH

PTA KEAMUKU - 5
POHAKULOA TRAINING AREA KEAMUKU PARCEL
EMU

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

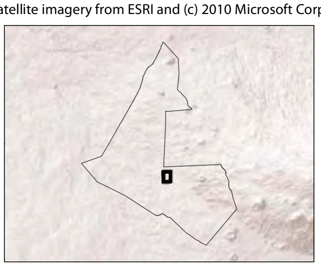
0 20 40 80
SCALE IN METERS

0 75 150 300
SCALE IN FEET

NORTH

PTA KEAMUKU - 6
POHAKULOA TRAINING AREA KEAMUKU PARCEL
FINCH

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

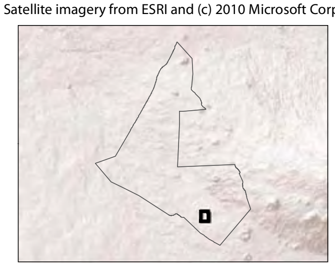
0 20 40 80
SCALE IN METERS

0 75 150 300
SCALE IN FEET

NORTH

PTA KEAMUKU - 7
POHAKULOA TRAINING AREA KEAMUKU PARCEL
GAMECOCK

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

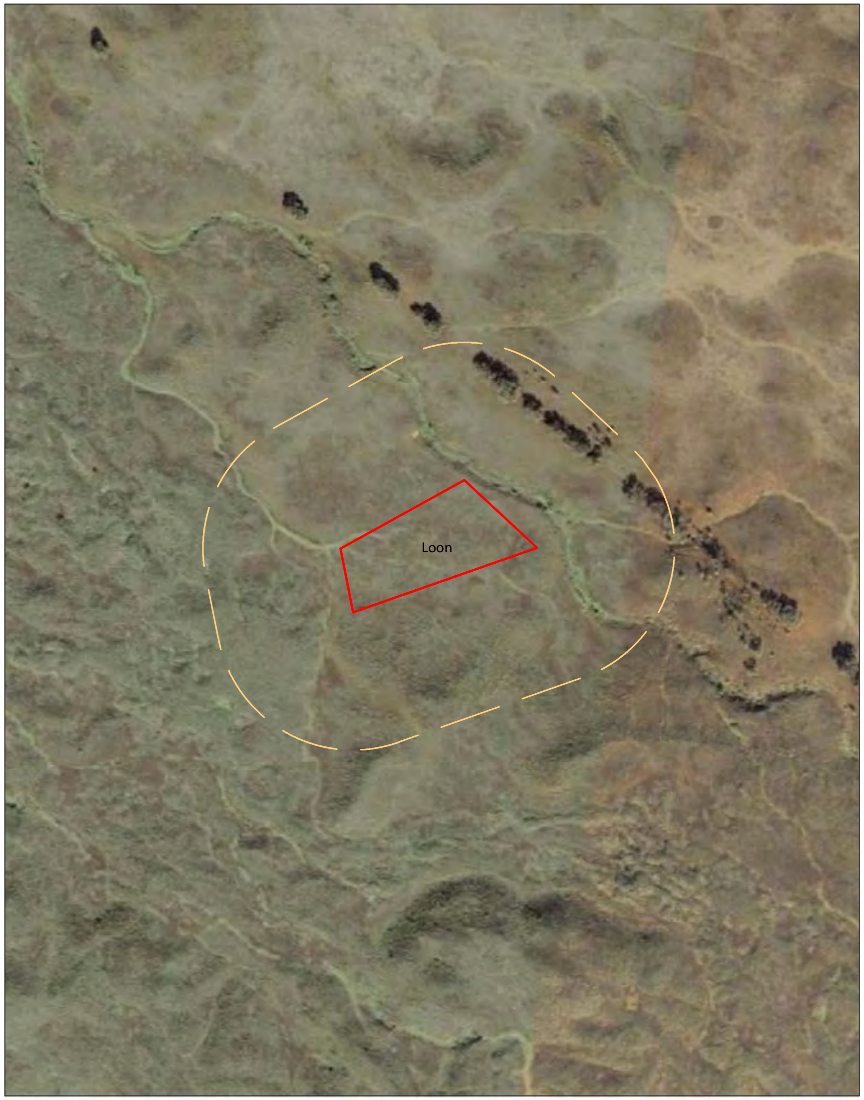
Evaluation Area

0 20 40 80
SCALE IN METERS

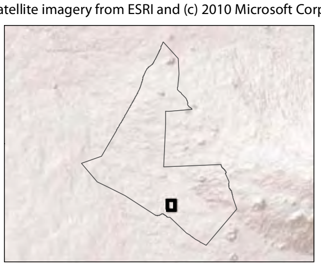
0 75 150 300
SCALE IN FEET

NORTH

PTA KEAMUKU - 8
POHAKULOA TRAINING AREA KEAMUKU PARCEL
KIWI



Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

0 20 40 80

SCALE IN METERS

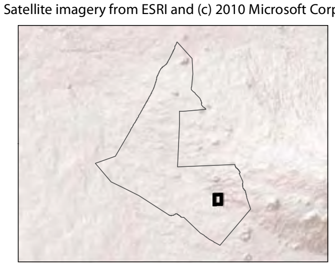
0 75 150 300

SCALE IN FEET

NORTH

PTA KEAMUKU - 9
POHAKULOA TRAINING AREA KEAMUKU PARCEL
LOON

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

0 20 40 80

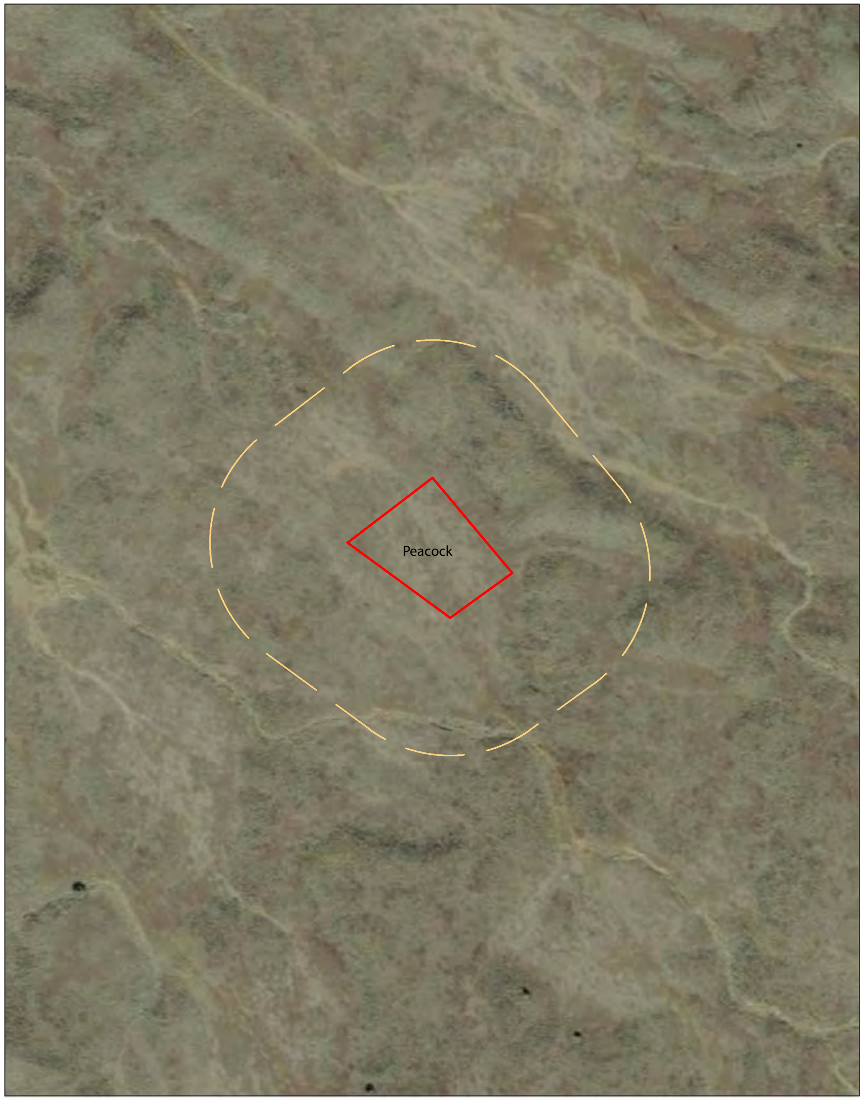
SCALE IN METERS

0 75 150 300

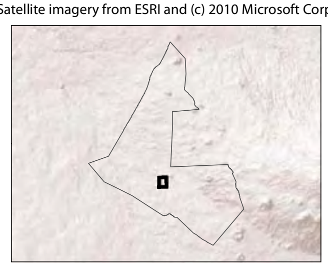
SCALE IN FEET

NORTH

PTA KEAMUKU - 10
POHAKULOA TRAINING AREA KEAMUKU PARCEL
PARROT OPTION



Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

0 20 40 80

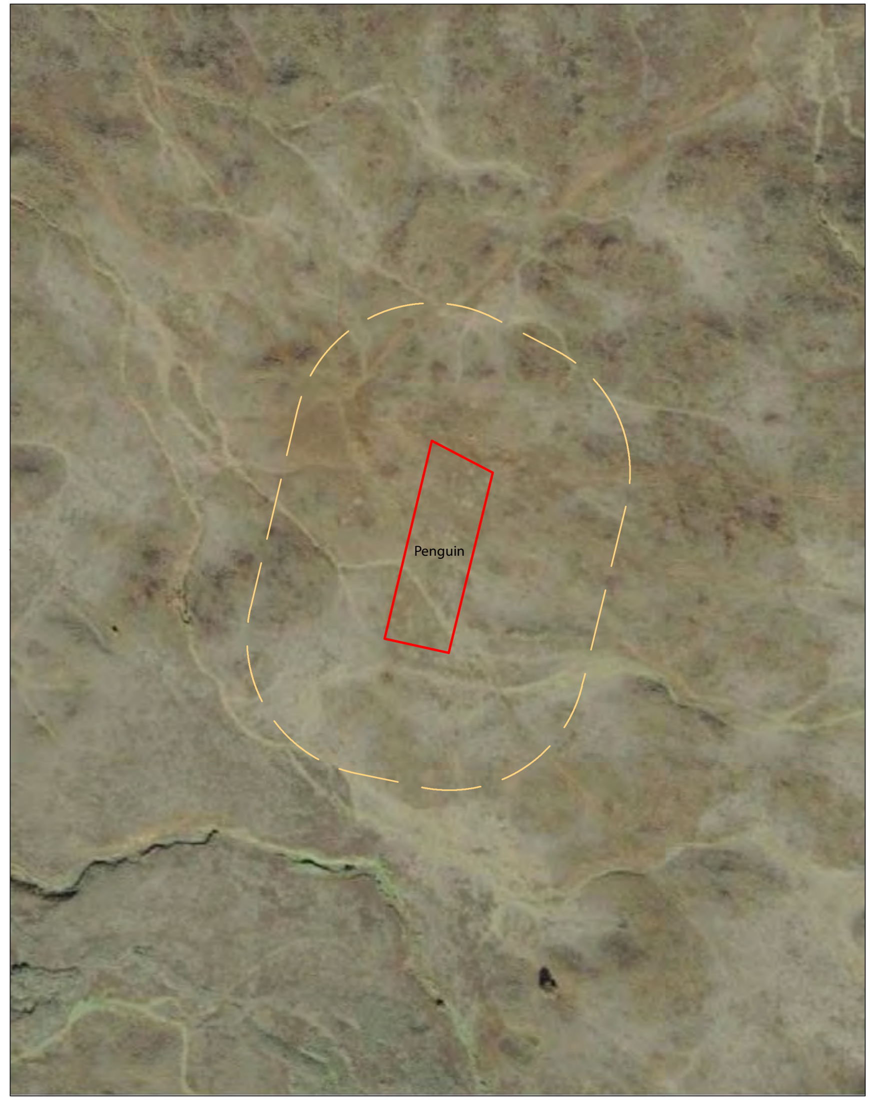
SCALE IN METERS

0 75 150 300

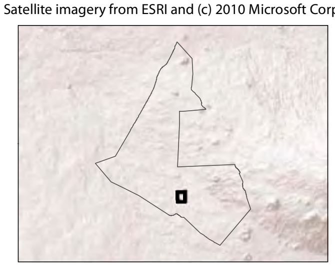
SCALE IN FEET

NORTH

PTA KEAMUKU - 11
POHAKULOA TRAINING AREA KEAMUKU PARCEL
PEACOCK



Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

0 20 40 80

SCALE IN METERS

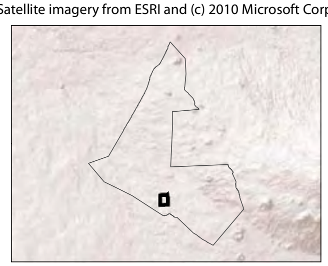
0 75 150 300

SCALE IN FEET

NORTH

PTA KEAMUKU - 12
POHAKULOA TRAINING AREA KEAMUKU PARCEL
PENGUIN

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

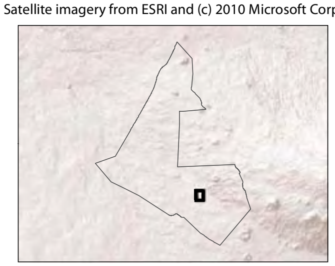
0 20 40 80
SCALE IN METERS

0 75 150 300
SCALE IN FEET

NORTH

PTA KEAMUKU - 13
POHAKULOA TRAINING AREA KEAMUKU PARCEL
ROBIN

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

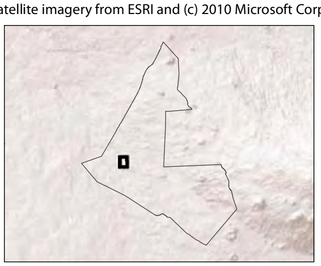
0 20 40 80
SCALE IN METERS

0 75 150 300
SCALE IN FEET

NORTH

PTA KEAMUKU - 14
POHAKULOA TRAINING AREA KEAMUKU PARCEL
ROOSTER

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

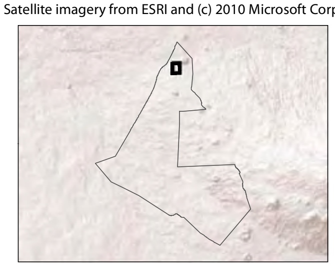
0 20 40 80
SCALE IN METERS

0 75 150 300
SCALE IN FEET

NORTH

PTA KEAMUKU - 15
POHAKULOA TRAINING AREA KEAMUKU PARCEL
SEAGULL

Satellite imagery from ESRI and (c) 2010 Microsoft Corporation and its data suppliers.



LEGEND

Zone Perimeter

Evaluation Area

0 20 40 80
SCALE IN METERS

0 75 150 300
SCALE IN FEET

NORTH

PTA KEAMUKU - 16
POHAKULOA TRAINING AREA KEAMUKU PARCEL
TURKEY

APPENDIX C

Airspace

1.1 INTRODUCTION

Appendix C-1 provides a description of how the proposed aircraft would operate during training activities. A primary capability of Marine Corps rotorcraft is to land and depart from shore-based austere sites, as well as amphibious ships (such as the Landing Helicopter Deck or a Landing Helicopter Assault ships). Additionally, the H-1s would also conduct live-fire training as the H-1s use more types of ordnance than the MV-22.

1.2 MV-22 OPERATIONS AT LANDING ZONES

One function of the MV-22s is to make shipboard departures and quickly transport troops, equipment, and supplies inland to forward combat areas while avoiding the need for beachhead or interim transfers. To accomplish these missions, MV-22 aircrews must be able to effectively and efficiently locate, approach, land on, and depart LZs that reflect reality in terms of terrain, accessibility, and vegetation and offer a variety of circumstances and conditions. Such training would use existing DoD LZs and several State facilities, such as Kalaupapa Airport, throughout the state of Hawaii.

MV-22 Modes of Operation for LZs

The MV-22 operates in different modes of flight to maximize its capabilities as both an "airplane" and a "helicopter" when training on LZs. These modes consist of hover/land, conversion, transit, and landing. While operating like a helicopter, its speeds, patterns, and activities would be similar to the CH-46E that it is replacing. While operating like a fixed-wing aircraft (i.e., Transit Mode), the MV-22 would use speeds and patterns more closely resembling medium-sized turboprop aircraft. When performed near an airfield, such operations would blend in well with the fixed-wing aircraft there. The following describes these modes within the context of a training sortie to an LZ.

Departure from MCAS Kaneohe Bay. On a daily basis, MV-22s would depart MCAS Kaneohe Bay via vertical or short-roll take-off as described for the airfield. The aircraft would then transition to Transit Mode for the flight to the training area.

Flight to LZ. In Transit Mode, the MV-22 would normally fly like a turboprop (rotors and engines [nacelles] forward) aircraft at altitudes of about 300 ft to 10,000 ft above ground level (AGL) and at a speed of 230 nautical miles per hour (kph). Transit at lower altitudes, down to 300 ft AGL would be infrequent to rare. Throughout many years of DoD training in Hawaii, the various military organizations have established informal transit routes to training areas throughout the state. The MV-22s would continue to follow these informal tracks to the extent feasible given their greater speed, higher altitudes, and different handling characteristics. It is highly probable that more than one MV-22 would fly together for this training, and the aircraft would fly in formation. A formation typically involves a lead aircraft and one or more other aircraft in formation.

Approaching the LZ. Training in and around the LZs would differ somewhat from that of current helicopters. Upon approaching the LZ, at a point about three miles away, the MV-22 would begin either a spiral or other type of maneuver to start the landing. When the aircraft arrives at a defined distance (or Initial Point) from the LZ, the MV-22 would initiate the Conversion Mode while in straight and level flight, moving the nacelles toward the vertical. Transition to Conversion Mode typically occurs at 500 ft to 1,000 ft AGL at a speed of 110 kph. Once the transition to the Conversion Mode is complete, they can begin hover/landing training activities.

Hovering/Landing. Following the conversion mode, the MV-22 would be less than 1,000 ft AGL and would be traveling at a speed of 110 kph or less. The MV-22 would then enter the Hover/Land mode with flight characteristics similar to a helicopter, such as the CH-53D/E. A typical vertical landing involves the aircraft starting a descent at 500 ft AGL at an initial speed of 110 knots, slowing to 50 knots at 50 ft to 300 ft AGL to initiate the approach turn, establishing a stable hover at 20 ft AGL, then landing the aircraft. In this mode, landings to and takeoffs from uneven terrain are possible. At suitable LZs and under appropriate conditions, a formation of MV-22s may land in sequence.

Take-Off from LZ. An MV-22 takeoff from an LZ like a helicopter. As power is added, the aircraft would rise straight up through the first 20 ft, then allowing the pilot to transition to forward flight by tilting the nacelles forward, causing the aircraft to accelerate forward as it climbs and gains speed. If the pilot plans to stay in the Conversion Mode, the nacelles would be moved to 75 degrees (15 degrees forward from vertical) for acceleration. At about 100 ft AGL, the aircraft would be at about 30 kph of ground speed and settle at about 80 kph when leveling off at 300 to 600 ft AGL. If the pilot plans to transition to fixed-wing flight, the nacelle movement would continue to 60 degrees (30 degrees forward from vertical) passing 40 kph, continuing forward until the nacelles are fully horizontal (like an airplane). At this point, the MV-22 would have accelerated to 200 to 220 kph and climbed to a cruising altitude that can vary from 1,000 ft AGL (if the pilot will be staying in a training pattern for further landings) or to higher than 10,000 ft AGL (if the pilot wishes to travel longer distances en route to another training area or base).

Patterns and Repeated Landings at LZ. For training, the MV-22 may conduct more than one approach and landing/takeoff sequence at a given LZ during a sortie. These can be conducted either in fixed-wing or rotary-wing configurations. When in the fixed-wing configuration, the sizes of the patterns more closely represent those by other types of fixed-wing turboprop aircraft which do not typically operate at tactical LZs. These patterns are longer and faster than the current CH-53D employs, with the MV-22 flying 200 to 220 kph and up to 5 mi to 6 mi from the LZ. As described previously, the pattern "work" would start with the vertical takeoff with a transition into the Conversion Mode followed by the Transit Mode. The MV-22 would proceed away from the LZ at about 600 ft AGL and 200 kph. When separated sufficiently (around 5 mi) from the LZ, the MV-22 would turn back toward the LZ, descend to about 300 ft AGL and accelerate to about 220 kph. This maneuver offers pilots training using a more tactical approach to an LZ. As the aircraft approaches the LZ, the pilot would gradually adjust the nacelle angle back up toward vertical, converting the aircraft's flight profile to that more like a helicopter. Deceleration would result in the aircraft arriving back over its intended point of landing on the LZ at zero airspeed, so that it can land vertically.

Exiting the LZ. Using the takeoff and transition procedures described above, the MV-22 would exit the LZ. On any given sortie, an MV-22 may transit to another LZ, return to base, or continue with different operations elsewhere.

1.3 H-1 OPERATIONS AT LZS

Their tasks, which include offensive air support, light lift, and armed reconnaissance, will require them to proceed to the combat area while avoiding surface-to-air threats. Implied with these tasks is the requirement to conduct landing at the edge of the threat environment to refuel and reload weapon systems. These locations are referred to as Forward Arming and Refueling Points (FARPs) and are well represented by most any landing zones on the Hawaiian Islands. To accomplish these tasks, H-1 aircrews must be able to effectively and efficiently navigate to, approach, land on, and depart LZs and confined areas that reflect reality in terms of terrain, accessibility, and vegetation and offer a variety of circumstances and conditions. Such training would primarily use existing DoD LZs and several State facilities, such as Kalaupapa Airport, throughout the state of Hawaii.

The AH-1 and UH-1 operate much like any other helicopter and therefore takeoff and land vertically. Since they are both configured with skid landing gear, they hover taxi and rarely conduct sliding takeoffs or landings unless required for high gross weight operations, training, or emergencies. Profiles to and from a landing zone resemble those profiles conducted at MCAS Kaneohe Bay. Typical approach profiles will be flown between 300 ft and 500 ft Above Ground Level (AGL), however, flight profiles will be flown at higher and lower altitudes in approved training areas to more accurately represent those flown in combat. The following describes H-1 operations in the context of a training sortie to an LZ.

Departure from MCAS Kaneohe Bay. On a daily basis, H-1s would depart MCAS Kaneohe Bay via vertical take-off as described for the airfield. The aircraft would then proceed to the to training area to conduct landings to an LZ or live fire training (approved live fire training areas are Pohokuloa Training Area or the Pacific Missile Range Facility).

Flight to LZ. In transit, the H-1s will fly at varying altitudes between 300 ft and 2,500 ft above ground level (AGL) and at a speed of 120 nautical miles per hour (kph). Throughout many years of training on Kaneohe Bay, the CH-53Ds established and used transit routes to access LZs and training areas; the H-1s would continue to follow these informal tracks to the extent feasible. It is highly probable that more than one H-1 would fly together for this training, and the aircraft would fly in formation. A formation typically involves a lead aircraft and one or more other aircraft in formation either at a 45 degree angle behind or directly abeam the forward aircraft. Separation between aircraft is typically 15 ft vertically and 40 ft to 0.5 mile horizontally.

Approaching the LZ. Training in and around the LZs would be very similar to the CH-53Ds and would include offset approaches to the zone or direct flight overhead prior to beginning the approach. When the aircraft arrives at a defined distance from the LZ, they will transition from their transit airspeed to between 90 and 100 kph and between 100 ft and 2,500 ft AGL. Once the aircrew initiates the approach, they will gradually descend and decelerate in order to arrive over the intended point of landing at 10 ft AGL in a hover or continue the approach to a no-hover landing.

Hovering/Landing. H-1s conducts hover operations and landings with flight characteristics similar to any other helicopter. A typical vertical landing involves the aircraft starting a descent at 300 ft to 500 ft AGL at an initial speed of 90-110 knots, slowing to 60 knots at 200 ft AGL during the approach turn to final, establishing a stable hover at 10 ft AGL, then landing the aircraft. Landings to and takeoffs from uneven terrain are possible. At suitable LZs and under appropriate conditions, a formation of H-1s may land in sequence.

Take Off. An H-1 takeoff from an LZ would be into the wind. As power is added, the aircraft would rise straight up through the first 10 ft, then allowing the pilot to transition to forward flight by tilting the tip-path-plane of the main rotor, causing the aircraft to accelerate forward as it climbs and gains speed. At about 200 ft AGL, the aircraft would be at about 80 kph of ground speed and maintain 80 kph when leveling off at 300 ft to 500 ft AGL.

Patterns and Repeated Landings at LZ. For training, the H-1 may conduct more than one approach and landing/takeoff sequence at a given LZ during a sortie. As described previously, the pattern "work" would start with the vertical takeoff followed by a transition to forward flight. The H-1 would proceed away from the LZ at about 500 ft AGL and 90-100 kph. When separated sufficiently (around 1 to 2 miles) from the LZ, the H-1 would turn back toward the LZ, descend to about 10 ft to 2,500 ft AGL and accelerate to about 10 to 120 kph. This maneuver offers pilots training using a more tactical approach to an LZ. As the aircraft approaches the LZ, the pilot would initiate a turn as required, descend, and decelerate. Deceleration would result in the aircraft arriving back over its intended point of landing on the LZ at zero airspeed, so that it can land vertically.

Exiting the LZ. Using the takeoff and transition procedures described in "Take Off", the H 1s would exit the LZ. On any given sortie, an H-1s may transit to another LZ, return to base, or continue with different operations at another training area.

Live fire Training. H-1s would conduct live fire training in restricted areas at the PTA PMRF. A typical live fire evolution will include a pair of H-1s arriving at the training area from MCAS Kaneohe Bay between 500 ft and 1,000 ft AGL at 100-120 knots. Once established in the restricted area, they will enter a 500-ft/80-knot traffic pattern 3-7 km from the target area to receive a target area brief and instructions. Single aircraft live fire operations are non-standard and will often require the positive control from a Forward Air Controller (FAC). With target area briefs completed, the H-1s will establish on a restricted fire heading to arrive at firing points along the run-in profile to employ Precision Guided Munitions, as well as guided and unguided rockets, the 20 milimeter cannon, and crew-served machine guns. All ordnance is employed along the final attack heading to maintain fires within the impact area and safely away from personnel on the ground. Attacks are terminated prior to 500-ft separation from the target. Altitudes and airspeeds will very during each attack with the H-1 immediately returning for another attack or reestablishing in the holding pattern at 500 ft. Depending on the threat scenario, H-1s will conduct ordnance delivery from a hover. The same restriction for attack headings will still apply. With ordnance expended or training objectives met, H-1s will return to an approved FARP to refuel and upload ordnance or return to base.

Appendix C provides additional background on the National Airspace System.

1.1 THE NATIONAL AIRSPACE SYSTEM (NAS)

The National Airspace System (NAS) is a complex system made up of airports, airway routes, airlines, and people (pilots, flying public). This enables the safe air travel throughout the United States and over large portions of the oceans. The NAS is composed from ground level up to 60,000 mean sea level (msl). The NAS is under the control of the Federal Aviation Administration (FAA). The FAA is responsible for the safe and efficient use of U.S. airspace by military and civilian aircraft and for supporting national defense requirements.

1.1.1 VISUAL AND INSTRUMENT FLIGHT RULES

There are two sets of regulations that allow pilots to operate an aircraft: visual flight rules (VFR) and instrument flight rules (IFR). Under visual flight rules (VFR), a pilot can fly off published routes using visual references only, such as highways, power lines, terrain, etc. In order to fly under VFR, the weather must meet or exceed minimum requirements for visibility. This generally means there must be at least three miles of visibility and the pilot must be able to remain clear of clouds by at least 500 ft.[1]

Minimum VFR requirements will change depending on the airspace classification (see Section 1.1.3). VFR flight is restricted to below 18,000 feet msl and typically does not require air traffic control (ATC) clearances (depending on airspace Class). VFR pilots exercise *see and avoid* precautions which requires the pilot to be vigilant of their surroundings to remain clear of other traffic, terrain, populated areas, etc. Instrument flight rules (IFR) requires pilots to be trained and certified in navigational methods and follow air traffic control tower clearances for flight routes and altitudes. The air traffic control tower relies on radar and other navigational aid systems to keep IFR aircraft separated from each other.

1.1.2 VISUALIZING AIRSPACE

When defining airspace, four criteria are considered; Volume, Proximity, Time, and Other Attributes.

Volume. A block of airspace is defined by a length, a width, and a floor (the bottom) and ceiling (the top) height. One way to visualize this is stacking layers. For example, airport operations could begin from the ground up to 8,000 feet above ground. From 8,000 feet or above, other aircraft can operate freely without affecting airport operations.

Proximity. Airspace is usually associated with a geographic area, such as an airport or military installation. The airspace classification over these areas control how aircraft operations are handled.

Time. Airspace is allotted for use for specific amounts of time. A designated block of airspace can be used to separate unusual flight maneuvers from other aircraft. Other times, a block of airspace can be reserved for use during the day, and then released back to the FAA at night (such as when the airport closes for the night).

[1] 14 CFR 91, 155 Basic VFR Weather Minimums.

Other Attributes. Characteristics of the underlying land can influence airspace classification. These attributes may have unique terrain needed for testing and/or training requirements such as open water, desert, and mountains.[2]

1.1.3 AIRSPACE

Airspace is defined as an area of defined dimensions within which air traffic control (ATC) service is provided to instrument and visual flights in accordance to airspace classification. Airspace is divided into two broad categories: Regulatory (Class A to E, restricted and prohibited areas), and Nonregulatory (MOA, warning areas, alert areas, and controlled firing areas). Within these two categories are four types: controlled, uncontrolled, special use, and other. Each type is further defined by: complexity and density of aircraft movement, nature of operations within the airspace, level of safety required, and national and public interests.[3]

1.1.3.1 Controlled Airspace

The following classifications are controlled airspaces in ATC is provided to IFR and VFR flights in accordance with each classification. Figure C-1 provides a definition of each airspace class.

Table C-1. Airspace Classification (Regulatory)

Airspace Class	Definition	Control	Flight Rules
Class A	Airspace from 18,000 feet MSL up to and including FL 600, including the airspace overlying the waters within 12 nautical miles of the coast of the 48 contiguous States and Alaska. Unless otherwise authorized, all persons must operate their aircraft under IFR.	Controlled	IFR
Class B	Airspace from the surface to 10,000 feet mean sea level (MSL) surrounding the nation's busiest airports in terms of airport operations or passenger enplanements. The configuration of each Class B airspace area is individually tailored and consists of a surface area and two or more layers, and is designed to contain all published instrument procedures. An ATC clearance is required for all aircraft to operate in the area, and all aircraft that are so cleared receive separation services within the airspace. The cloud clearance requirement for VFR operations is "clear of clouds."	Controlled	VFR, IFR

[2] Interagency Airspace Coordination. July 2003. *Interagency Airspace Coordination Guide.*

[3] Federal Aviation Administration. Aeronautical Information Manual. February 11, 2010.

Table C-1. Airspace Classification (Regulatory)

Airspace Class	Definition	Control	Flight Rules
Class C	Airspace from the surface to 4,000 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower, are serviced by a radar approach control, and that have a certain number of IFR operations or passenger enplanements. Although the configuration of each Class C area can vary, the airspace usually consists of a surface area with a 5 NM radius, an outer circle with a 10 NM radius that extends from no lower than 1,200 feet up to 4,000 feet above the airport elevation. Each person must establish two-way radio communications with the ATC facility providing air traffic services prior to entering the airspace and thereafter maintain those communications while within the airspace.	Controlled	VFR, IFR
Class D	Airspace from the surface to 2,500 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower. The configuration of each Class D airspace area is individually tailored and when instrument procedures are published, the airspace will normally be designed to contain the procedures. Arrival extensions for instrument approach procedures may be Class D or Class E airspace. Unless otherwise authorized, each person must establish two-way radio communications with the ATC facility providing air traffic services prior to entering the airspace and thereafter maintain those communications while in the airspace. No separation services are provided to VFR aircraft.	Controlled	VFR, IFR
Class E	Generally, if the airspace is not Class A, Class B, Class C, or Class D, and it is controlled airspace, it is Class E airspace. The types of Class E airspace areas are:	Controlled	VFR, IFR
	(1) Surface Area Designated for an Airport - When designated as a surface area for an airport, the airspace will be configured to contain all instrument procedures.		
	(2) Extension to a Surface Area - There are Class E airspace areas that serve as extensions to Class B, Class C, Class D, and Class E surface areas designated for an airport. Such airspace provides controlled airspace to contain standard instrument approach procedures without imposing a communications requirement on pilots operating under VFR.		
	(3) Airspace Used for Transition - There are Class E airspace areas beginning at either 700 or 1,200 feet AGL used to transition to/from the terminal or en route environment.		
	(4) En Route Domestic Areas - There are Class E airspace areas that extend upward from a specified altitude and are en route domestic airspace areas that provide controlled airspace in those areas where there is a requirement to provide IFR en route ATC services but the Federal airway system is inadequate.		
	(5) Federal Airways - The Federal airways are Class E airspace areas and, unless otherwise specified, extend upward from 1,200 feet to, but not including, 18,000 feet MSL. The colored airways are green, red, amber, and blue. The VOR airways are classified as Domestic, Alaskan, and Hawaiian.		
	(6) Unless designated at a lower altitude, Class E airspace begins at 14,500 feet MSL to, but not including 18,000 feet MSL overlying: the 48 contiguous States including the waters within 12 miles from the coast of the 48 contiguous States; the District of Columbia; Alaska, including the waters within 12 miles from the coast of Alaska, and that airspace above FL 600; excluding the Alaska peninsula west of long. 160°00'00"W., and the airspace below 1,500 feet above the surface of the earth unless specifically so designated.		
	(7) Offshore/Control Airspace Areas. Airspace areas beyond 12 NM from the coast of the United States, wherein ATC services are provided.		
Class F	Class F is an international classification and is not used in the United States.	not applicable	not applicable
Class G	Airspace that has not been designated as Class A, B, C, D, or E airspace.	Uncontrolled	VFR, IFR

Source: Federal Aviation Administration. March 2011. *Procedures for Handling Airspace Matters.* Order JO 7400.2H.

Figure C-1 graphically shows typical boundaries for each airspace class.

1.1.4 SPECIAL USE AIRSPACE

Another designation for airspace is called Special Use Airspace (SUA). SUAs alert pilots about areas of military activity, unusual flight hazards, or national security needs. The SUA is designed to segregate these activities for safety. While most SUAs are military, civilian agencies could also have SUAs such as NASA or the Department of Energy. The six types of SUAs are described in Table C-2.

Table C-2. Special Use Airspace

Airspace	Definition	Regulatory/ Nonregulatory
Alert Area	Alert areas may contain a high volume of pilot training or other unusual type of aerial activity. There are no special requirements for clearances. All flight operations must comply with FAA regulations.	Nonregulatory
Controlled Firing Area	Controlled firing areas contain civilian or military activities which could be hazardous to non-participating aircraft. Activities include rocket testing, ordnance disposal, blasting, etc.	Nonregulatory
Military Operating Area (MOA)	Airspace designated for military training activities. These activities include air combat maneuvers, acrobatics, etc. When operating within an MOA, military pilots are exempt from FAA regulations regarding acrobatic flight and speeds in excess of 250 knots below 10,000 msl (14 CFR Section 91.303(c) and (d)).	Nonregulatory
Prohibited Area	Prohibited areas are established over sensitive ground facilities, such as the White House, presidential homes, etc. Dimensions of the area vary. All aircraft are prohibited from operating in the area unless specific approval is obtained from the FAA or controlling agency.	Regulatory
Restricted Area	Restricted areas contain activities that create hazards to aircraft, such as artillery firing and aerial gunnery Dimensions of the area vary depending on the geography, activity requirements, and risks to aircraft. Restricted areas typically have specific hours of operation. Entry into the area requires specific permission from the FAA or the controlling agency.	Regulatory
Warning Area	Warning areas have the same kind of hazardous flight activities as Restricted areas. The names differ due to the Warning area being located offshore over domestic and international waters. (See Figure C-3 for an example in Hawaii.) Warning areas generally begin three miles offshore. The extent of the area boundary will vary depending on the jurisdiction of the United States or international treaty agreement.	Nonregulatory

Special Use Airspace is descriptions are in FAA Order JO 7400.8 Special Use Airspace.

1.1.5 OTHER TYPES OF AIRSPACE

Because of the unique nature of military training operations, other airspace designations have been created by the Department of Defense (DOD) and FAA. Table C-3 provides a summary of the major types of other airspace.

Table C-3. Other Airspace

Airspace	Definition
Military Training Route (MTR)	MTRs are flight corridors designed for low-level high-speed terrain-following training activities. Speeds flown are more than 250 knots at altitudes that range from ground level to 18,000 ft. Routes can be flown VFR and IFR. MTRs are established by the FAA and DOD.
Slow Routes	Slow-speed low-altitude routes are typically used by Air Force cargo aircraft over drop zones. These routes are flown from the surface up to 1,500 ft AGL at speeds 250 KIAS or less.
Low Altitude Tactical Navigation Area (LATN)	LATNs are defined geographical areas for practicing low altitude navigation. The Air Force practices random tactical navigation that typically ranges from 200 AGL to 1,500 ft AGL. These areas are flown at or below 250 knots indicated airspeed (KIAS). Flights within a LATN area are in accordance with FAA flight rules.
Aerial Refueling Routes	These are routes designated for aerial refueling of aircraft.
Temporary SUA	FAA and the military have the ability to create Temporary MOAs or Restricted Areas. These areas are published in the Notices to Airmen.
Cruise Missile Routes	Cruise missile operations are conducted on selected MTRs.
National Security Areas	NSAs are areas where there is a requirement for increased security. Pilots are requested to voluntarily avoid flying through NSAs.
Area Defense Identification Zone (ADIZ)	All aircraft entering domestic U.S. airspace from points outside must provide identification prior to entry. ADIZs are normally located offshore or along U.S. boundaries. (14 CFR 99.17)
Environmentally Sensitive Areas	There are areas of airspace in the U.S. that are considered environmentally sensitive. When flying over these areas, pilots are voluntarily requested to maintain a minimum altitude of 2,000 AGL. Examples of sensitive areas include National Parks, monuments, and recreation areas administered by the National Parks Service, U.S. Forestry Service, and U.S. Fish and Wildlife Service.

1.2 THE HAWAII OPERATING AREA

Air traffic control for the Hawaiian Islands is managed by the Honolulu Control Facility (HCF), which houses the Honolulu Center Radar Approach Control (CERAP), Hawaii-Pacific System Management Office (SMO), Honolulu Airport Traffic Control Tower (ATCT), and the Terminal Radar Approach Control (TRACON). The HCF is located at Honolulu International Airport. Hawaii has 11 Air Traffic Control Assigned Airspaces (ATCAA), and an Air Route Traffic Control Center (ARTCC) assigned to each ATCAA.

Hawaii is located within the Oakland Air Route Traffic Control Center (Figure C-2). The HCF manages the Control Area for the Hawaiian Islands. Figure C-3 depicts the routes and SUAs in Hawaii. Most of the airspace is in international airspace. Scheduling of Warning Areas W-188 Rainbow, W-189, W-190, W-187 surrounding Kaula Island, W191, W-192, W-193, and W-194 are through the Navy Fleet Area Control and Surveillance Facility Detachment Pearl Harbor (FACSFACPH). There are also 11 Air Traffic Assigned Airspace (ATCAA). ATCAA areas (shown as the non-numbers areas next to the Warning Areas). ATCAA are additional controlled areas adjacent to and between the Warning Areas.[4]

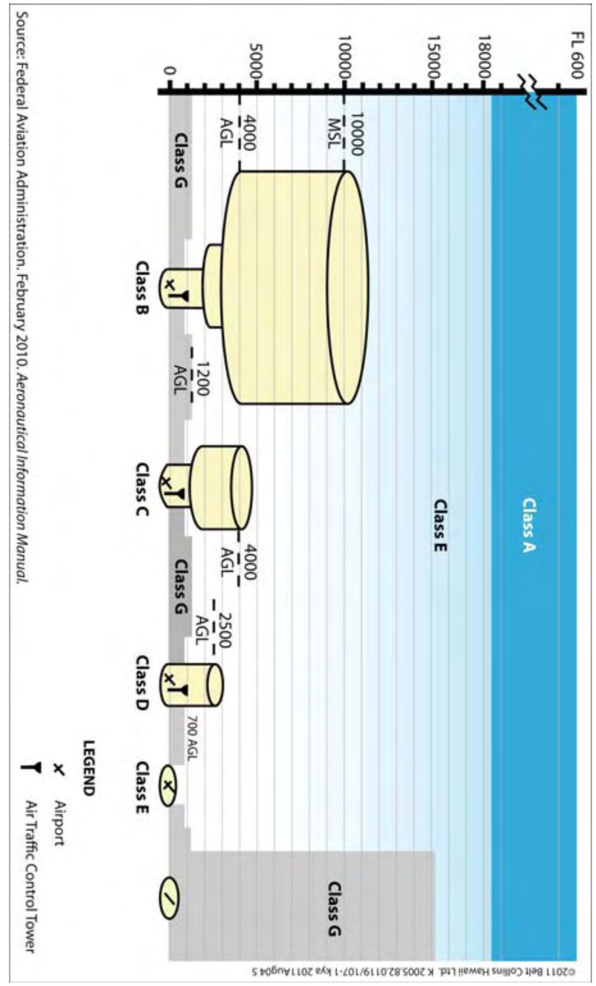


Figure C-1. Airspace Classifications

[4] U.S. Department of the Navy, Commander Pacific Missile Range Facility. April 2010. *Pacific Missile Range Facility Intercept Test Support EA/OEA.*

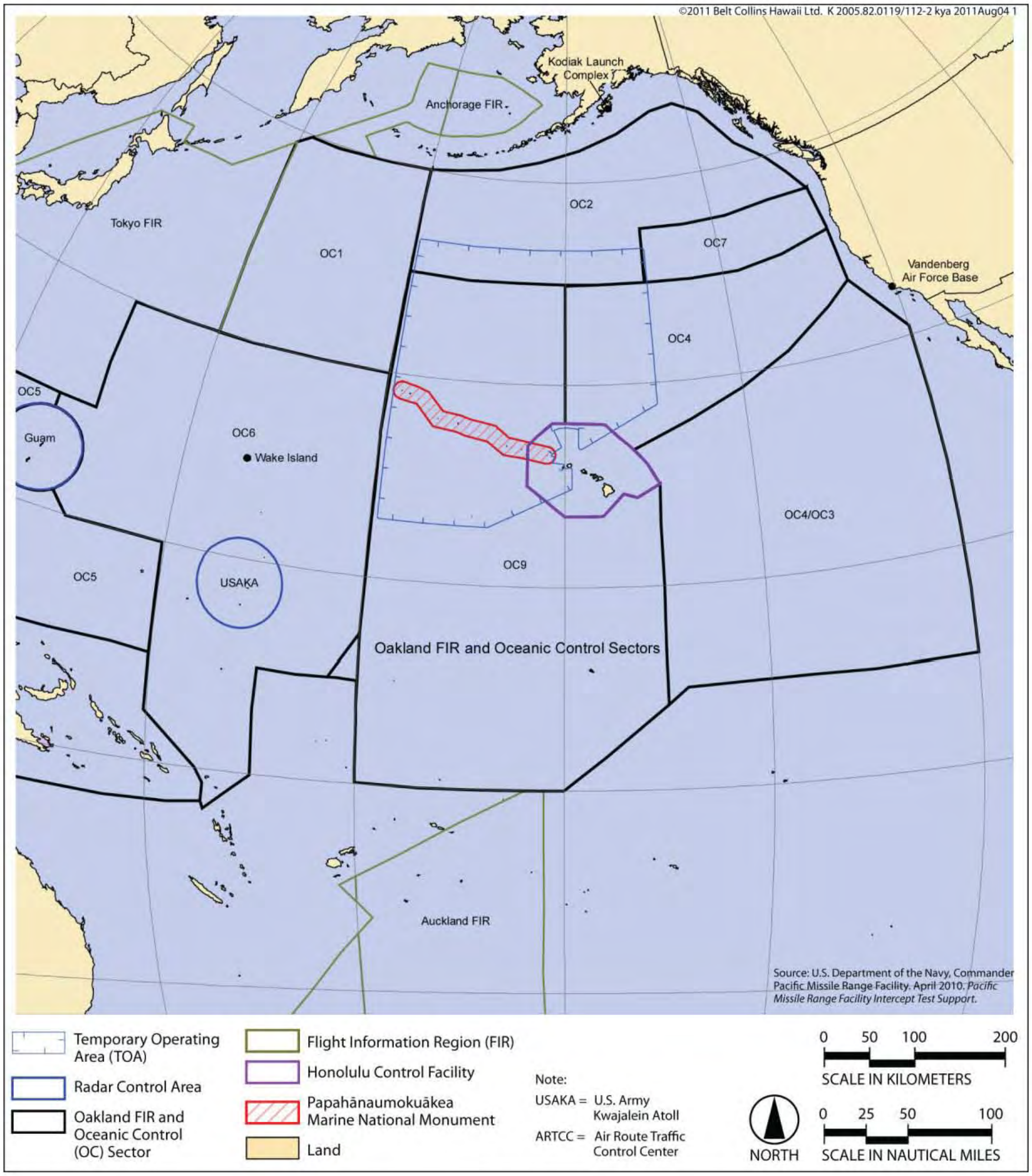


Figure C-2. Oakland Air Route Traffic Control Center and HCF

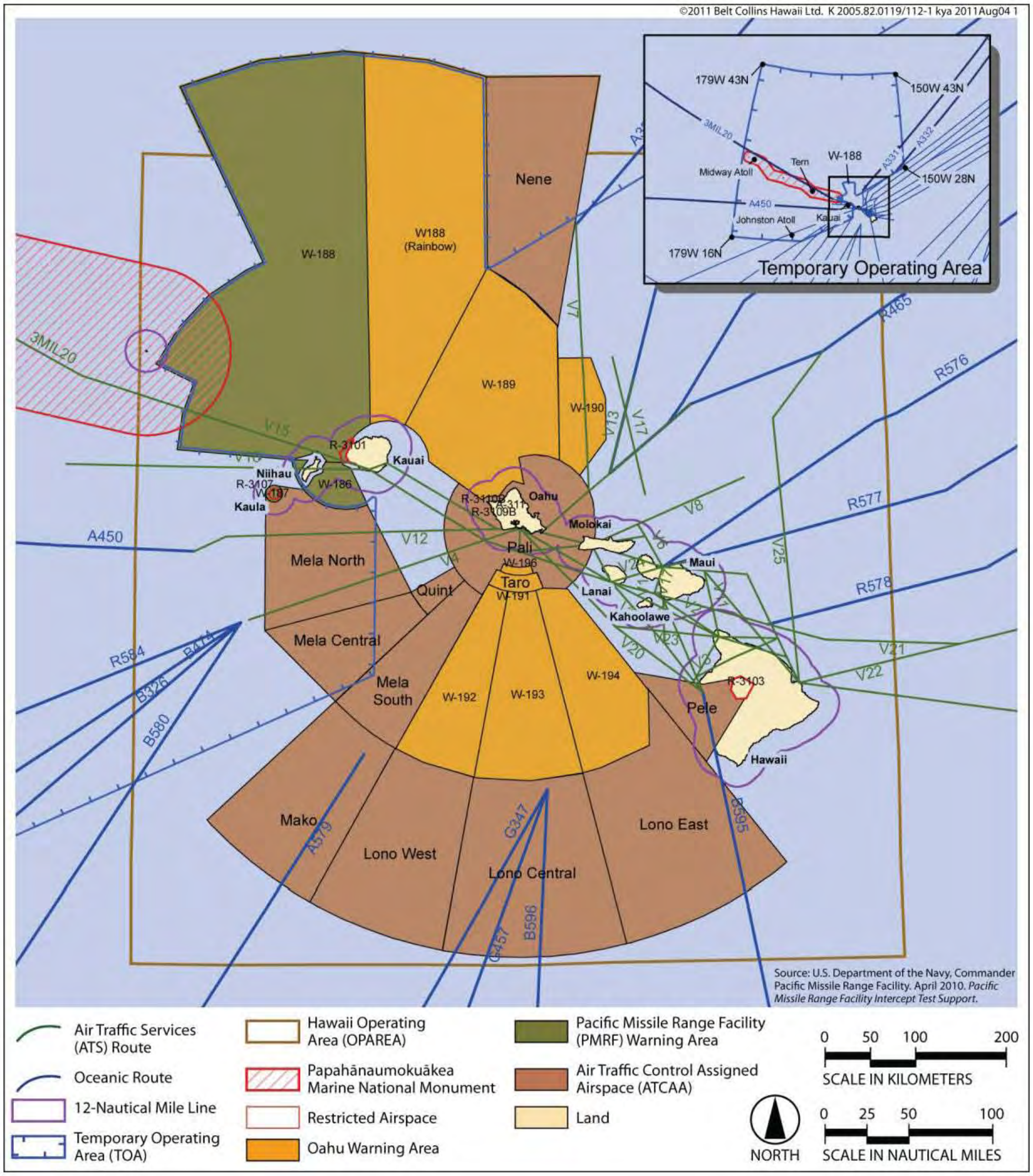


Figure C-3. Hawaii Airways and SUA

Appendix C-3: Marine Corps Admin Use of State Airports

Table 1. Summary of Marine Corps Admin Use of State Airports

	Island	State Airport[4]	Baseline Airport Ops for CY2009[5]	Military Operations CY2009[5]	% Military Use[1]	Proposed Action Admin ops[2]	Airport Ops + Proposed Action Ops	% Increase from Proposed Action
1	Hawaii	*Hilo International*	67,851	6,119	9.02%	127.01	67,978	0.19%
2	Hawaii	*Kona International*	109,581	13,271	12.11%	304.83	109,886	0.28%
3	Hawaii	Upolu[3]	800	81	10.13%	25.40	825	3.08%
4	Hawaii	Waimea-Kohala	2,238	56	2.50%	50.81	2,289	2.22%
5	Kauai	*Lihue*	99,171	6,490	6.54%	98.78	99,270	0.10%
6	Kauai	Port Allen	2,120	9	0.45%	10.98	2,131	0.52%
7	Lanai	Lanai	7,266	107	1.48%	0.00	7,266	0.00%
8	Maui	Hana	2,546	6	0.22%	0.00	2,546	0.00%
9	Maui	*Kahului*	118,800	4,028	3.39%	0.00	118,800	0.00%
10	Molokai	Kalaupapa	3,094	212	6.84%	0.00	3,094	0.00%
11	Molokai	*Molokai*	24,295	700	2.88%	69.40	24,364	0.28%
12	Oahu	Dillingham	49,758	1,093	2.20%	66.46	49,824	0.13%
13	Oahu	*Honolulu International*	274,434	15,462	5.63%	66.46	274,500	0.02%
14	Oahu	*Kalaeloa*	128,732	24,302	18.88%	66.46	128,798	0.05%
		TOTAL	**890,686**	**71,937**		**886.58**	**891,573**	**0.10%**

Notes

1 Shaded cells indicate use of GCR data to fill gaps in the Hawaii Military ops data. GCR Inc. publishes the FAA Airport Master Record, Form 5010-1. Available at http://www.gcr1.com/5010web/. Period ending dates for GCR military percentages: Upolu (12/31/2008), Waimea-Kohala (12/31/2009), Port Allen (12/31/2010), Lanai (3/16/2007), Hana (12/31/2009), Kalaupapa (12/31/2010), Dillingham (7/31/2010). GCR percentages used to calculate military operations

2 Estimated ops from Table 3. Estimates do not include CH-53, only Proposed Action. CH-53 ops assumed already in the Airport Ops

3 Estimated ops from DOT Airports provided via email

4 Italicized text = towered airport. Kapalua Airport has restrictions for helicopter use and military training.

5 Source: State of Hawaii 2010 databook and Hawaii DOT Airports Statistics 2010.

Table 2. Proposed Admin Ops for V-22/H-1

Total tactical ops	17,732	
Admin ops factor	5%	
TOTAL Admin ops	886.60	Number of Admin ops to reallocate to State Airports

Table 3. Distribution of Marine Corps Admin Ops By Island

Island	Airport	Island Tactical Ops Relative to Statewide Tactical Ops	Estimated Admin Ops by Island	Airport Admin Ops Relative to Island Admin Ops	Estimated Admin Ops by Airport
Hawaii		57.30%	508.05		
	Hilo International			25.00%	127.01
	Kona International			60.00%	304.83
	Upolu			5.00%	25.40
	Waimea-Kohala			10.00%	50.81
	TOTAL Hawaii			*100.00%*	*508.05*
Kauai + Kaula		12.38%	109.75		
	Lihue			90.00%	98.78
	Port Allen			10.00%	10.98
	TOTAL Kauai			*100.00%*	*109.75*
Maui		0.00%	0.00		
	Hana			0.00%	0.00
	Kahului			100.00%	0.00
	TOTAL Maui			*100.00%*	*0.00*
Molokai		7.83%	69.40		
	Kalaupapa			0.00%	0.00
	Molokai			100.00%	69.40
	TOTAL Molokai			*100.00%*	*69.40*
Oahu[1]		22.49%	199.40		
	Dillingham			33.33%	66.46
	Honolulu International			33.33%	66.46
	Kalaeloa			33.33%	66.46
	TOTAL Oahu			*99.99%*	*199.38*
Lanai		0.00%			
	Lanai			0.00%	0.00
		100.00%			

1 Oahu total does not include MCAS Kaneohe Bay

Appendix C-3. NVD Ops

Table 1. Determine Number of Military NVD Ops From 7am–10pm Tactical Ops

Airport	Military tactical ops (7am to 10pm) Under Proposed Action (does not include V-22/H-1)	Factor to determine NVD ops from 7am-10pm ops	Military tactical Ops (10 to 7am) Under Proposed Action (does not include V-22/H-1)	Military NVD ops (does not include V-22/H-1)
Dillingham	1,553.00	100.00%	946.00	2,499.00
PTA (Bradshaw)	10,120.00	50.00%	5,486.00	10,546.00
PMRF	0.00			

Table 2. Determine Number of Proposed Action NVD Ops From 7am–10pm Tactical Ops

Airport	Proposed Action (V-22 and H1) tactical ops (7am to 10pm)	Factor to determine NVD ops from 7am-10pm ops	Proposed Action (V-22 and H1) tactical ops (10pm to 7am)	Proposed Action NVD ops
Dillingham	671.00	100.00%	705	1,376
PTA (Bradshaw)	5,792.00	50.00%	4,347	7,243
PMRF	1,043.00	50.00%	891	1,413

Table 3. Change in Reallocated NVD Ops

Airport	Military + Proposed Action NVD ops	Reallocation of Kalaupapa NVD Ops	Change in NVD ops
Dillingham	3,875.00	555.2	14.33%
PTA (Bradshaw)	17,789.00	555.2	3.12%
PMRF	1,412.50	277.6	19.65%

Table 4: Reallocation of Kalaupapa ops.

Areas considered	Percentage for Reallocating Kalauapapa Ops	1388	<== Kalaupapa H1 ops to reallocate
Dillingham	40.00%	555.2	
PTA (Bradshaw)	40.00%	555.2	
PMRF	20.00%	277.6	
TOTAL	100.00%	1388	

Table 5. What does 1388 CAL ops represent

Number of ops per CAL (landing/takeoff)	2	ops
Number of CALs per training event	5	CAL
TOTAL ops (2 ops x 5 CALs)	10	ops per training event
Two training events flown per aircraft (10 ops x 2 events)	20	ops per aircraft
Two aircraft (section) flown for training *assume 40 ops conducted within 1 hours*	40	ops for two aircraft
Kalaupapa ops converted to time 1388 ops / 40 ops/hr	34.7	hours

Areas considered	Kalaupapa Ops Reallocation	Number of Ops per Hour	Number of hours
Dillingham	555.2	40	13.88
PTA (Bradshaw)	555.2	40	13.88
PMRF	277.6	40	6.94
TOTAL	**1388**		**34.7**

APPENDIX D

Noise Modeling Data and Noise Effect

Table of Contents

D-1 MARINE CORPS BASE HAWAII KANEOHE BAY

D-1.1 OPERATIONS

Table 1.1-1 Baseline Annual Flight Operations at MCBH Kaneohe Bay

			Departure			Non-Break Visual Arrival			Instrument Arrival (TACAN)			Overhead Break Arrival			Touch and Go (11)			GCA Box (11)			TOTAL		
Category	Aircraft Type	Note	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Based	P-3C	1	3,096	124	3,220	2,377	116	2,493	719	9	728	-	-	-	12,273	526	12,799	928	21	949	19,393	796	20,189
	H-60	2	569	28	597	568	29	597	-	-	-	-	-	-	7,884	255	8,139	97	2	99	9,118	314	9,432
Based & Transient	CH-53D	3	1,532	107	1,639	1,479	107	1,586	53	-	53	-	-	-	9,577	328	9,905	382	19	401	13,023	561	13,584
	C-20	4	908	31	939	794	24	818	118	3	121	-	-	-	216	-	216	161	7	168	2,197	65	2,262
Transient	C-17	5	591	20	611	358	19	377	235	1	236	-	-	-	4,134	-	4,134	85	6	91	5,403	46	5,449
	C-5, An-124, Other Large Jet	6	86	7	93	83	6	89	6	1	7	-	-	-			-	-	-	-	175	14	189
	Propeller (C-130, C-26, P-3)	7	324	13	337	314	13	327	10	-	10	-	-	-	156	7	163	156	7	163	960	40	1,000
	Medium Jet (B-757, B-737, C-9)	8, 9	14	1	15	14	1	15			-			-			-			-	28	2	30
	4th Force Reconnaissance	8	6	-	6	6	-	6			-			-			-			-	12	-	12
	Fighter/Attack	10	251	3	254	1	-	1	232	6	238	16	-	16	13	-	13	-	-	-	513	9	522
Total			7,377	334	7,711	5,994	315	6,309	1,373	20	1,393	16	-	16	34,253	1,116	35,369	1,809	62	1,871	50,822	1,847	52,669

Notes:

1. modeled as P-3C
2. modeled as SH-60B (RNM)
3. includes Based CH-53D and Transient Rotary-wing aircraft; modeled as CH-53E (RNM)
4. includes Based C-20G (GIV) and Transient "Small Jet" (e.g., C-20, C-40)
5. includes Transient C-17 and 42% of Transient "Other Large Jet" (i.e., other than C-5, An-124 and C-17)
6. includes Transient C-5, An-124 and 58% of Transient "Other Large Jet"; modeled as C-5A
7. Modeled as a P-3C; ops per Holden 2011
8. not modeled
9. includes B-757, C-9, B-737
10. 100% modeled as F/A-18C/D
11. Each circuit counted as two operations

Table 1.1-2 Annual Flight Operations at MCBH Kaneohe Bay for Alternatives A/B

Category	Aircraft Type	Note	Departure			Non-Break Visual Arrival			Instrument Arrival (TACAN)			Overhead Break Arrival			Touch and Go (10)			GCA Box (10)			TOTAL		
			Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Based	P-8 MMA	1	1,295	39	1,334	1,293	39	1,332	1	-	1	-	-	-	14,230	-	14,230	6,112	-	6,112	22,931	78	23,009
	P-3C	5	555	21	576	441	20	461	113	1	114	-	-	-	2,003	17	2,020	146	3	149	3,258	62	3,320
	H-60	2	520	25	545	519	26	545	-	-	-	-	-	-	7,294	140	7,434	72	18	90	8,405	209	8,614
	MV-22		2,418	127	2,545	1,185	62	1,247	1,233	65	1,298	-	-	-	1,766	93	1,859	973	52	1,025	7,575	399	7,974
	AH-1/UH-1		2,633	184	2,817	2,543	184	2,727	91	-	91	-	-	-	7,695	54	7,749	812	40	852	13,774	462	14,236
Based & Transient	**CH-53E**	3	996	69	1,065	962	69	1,031	34	-	34	-	-	-	6,325	117	6,442	248	12	260	8,565	267	8,832
	C-20	4	765	25	790	765	24	789	-	-	-	-	-	-	1,028	-	1,028	1,493	60	1,553	4,051	109	4,160
Transient	C-17		592	19	611	521	26	547	66	-	66	-	-	-	4,132	-	4,132	85	5	90	5,396	50	5,446
	C-5, An-124, Other Large Jet	6	263	20	283	245	19	264	16	3	19	-	-	-	-	-	-	-	-	-	524	42	566
	Propeller (C-130, C-26, P-3)	5	823	34	857	813	34	847	10	-	10	-	-	-	156	7	163	156	7	163	1,958	82	2,040
	Medium Jet (B-757, B-737, C-9)	7, 8	14	1	15	14	1	15			-			-			-			-	28	2	30
	4th Force Reconnaissance	7	6	-	6	6	-	6			-			-			-			-	12	-	12
	Fighter/Attack	9	229	3	232	1	-	1	208	5	213	16	-	16	24	-	24	-	-	-	478	8	486
Total			11,109	567	11,676	9,308	504	9,812	1,772	74	1,846	16	-	16	44,653	428	45,081	10,097	197	10,294	76,955	1,770	78,725

Source: Ebisu & Associates 2010; Holden 2011; Wyle 2008a

Notes:

1. Modeled as a Boeing B-737-700.
2. modeled as SH-60B (RNM)
3. includes Based CH-53E and Transient Rotary-wing aircraft; modeled as CH-53E (RNM)
4. includes Based C-20G (GIV) and Transient "Small Jet" (e.g., C-20, C-40)
5. modeled as P-3C
6. Modeled as a C-5A
7. not modeled
8. includes B-757, C-9, B-737
9. 100% modeled as F/A-18C/D
10. Each circuit counted as two operations

Table 1.1-3 Annual Flight Operations at MCBH Kaneohe Bay for No Action Alternative

Category	Aircraft Type	Note	Departure			Non-Break Visual Arrival			Instrument Arrival (TACAN)			Overhead Break Arrival			Touch and Go [12]			GCA Box [12]			TOTAL		
			Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Based	P-8 MMA	1	1,295	39	1,334	1,293	39	1,332	1	-	1	-	-	-	14,230	-	14,230	6,112	-	6,112	22,931	78	23,009
	P-3C	7	555	21	576	441	20	461	113	1	114	-	-	-	2,002	18	2,020	146	4	150	3,257	64	3,321
	H-60	2	520	25	545	519	26	545	-	-	-	-	-	-	7,294	140	7,434	72	18	90	8,405	209	8,614
Based & Transient	CH-53E	3	1,391	97	1,488	1,343	97	1,440	48	-	48	-	-	-	8,834	164	8,998	347	17	364	11,963	375	12,338
	C-20	4	765	25	790	765	24	789	-	-	-	-	-	-	1,028	-	1,028	1,493	61	1,554	4,051	110	4,161
Transient	C-17		593	19	612	520	26	546	66	-	66	-	-	-	4,132	-	4,132	85	5	90	5,396	50	5,446
	C-5, An-124, Other Large Jet	6	263	20	283	245	19	264	16	3	19	-	-	-	-	-	-	-	-	-	524	42	566
	Propeller (C-130, C-26, P-3)	8	1,199	50	1,249	1,189	50	1,239	10	-	10	-	-	-	156	7	163	156	7	163	2,710	114	2,824
	Medium Jet (B-757, B-737, C-9)	9, 10	14	1	15	14	1	15			-			-			-			-	28	2	30
	4th Force Reconnaissance	9	6	-	6	6	-	6			-			-			-			-	12	-	12
	Fighter/Attack	11	229	3	232	1	-	1	208	5	213	16	-	16	24	-	24	-	-	-	478	8	486
Total			6,830	300	7,130	6,336	302	6,638	462	9	471	16	-	16	37,700	329	38,029	8,411	112	8,523	59,755	1,052	60,807

Source: WR 08-13 Prospective Scenario except for CH-53D (from Baseline) and based/transient P-3 (from Ebisu & Associates 2011 (23Feb) and KC-130 (Holden 2011)

Notes:

1. Modeled as a Boeing B-737-700.
2. modeled as SH-60B (RNM)
3. includes Based CH-53D and Transient Rotary-wing aircraft; modeled as CH-53E (RNM)
4. includes Based C-20G (GIV) and Transient "Small Jet" (e.g., C-20, C-40)
5. n/a
6. modeled as C-5A
7. modeled as P-3C
8. Modeled as a P-3C
9. not modeled
10. includes B-757, C-9, B-737
11. 100% modeled as F/A-18C/D
12. Each circuit counted as two operations

D-1.2 FLIGHT TRACKS

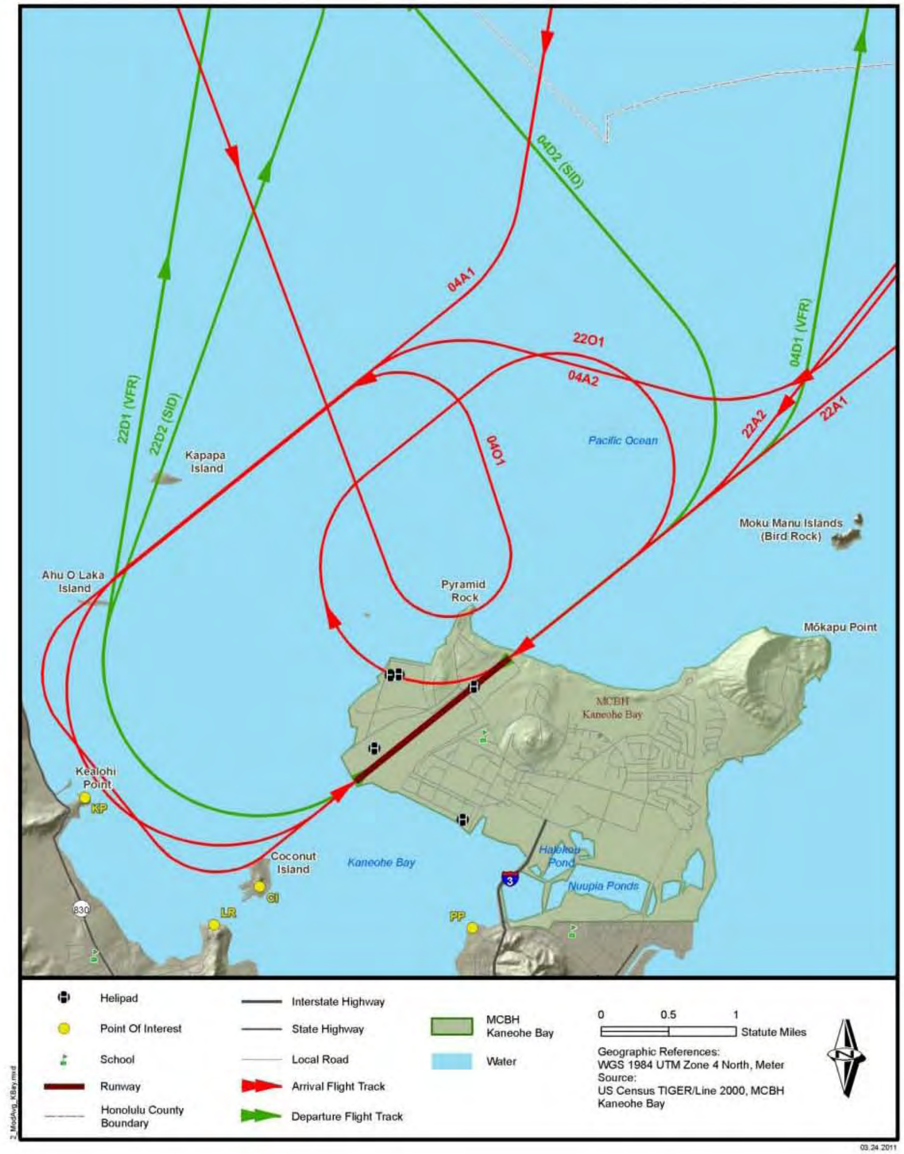


Figure D-1 Modeled Average Daily Fixed-Wing Departure and Arrival Flight Tracks

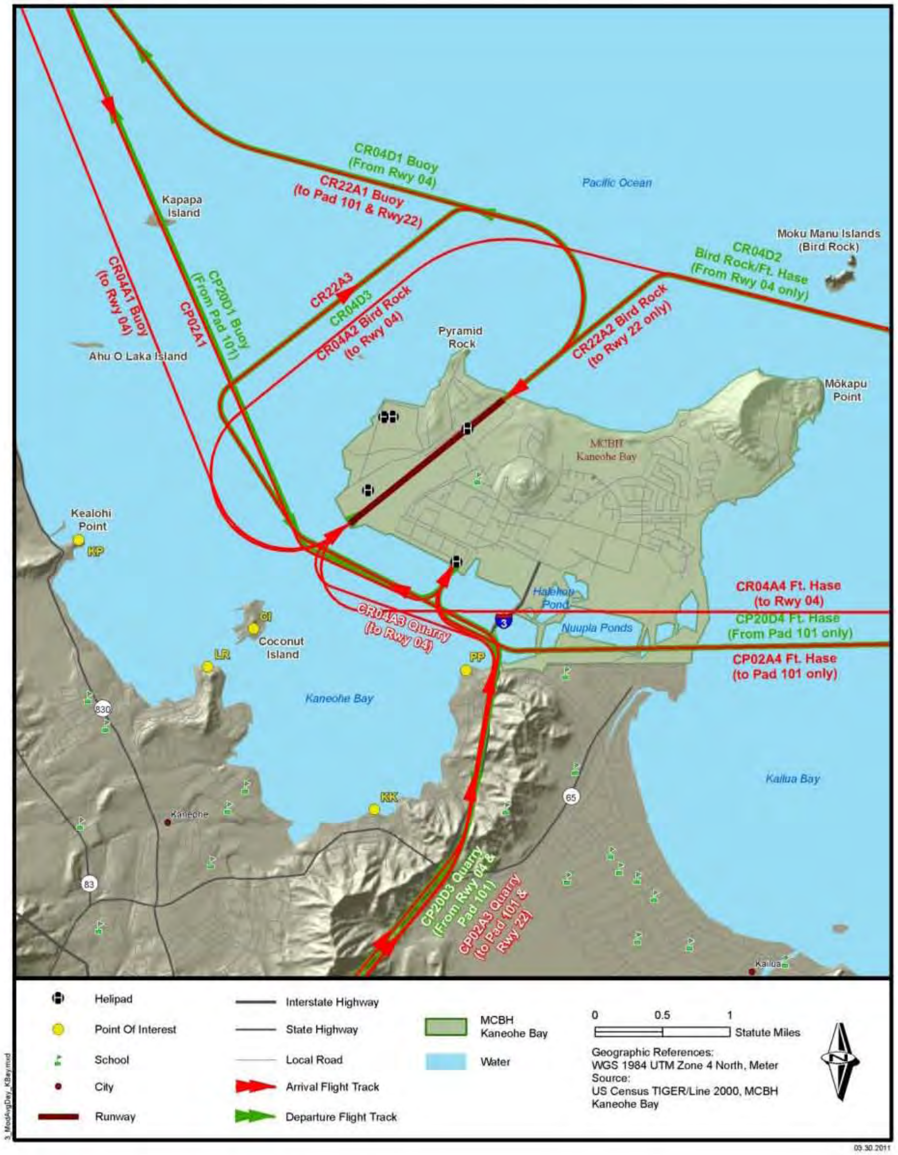


Figure D-2 Modeled Average Daily Rotary-Wing Departure and Arrival Flight Tracks (not MV-22)

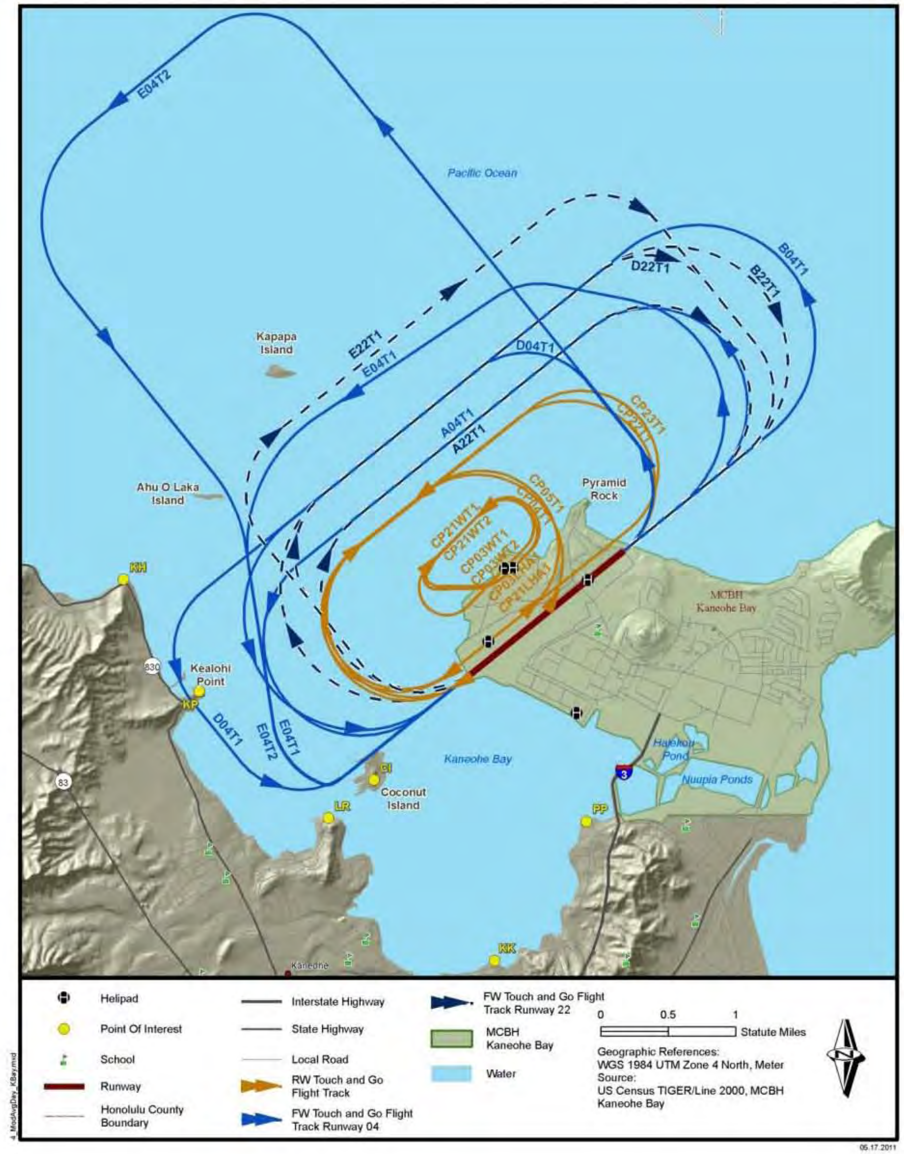


Figure D-3 Modeled Average Daily Touch and Go Flight Tracks

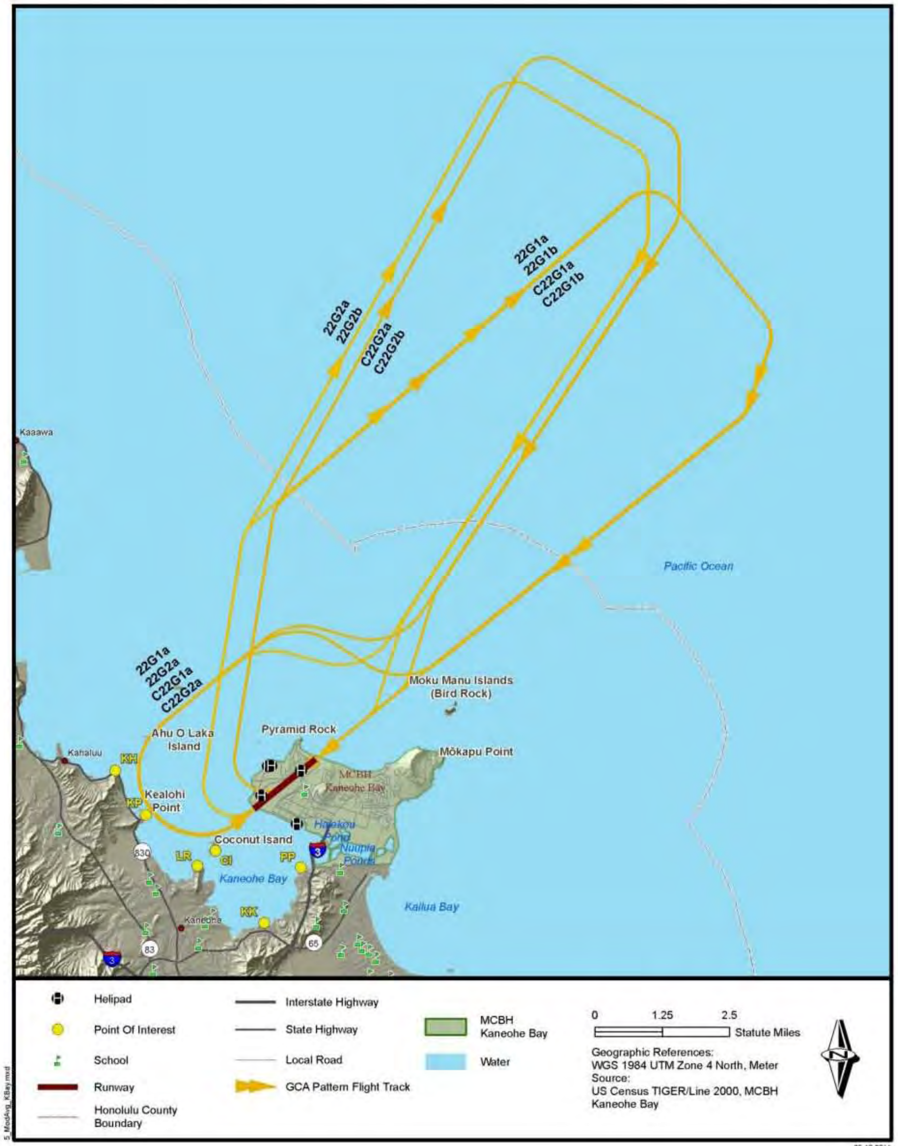


Figure D-4 Modeled Average Daily GCA Box Flight Tracks

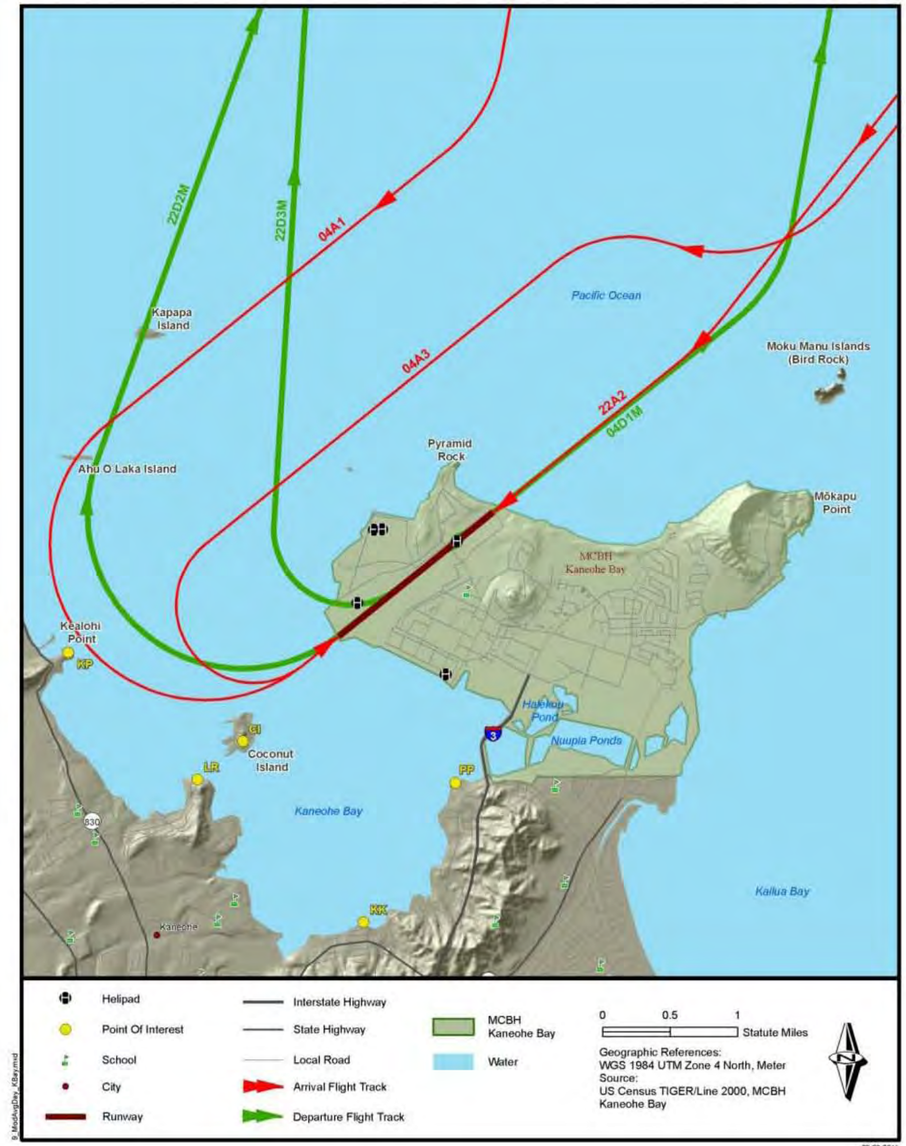


Figure D-5 Modeled Average Daily Departure and Arrival Flight Tracks for the MV-22 Tiltrotor

D-1.3 SHADED DNL MAPS

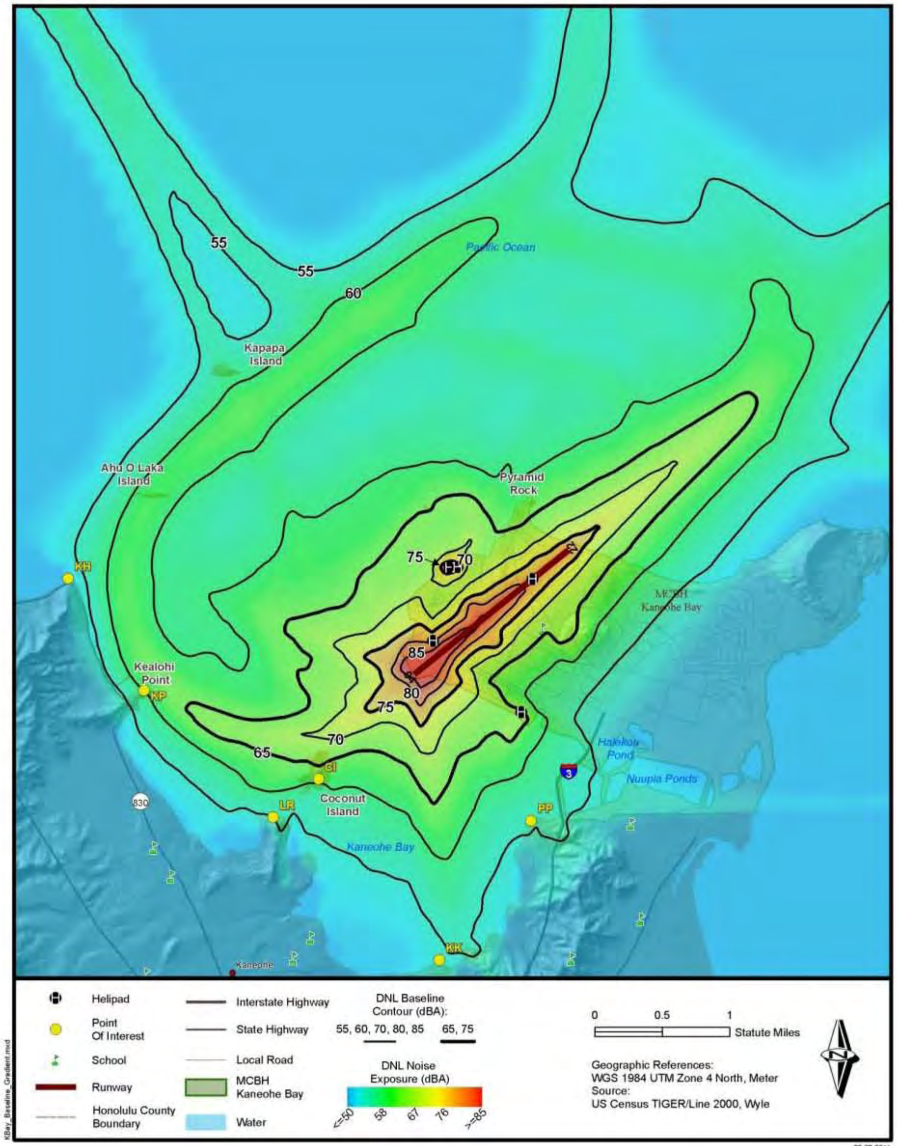


Figure 1.3-1 Shaded Aircraft DNL at MCB Hawaii Kaneohe Bay for 2009 Baseline Condition

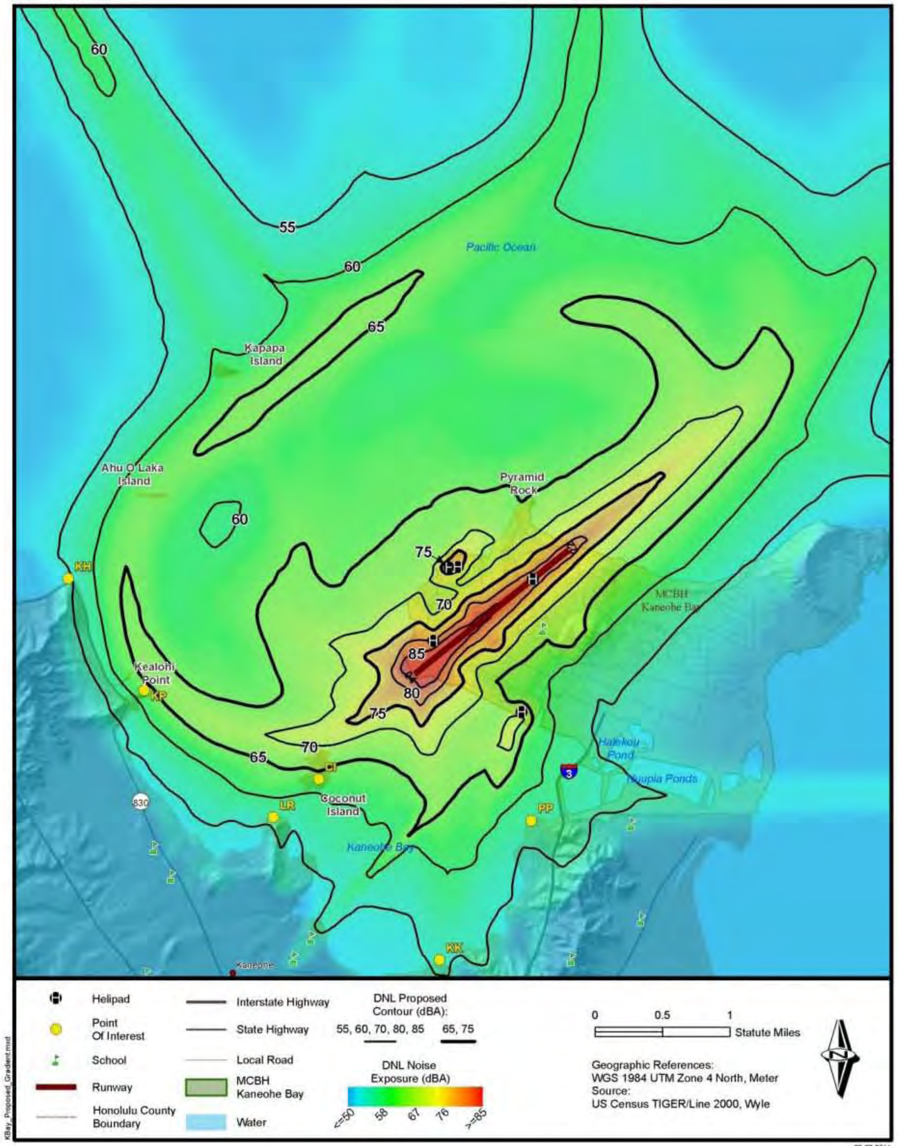


Figure 1.3-2 Shaded Aircraft DNL at MCB Hawaii Kaneohe Bay for 2018 Alternative A/B

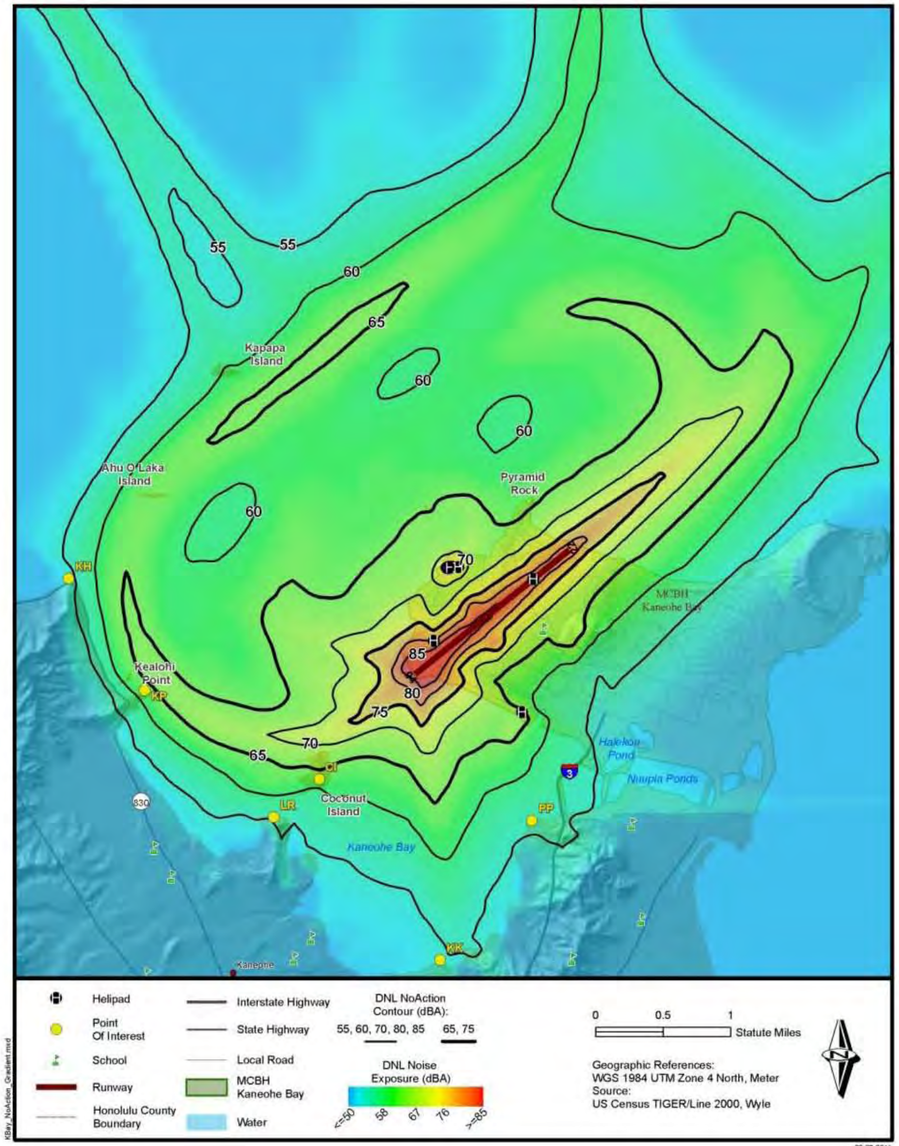


Figure 1.3-3 Shaded Aircraft DNL at MCB Hawaii Kaneohe Bay for 2018 No Action Alternative

D-2 OTHER TRAINING AREAS

D-2.1 EVENTS

Table 2.1-1 Summary of Baseline Annual Landing Events

Area	LZ	USMC									Other						TOTAL		
		CH-53D			MV-22			AH/UH-1			Army			HIARNG					
		Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Kalaupapa Airport	Kalaupapa Runway	250	11	261							-	-	-	-	-	-	250	11	261
Dillingham Military Resrv	Dillingham Airfield Runway	54	2	56							141	3	144	9	-	9	204	5	209
	Dillingham DZ	54	2	56							141	3	144	9	-	9	204	5	209
	Albatross (Apron)	54	2	56							141	3	144	9	-	9	204	5	209
	Blue Jay (New)	54	2	56							141	3	144	9	-	9	204	5	209
	Finch	54	2	56							141	3	144	9	-	9	204	5	209
	Rooster (Taxiway)	54	2	56							141	3	144	9	-	9	204	5	209
MCTAB	Tiger	29	1	30							-	-	-	-	-	-	29	1	30
	Noni	29	1	30							-	-	-	-	-	-	29	1	30
	Gull	58	2	60							-	-	-	-	-	-	58	2	60
	Hawk	58	2	60							-	-	-	-	-	-	58	2	60
	Owl	58	2	60							-	-	-	-	-	-	58	2	60
A311 Kawailoa Training Area	Black	925	27	952							913	16	929	144	1	145	1,982	44	2,026
A311 SB East Range	Ku Tree	62	2	64							62	-	62	9	-	9	133	2	135
Subtotals																			
Kalaupapa Airport		250	11	261	-	-	-	-	-	-	-	-	-	-	-	-	250	11	261
Dillingham Military Resrv		324	12	336	-	-	-	-	-	-	846	18	864	54	-	54	1,224	30	1,254
MCTAB		232	8	240	-	-	-	-	-	-	-	-	-	-	-	-	232	8	240
KTA Black		925	27	952	-	-	-	-	-	-	913	16	929	144	1	145	1,982	44	2,026
East Range Ku Tree		62	2	64	-	-	-	-	-	-	62	-	62	9	-	9	133	2	135
TOTAL		**1,793**	**60**	**1,853**	**-**	**-**	**-**	**-**	**-**	**-**	**1,821**	**34**	**1,855**	**207**	**1**	**208**	**3,821**	**95**	**3,916**

Table 2.1-2(a), USMC Baseline Annual Landing Events at Oahu and Molokai Landing Zones

Area	LZ	USMC																							
		CH-53D						MV-22						AH-1						UH-1					
		CAL			EXT			CAL			EXT			CAL			EXT			CAL			EXT		
		Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Kalaupapa Airport	Kalaupapa Runway	250	11	261	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dillingham Military Resrv	Dillingham Airfield Runway	54	2	56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dillingham DZ	54	2	56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Albatross (Apron)	54	2	56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Blue Jay (New)	54	2	56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Finch	54	2	56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rooster (Taxiway)	54	2	56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MCTAB	Tiger	29	1	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Noni	29	1	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Gull	58	2	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hawk	58	2	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Owl	58	2	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A311 Kawailoa Training Area	Black	625	16	641	300	11	311	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A311 SB East Range	Ku Tree	42	1	43	20	1	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 2.1-2(b), Army Baseline Annual Landing Events at Oahu and Molokai Landing Zones

Area	LZ	Army																	
		CH-47						OH-58						UH-60					
		CAL			EXT			CAL			EXT			CAL			EXT		
		Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Kalaupapa Airport	Kalaupapa Runway	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dillingham Military Resrv	Dillingham Airfield Runway	30	1	31	-	-	-	-	-	-	-	-	-	111	2	113	-	-	-
	Dillingham DZ	30	1	31	-	-	-	-	-	-	-	-	-	111	2	113	-	-	-
	Albatross (Apron)	30	1	31	-	-	-	-	-	-	-	-	-	111	2	113	-	-	-
	Blue Jay (New)	30	1	31	-	-	-	-	-	-	-	-	-	111	2	113	-	-	-
	Finch	30	1	31	-	-	-	-	-	-	-	-	-	111	2	113	-	-	-
	Rooster (Taxiway)	30	1	31	-	-	-	-	-	-	-	-	-	111	2	113	-	-	-
MCTAB	Tiger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Noni	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Gull	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hawk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Owl	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A311 Kawailoa Training Area	Black	105	2	107	35	1	36	268	5	273	-	-	-	365	6	371	140	2	142
A311 SB East Range	Ku Tree	7	-	7	2	-	2	18	-	18	-	-	-	25	-	25	10	-	10

Table 2.1-2(c), HIARNG Baseline Annual Landing Events at Oahu and Molokai Landing Zones

Area	LZ	HIARNG																	
		CH-47						OH-58						UH-60					
		CAL			EXT			CAL			EXT			CAL			EXT		
		Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Kalaupapa Airport	Kalaupapa Runway	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dillingham Military Resrv	Dillingham Airfield Runway	4	-	4	-	-	-	2	-	2	-	-	-	3	-	3	-	-	-
	Dillingham DZ	4	-	4	-	-	-	2	-	2	-	-	-	3	-	3	-	-	-
	Albatross (Apron)	4	-	4	-	-	-	2	-	2	-	-	-	3	-	3	-	-	-
	Blue Jay (New)	4	-	4	-	-	-	2	-	2	-	-	-	3	-	3	-	-	-
	Finch	4	-	4	-	-	-	2	-	2	-	-	-	3	-	3	-	-	-
	Rooster (Taxiway)	4	-	4	-	-	-	2	-	2	-	-	-	3	-	3	-	-	-
MCTAB	Tiger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Noni	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Gull	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hawk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Owl	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A311 Kawailoa Training Area	Black	78	1	79	27	-	27	15	-	15	-	-	-	20	-	20	4	-	4
A311 SB East Range	Ku Tree	5	-	5	2	-	2	1	-	1	-	-	-	1	-	1	-	-	-

Table 2.1-2(d), Totals Baseline Annual Landing Events at Oahu and Molokai Landing Zones

Area	LZ	USMC	Army	HIARNG	TOTAL						GRAND TOTAL		
					CAL			EXT					
		Total	Total	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Kalaupapa Airport	Kalaupapa Runway	261	-	-	250	11		-	-		250	11	
Dillingham Military Resrv	Dillingham Airfield Runway	56	144	9	204	5		-	-		204	5	
	Dillingham DZ	56	144	9	204	5		-	-		204	5	
	Albatross (Apron)	56	144	9	204	5		-	-		204	5	
	Blue Jay (New)	56	144	9	204	5		-	-		204	5	
	Finch	56	144	9	204	5		-	-		204	5	
	Rooster (Taxiway)	56	144	9	204	5		-	-		204	5	
MCTAB	Tiger	30	-	-	29	1		-	-		29	1	
	Noni	30	-	-	29	1		-	-		29	1	
	Gull	60	-	-	58	2		-	-		58	2	
	Hawk	60	-	-	58	2		-	-		58	2	
	Owl	60	-	-	58	2		-	-		58	2	
A311 Kawailoa Training Area	Black	952	929	145	1,476	30		506	14		1,982	44	
A311 SB East Range	Ku Tree	64	62	9	99	1		34	1		133	2	

Table 2.1-3 Summary of Action Annual Landing Events for Alternatives A/B

Area	LZ	USMC									Other						TOTAL		
		CH-53D			MV-22			AH/UH-1			Army			HIARNG					
		Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Kalaupapa Airport	Kalaupapa Runway	107	5	112	650	34	684	1,037	351	1,388	-	-	-	-	-	-	1,794	390	2,184
Dillingham Military Resrv	Dillingham Airfield Runway	24	1	25	108	6	114	70	3	73	455	9	464	9	-	9	666	19	685
	Dillingham DZ	24	1	25	108	6	114	70	3	73	455	9	464	9	-	9	666	19	685
	Albatross (Apron)	24	1	25	108	6	114	70	3	73	455	9	464	9	-	9	666	19	685
	Blue Jay (New)	24	1	25	108	6	114	70	3	73	455	9	464	9	-	9	666	19	685
	Finch	24	1	25	108	6	114	70	3	73	455	9	464	9	-	9	666	19	685
	Rooster (Taxiway)	24	1	25	108	6	114	70	3	73	455	9	464	9	-	9	666	19	685
MCTAB	Tiger	13	-	13	14	1	15	15	1	16	-	-	-	-	-	-	42	2	44
	Noni	13	-	13	14	1	15	15	1	16	-	-	-	-	-	-	42	2	44
	Gull	26	1	27	27	1	28	30	1	31	-	-	-	-	-	-	83	3	86
	Hawk	26	1	27	27	1	28	30	1	31	-	-	-	-	-	-	83	3	86
	Owl	26	1	27	27	1	28	30	1	31	-	-	-	-	-	-	83	3	86
A311 Kawailoa Training Area	Black	411	12	423	250	112	362	97	3	100	2,036	36	2,072	144	1	145	2,938	164	3,102
A311 SB East Range	Ku Tree	28	-	28	17	8	25	7	-	7	126	2	128	9	-	9	187	10	197
Subtotals																			
Kalaupapa Airport		107	5	112	650	34	684	1,037	351	1,388	-	-	-	-	-	-	1,794	390	2,184
Dillingham Military Resrv		144	6	150	648	36	684	420	18	438	2,730	54	2,784	54	-	54	3,996	114	4,110
MCTAB		104	3	107	109	5	114	120	5	125	-	-	-	-	-	-	333	13	346
KTA Black		411	12	423	250	112	362	97	3	100	2,036	36	2,072	144	1	145	2,938	164	3,102
East Range Ku Tree		28	-	28	17	8	25	7	-	7	126	2	128	9	-	9	187	10	197
TOTAL		**794**	**26**	**820**	**1,674**	**195**	**1,869**	**1,681**	**377**	**2,058**	**4,892**	**92**	**4,984**	**207**	**1**	**208**	**9,248**	**691**	**9,939**

Table 2.1-4(a) USMC Annual Landing Events at Oahu and Molokai Landing Zones for Alternatives A/B

Area	LZ	USMC																							
		CH-53E						MV-22						AH-1						UH-1					
		CAL			EXT OPS			CAL			EXT OPS			CAL			EXT OPS			CAL			Insert/Extract OPS		
		Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Kalaupapa Airport	Kalaupapa Runway	107	5	112	-	-	-	650	34	684	-	-	-	709	341	1,050	-	-	-	328	10	338	-	-	-
Dillingham Military Resrv	Dillingham Airfield Runway	24	1	25	-	-	-	108	6	114	-	-	-	-	1	1	-	-	-	70	2	72	-	-	-
	Dillingham DZ	24	1	25	-	-	-	108	6	114	-	-	-	-	1	1	-	-	-	70	2	72	-	-	-
	Albatross (Apron)	24	1	25	-	-	-	108	6	114	-	-	-	-	1	1	-	-	-	70	2	72	-	-	-
	Blue Jay (New)	24	1	25	-	-	-	108	6	114	-	-	-	-	1	1	-	-	-	70	2	72	-	-	-
	Finch	24	1	25	-	-	-	108	6	114	-	-	-	-	1	1	-	-	-	70	2	72	-	-	-
	Rooster (Taxiway)	24	1	25	-	-	-	108	6	114	-	-	-	-	1	1	-	-	-	70	2	72	-	-	-
MCTAB	Tiger	13	-	13	-	-	-	14	1	15	-	-	-	-	-	-	-	-	-	-	-	-	15	1	16
	Noni	13	-	13	-	-	-	14	1	15	-	-	-	-	-	-	-	-	-	-	-	-	15	1	16
	Gull	26	1	27	-	-	-	27	1	28	-	-	-	-	-	-	-	-	-	-	-	-	30	1	31
	Hawk	26	1	27	-	-	-	27	1	28	-	-	-	-	-	-	-	-	-	-	-	-	30	1	31
	Owl	26	1	27	-	-	-	27	1	28	-	-	-	-	-	-	-	-	-	-	-	-	30	1	31
A311 Kawailoa Training Area	Black	278	7	285	133	5	138	152	8	160	98	104	202	30	1	31	-	-	-	67	2	69	-	-	-
A311 SB East Range	Ku Tree	19	-	19	9	-	9	10	1	11	7	7	14	2	-	2	-	-	-	5	-	5	-	-	-

Table 2.1-4(b) Army Annual Landing Events at Oahu and Molokai Landing Zones for Alternatives A/B

Area	LZ	Army																	
		CH-47 (cumu)						OH-58 (cumu)						UH-60 (cumu)					
		CAL			EXT			CAL			EXT			CAL			EXT		
		Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Kalaupapa Airport	Kalaupapa Runway	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dillingham Military Resrv	Dillingham Airfield Runway	49	1	50	-	-	-	-	-	-	-	-	-	203	4	207	203	4	207
	Dillingham DZ	49	1	50	-	-	-	-	-	-	-	-	-	203	4	207	203	4	207
	Albatross (Apron)	49	1	50	-	-	-	-	-	-	-	-	-	203	4	207	203	4	207
	Blue Jay (New)	49	1	50	-	-	-	-	-	-	-	-	-	203	4	207	203	4	207
	Finch	49	1	50	-	-	-	-	-	-	-	-	-	203	4	207	203	4	207
	Rooster (Taxiway)	49	1	50	-	-	-	-	-	-	-	-	-	203	4	207	203	4	207
MCTAB	Tiger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Noni	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Gull	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hawk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Owl	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A311 Kawailoa Training Area	Black	172	3	175	57	1	58	441	8	449	-	-	-	683	12	695	683	12	695
A311 SB East Range	Ku Tree	12	-	12	4	-	4	30	1	31	-	-	-	46	1	47	34	-	34

Table 2.1-4(c) HIARNG Annual Landing Events at Oahu and Molokai Landing Zones for Alternatives A/B

Area	LZ	HIARNG (same as Baseline)																	
		CH-47						OH-58						UH-60					
		CAL			EXT			CAL			EXT			CAL			EXT		
		Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Kalaupapa Airport	Kalaupapa Runway	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dillingham Military Resrv	Dillingham Airfield Runway	4	-	4	-	-	-	2	-	2	-	-	-	3	-	3	-	-	-
	Dillingham DZ	4	-	4	-	-	-	2	-	2	-	-	-	3	-	3	-	-	-
	Albatross (Apron)	4	-	4	-	-	-	2	-	2	-	-	-	3	-	3	-	-	-
	Blue Jay (New)	4	-	4	-	-	-	2	-	2	-	-	-	3	-	3	-	-	-
	Finch	4	-	4	-	-	-	2	-	2	-	-	-	3	-	3	-	-	-
	Rooster (Taxiway)	4	-	4	-	-	-	2	-	2	-	-	-	3	-	3	-	-	-
MCTAB	Tiger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Noni	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Gull	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hawk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Owl	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A311 Kawailoa Training Area	Black	78	1	79	27	-	27	15	-	15	-	-	-	20	-	20	4	-	4
A311 SB East Range	Ku Tree	5	-	5	2	-	2	1	-	1	-	-	-	1	-	1	-	-	-

Table 2.1-4(d) Totals Annual Landing Events at Oahu and Molokai Landing Zones for Alternatives A/B

Area	LZ	USMC	Army	HIARNG	TOTAL						GRAND TOTAL		
					CAL			EXT					
		Total	Total	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Kalaupapa Airport	Kalaupapa Runway	2,184	-	-	1,794	390		-	-		1,794	390	2,184
Dillingham Military Resrv	Dillingham Airfield Runway	212	464	9	463	15		203	4		666	19	685
	Dillingham DZ	212	464	9	463	15		203	4		666	19	685
	Albatross (Apron)	212	464	9	463	15		203	4		666	19	685
	Blue Jay (New)	212	464	9	463	15		203	4		666	19	685
	Finch	212	464	9	463	15		203	4		666	19	685
	Rooster (Taxiway)	212	464	9	463	15		203	4		666	19	685
MCTAB	Tiger	44	-	-	27	1		15	1		42	2	44
	Noni	44	-	-	27	1		15	1		42	2	44
	Gull	86	-	-	53	2		30	1		83	3	86
	Hawk	86	-	-	53	2		30	1		83	3	86
	Owl	86	-	-	53	2		30	1		83	3	86
A311 Kawailoa Training Area	Black	885	2,072	145	1,936	42		1,002	122		2,938	164	3,102
A311 SB East Range	Ku Tree	60	128	9	131	3		56	7		187	10	197

Table 2.1-5 Summary of Landing Events for No Action Alternative

Area	LZ	USMC									Other						TOTAL		
		CH-53D			MV-22			AH/UH-1			Army			HIARNG					
		Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Kalaupapa Airport	Kalaupapa Runway	150	7	157	-	-	-	-	-	-	-	-	-	-	-	-	150	7	157
Dillingham Military Resrv	Dillingham Airfield Runway	34	1	35	-	-	-	-	-	-	455	9	464	9	-	9	498	10	508
	Dillingham DZ	34	1	35	-	-	-	-	-	-	455	9	464	9	-	9	498	10	508
	Albatross (Apron)	34	1	35	-	-	-	-	-	-	455	9	464	9	-	9	498	10	508
	Blue Jay (New)	34	1	35	-	-	-	-	-	-	455	9	464	9	-	9	498	10	508
	Finch	34	1	35	-	-	-	-	-	-	455	9	464	9	-	9	498	10	508
	Rooster (Taxiway)	34	1	35	-	-	-	-	-	-	455	9	464	9	-	9	498	10	508
MCTAB	Tiger	18	-	18	-	-	-	-	-	-	-	-	-	-	-	-	18	-	18
	Noni	18	-	18	-	-	-	-	-	-	-	-	-	-	-	-	18	-	18
	Gull	36	1	37	-	-	-	-	-	-	-	-	-	-	-	-	36	1	37
	Hawk	36	1	37	-	-	-	-	-	-	-	-	-	-	-	-	36	1	37
	Owl	36	1	37	-	-	-	-	-	-	-	-	-	-	-	-	36	1	37
A311 Kawailoa Training Area	Black	575	17	592	-	-	-	-	-	-	2,036	36	2,072	144	1	145	2,755	54	2,809
A311 SB East Range	Ku Tree	39	-	39	-	-	-	-	-	-	126	2	128	9	-	9	174	2	176
Subtotals																			
Kalaupapa Airport		150	7	157	-	-	-	-	-	-	-	-	-	-	-	-	150	7	157
Dillingham Military Resrv		204	6	210	-	-	-	-	-	-	2,730	54	2,784	54	-	54	2,988	60	3,048
MCTAB		144	3	147	-	-	-	-	-	-	-	-	-	-	-	-	144	3	147
KTA Black		575	17	592	-	-	-	-	-	-	2,036	36	2,072	144	1	145	2,755	54	2,809
East Range Ku Tree		39	-	39	-	-	-	-	-	-	126	2	128	9	-	9	174	2	176
TOTAL		**1,112**	**33**	**1,145**	**-**	**-**	**-**	**-**	**-**	**-**	**4,892**	**92**	**4,984**	**207**	**1**	**208**	**6,211**	**126**	**6,337**

Table 2.1-6(a) USMC Annual Landing Events at Oahu an Molokai Landing Zones for No Action Alternative

Area	LZ	USMC																							
		CH-53E						MV-22						AH-1						UH-1					
		CAL			EXT OPS			CAL			EXT OPS			CAL			EXT OPS			CAL			Insert/Extract OPS		
		Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Kalaupapa Airport	Kalaupapa Runway	150	7	157	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dillingham Military Resrv	Dillingham Airfield Runway	34	1	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dillingham DZ	34	1	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Albatross (Apron)	34	1	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Blue Jay (New)	34	1	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Finch	34	1	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rooster (Taxiway)	34	1	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MCTAB	Tiger	18	1	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Noni	18	1	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Gull	36	1	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hawk	36	1	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Owl	36	1	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A311 Kawailoa Training Area	Black	389	10	399	187	7	194	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A311 SB East Range	Ku Tree	26	1	27	13	-	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 2.1-6(b) Army Annual Landing Events at Oahu an Molokai Landing Zones for No Action Alternative

		Army																	
		CH-47 (cumu)						OH-58 (cumu)						UH-60 (cumu)					
		CAL			EXT			CAL			EXT			CAL			EXT		
Area	LZ	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Kalaupapa Airport	Kalaupapa Runway	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dillingham Military Resrv	Dillingham Airfield Runway	49	1	50	-	-	-	-	-	-	-	-	-	203	4	207	203	4	207
	Dillingham DZ	49	1	50	-	-	-	-	-	-	-	-	-	203	4	207	203	4	207
	Albatross (Apron)	49	1	50	-	-	-	-	-	-	-	-	-	203	4	207	203	4	207
	Blue Jay (New)	49	1	50	-	-	-	-	-	-	-	-	-	203	4	207	203	4	207
	Finch	49	1	50	-	-	-	-	-	-	-	-	-	203	4	207	203	4	207
	Rooster (Taxiway)	49	1	50	-	-	-	-	-	-	-	-	-	203	4	207	203	4	207
MCTAB	Tiger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Noni	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Gull	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hawk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Owl	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A311 Kawailoa Training Area	Black	172	3	175	57	1	58	441	8	449	-	-	-	683	12	695	683	12	695
A311 SB East Range	Ku Tree	12	-	12	4	-	4	30	1	31	-	-	-	46	1	47	34	-	34

Table 2.1-6(c) HIARNG Annual Landing Events at Oahu an Molokai Landing Zones for No Action Alternative

		HIARNG (same as Baseline)																	
		CH-47						OH-58						UH-60					
		CAL			EXT			CAL			EXT			CAL			EXT		
Area	LZ	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Kalaupapa Airport	Kalaupapa Runway	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dillingham Military Resrv	Dillingham Airfield Runway	4	-	4	-	-	-	2	-	2	-	-	-	3	-	3	-	-	-
	Dillingham DZ	4	-	4	-	-	-	2	-	2	-	-	-	3	-	3	-	-	-
	Albatross (Apron)	4	-	4	-	-	-	2	-	2	-	-	-	3	-	3	-	-	-
	Blue Jay (New)	4	-	4	-	-	-	2	-	2	-	-	-	3	-	3	-	-	-
	Finch	4	-	4	-	-	-	2	-	2	-	-	-	3	-	3	-	-	-
	Rooster (Taxiway)	4	-	4	-	-	-	2	-	2	-	-	-	3	-	3	-	-	-
MCTAB	Tiger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Noni	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Gull	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hawk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Owl	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A311 Kawailoa Training Area	Black	78	1	79	27	-	27	15	-	15	-	-	-	20	-	20	4	-	4
A311 SB East Range	Ku Tree	5	-	5	2	-	2	1	-	1	-	-	-	1	-	1	-	-	-

Table 2.1-6(d) Totals Annual Landing Events at Oahu an Molokai Landing Zones for No Action Alternative

		USMC	Army	HIARNG	TOTAL						GRAND TOTAL		
					CAL			EXT					
Area	LZ	Total	Total	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Kalaupapa Airport	Kalaupapa Runway	157	-	-	150	7		-	-		150	7	157
Dillingham Military Resrv	Dillingham Airfield Runway	35	464	9	295	6		203	4		498	10	508
	Dillingham DZ	35	464	9	295	6		203	4		498	10	508
	Albatross (Apron)	35	464	9	295	6		203	4		498	10	508
	Blue Jay (New)	35	464	9	295	6		203	4		498	10	508
	Finch	35	464	9	295	6		203	4		498	10	508
	Rooster (Taxiway)	35	464	9	295	6		203	4		498	10	508
MCTAB	Tiger	19	-	-	18	1		-	-		18	1	19
	Noni	19	-	-	18	1		-	-		18	1	19
	Gull	37	-	-	36	1		-	-		36	1	37
	Hawk	37	-	-	36	1		-	-		36	1	37
	Owl	37	-	-	36	1		-	-		36	1	37
A311 Kawailoa Training Area	Black	593	2,072	145	1,798	34		958	20		2,756	54	2,810
A311 SB East Range	Ku Tree	40	128	9	121	3		53	-		174	3	177

D-2.2 MARINE CORPS TRAINING AREA BELLOWS (MCTAB)

D-2.2.1 MCTAB BASELINE SCENARIO

D-2.2.1.1 Flight Track Utilization and Modeled Events

Table 2.2-1 MCTAB Helicopter Flight Track Utilization

LZ Name	Heading	Heading Utilization	Op Type	Turn Direction	Turn Direction Utilization	Track ID
Gull	050	100%	Ingress	right	100%	GU22-5
			Egress	Left	100%	GUD22-3L
				Right		
Hawk	230	100%	Ingress	Straight In	100%	HK22-5
			Egress	Left		
				Right	100%	HKD22-3R
Noni	230	100%	Ingress	Straight In	100%	NO22-5
			Egress	Left	50%	NOD22-3L
				Right	50%	NOD22-3R
Owl	230	100%	Ingress	Straight In	100%	OW22-5
			Egress	Left	100%	OWD22-3L
				Right		
Tiger	230	100%	Ingress	Straight In	100%	TI22-5
			Egress	Left		
				Right	100%	TID22-3R

Notes: (1) All helicopters use the same tracks use; including the Proposed AH-1/UH-1

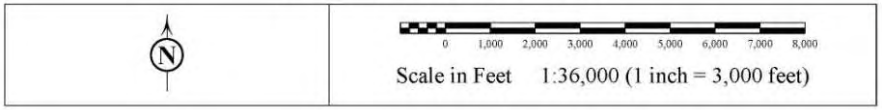
Table 2.2-2 Modeled Daily Events at MCTAB Landing Zones for Baseline Busiest Month

LZ Name	Op Type	Turn Direction	Track ID	CH-53		
				Profile ID	Day (0700 - 2200)	Night (2200 - 0700)
Gull	Ingress	right	GU22-5	CGU040	0.1973	0.0076
	Egress	Left	GUD22-3L	CGU040DL	0.1973	0.0076
		Right			0	0
Hawk	Ingress	Straight In	HK22-5	CHK230	0.1973	0.0076
	Egress	Left			0	0
		Right	HKD22-3R	CHK230DR	0.1973	0.0076
Noni	Ingress	Straight In	NO22-5	CNO230	0.0986	0.0000
	Egress	Left	NOD22-3L	CNO230DL	0.0493	0
		Right	NOD22-3R	CNO230DR	0.0493	0
Owl	Ingress	Straight In	OW22-5	COW230	0.1973	0.0076
	Egress	Left	OWD22-3L	COW230DL	0.1973	0.0076
		Right			0	0
Tiger	Ingress	Straight In	TI22-5	CTI230	0.0986	0
	Egress	Left			0	0
		Right	TID22-3R	CTI230DR	0.0986	0

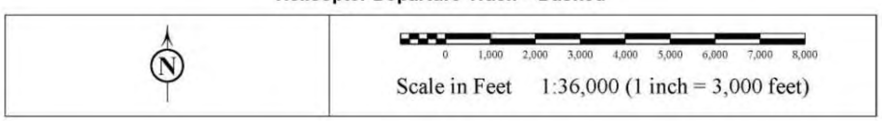
Notes: (1) Busy month factor of 1.2 (i.e., 120% of average daily events)

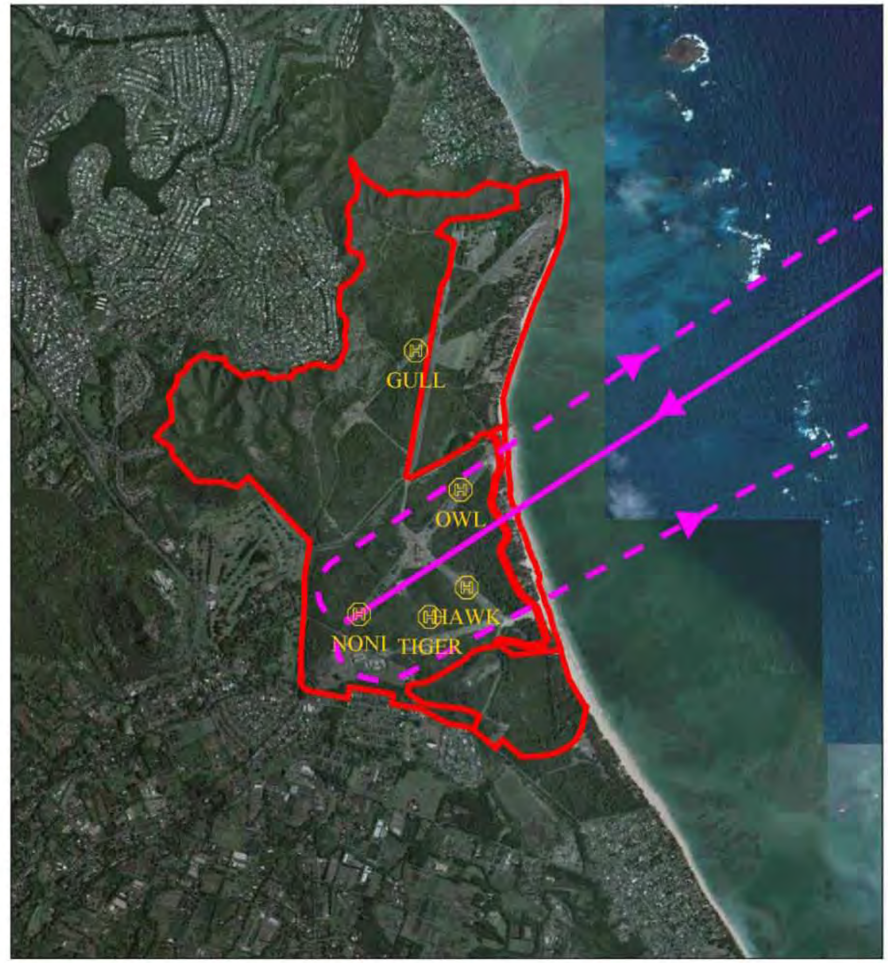
D-2.2.1.2 MCTAB – Modeled Flight Tracks

MCTAB - LZ Gull Baseline Flight Tracks
Helicopter Approach Track = Solid Line
Helicopter Departure Track = Dashed

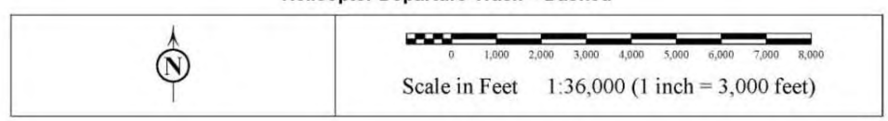


MCTAB - LZ Hawk Baseline Flight Tracks
Helicopter Approach Track = Solid Line
Helicopter Departure Track = Dashed

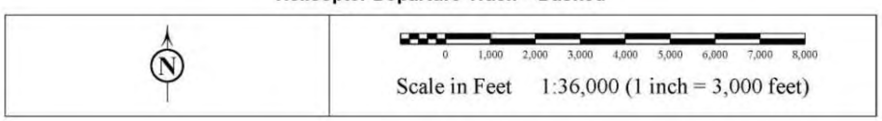


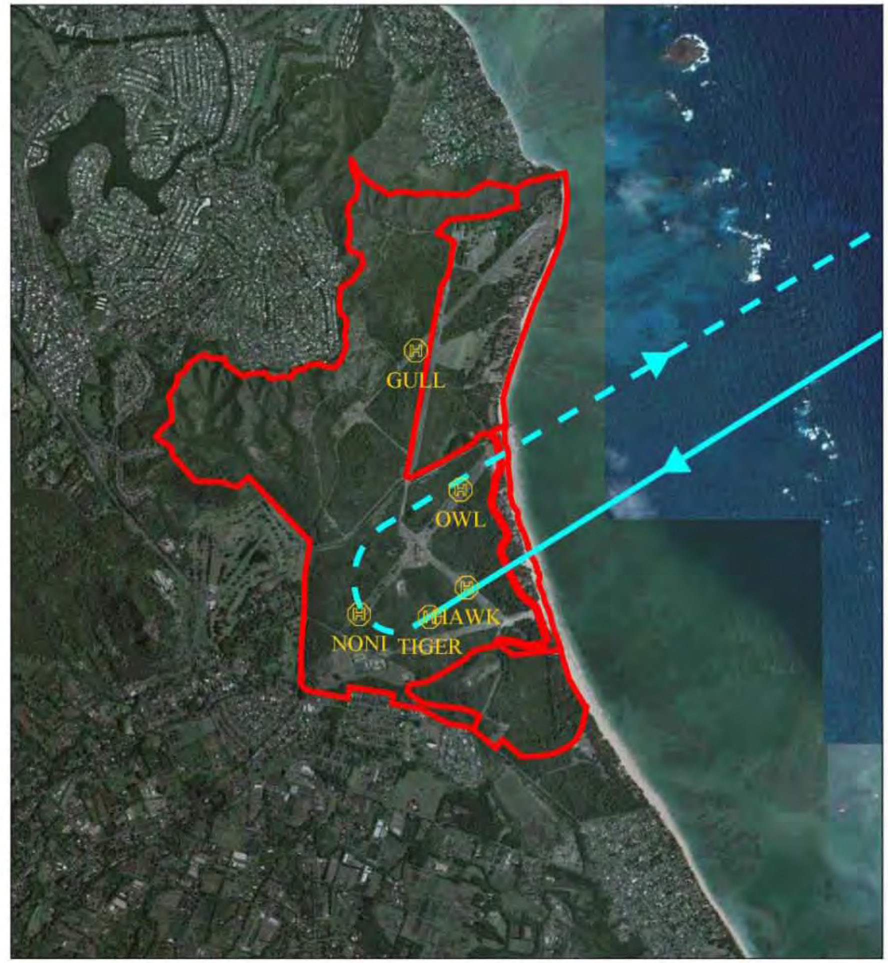


MCTAB - LZ Noni Baseline Flight Tracks
Helicopter Approach Track = Solid Line
Helicopter Departure Track = Dashed

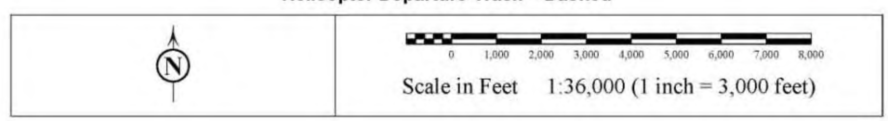


MCTAB - LZ Owl Baseline Flight Tracks
Helicopter Approach Track = Solid Line
Helicopter Departure Track = Dashed





MCTAB - LZ Tiger Baseline Flight Tracks
Helicopter Approach Track = Solid Line
Helicopter Departure Track = Dashed



D-2.2.1.3 MCTAB – Modeled Flight Profiles

Flight Profile CGU040

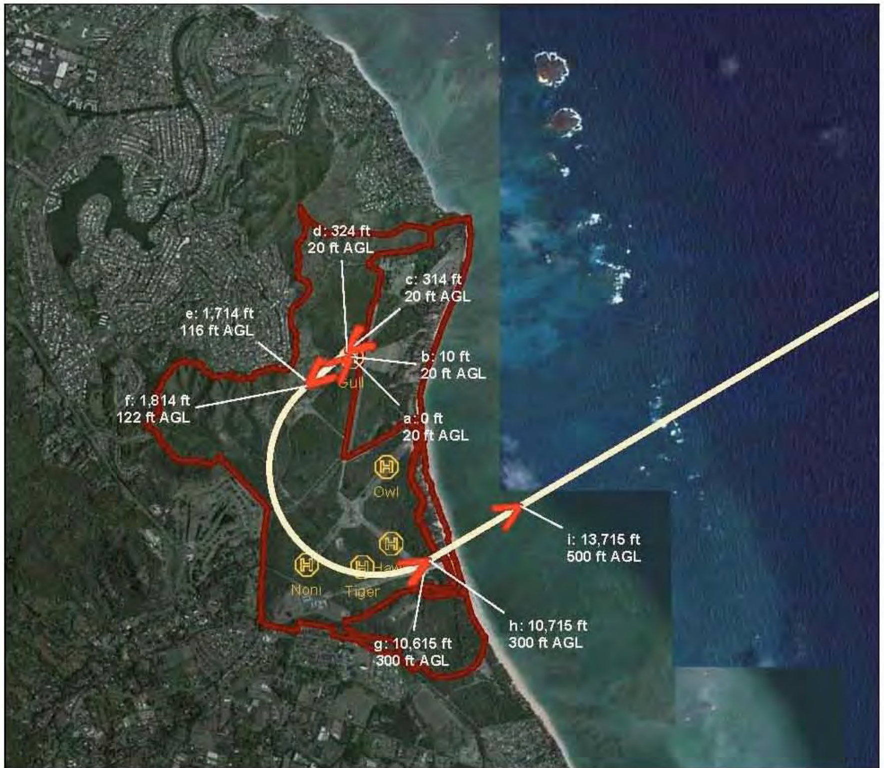
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	27,000	500 AGL	120	0	0	0	90	
b	18,940	400 AGL	120	0	0	0	90	
c	16,640	300 AGL	120	0	0	0	90	
d	10,640	300 AGL	120	0	0	0	90	begin to roll
e	10,440	300 AGL	120	0	0	-30	90	reach 30 deg roll angle; begin turn
f	1,600	110 AGL	80	0	0	-30	90	begin roll to wings level
g	1,500	104 AGL	80	0	0	0	90	end turn; wings level
h	0	20 AGL	0	0	0	0	90	

MCTAB Flight Profile CGU040 - LZ Gull Approach - 180 deg
CH-53
on Flight Track GU22-5 - 180 to 040 heading

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000 18,000 20,000

Scale in Feet 1:61,900 (1 inch = 5,160 feet)

N



Flight Profile CGU040DL

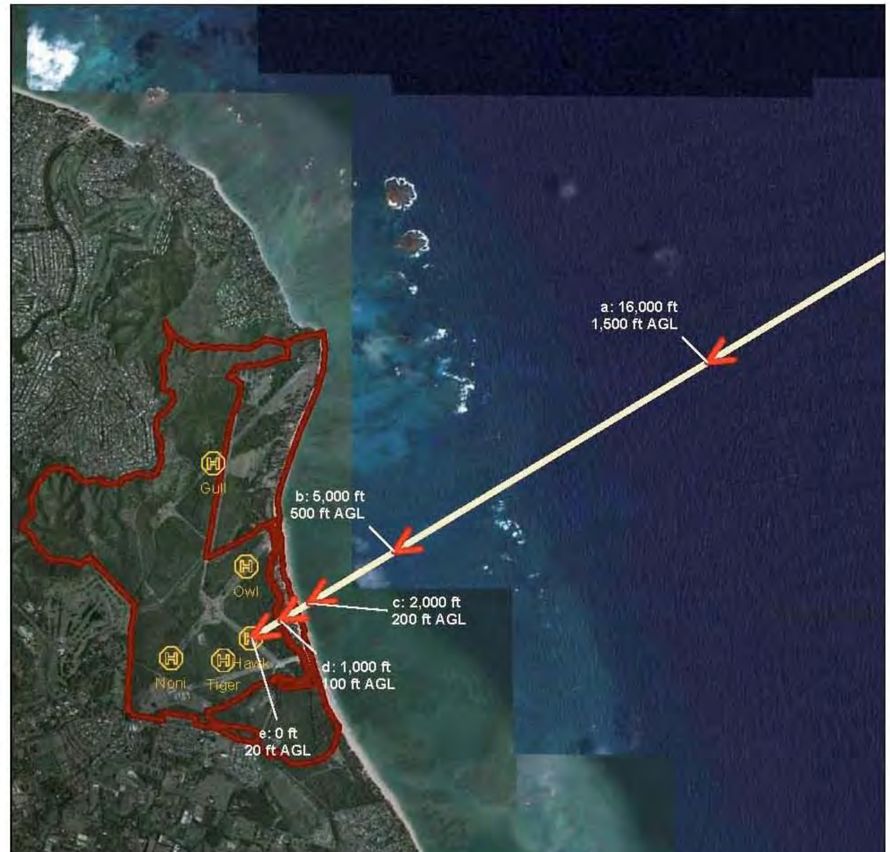
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	0	20 AGL	5	0	0	0	90	liftoff and rotate 180 deg within 1 min; modeled as a
b	10	20 AGL	5	0	0	30	90	reach roll angle and begin 180 deg turn
c	314	20 AGL	5	0	0	30	90	begin roll to wings level
d	324	20 AGL	5	0	0	0	90	depart LZ and climb to 300' AGL
e	1,714	116 AGL	80	0	0	0	90	begin to roll
f	1,814	122 AGL	80	0	0	30	90	reach 30 deg roll angle; begin turn
g	10,615	300 AGL	80	0	0	30	90	begin roll to wings level
h	10,715	300 AGL	80	0	0	0	90	end turn; wings level; climb to 500 ft AGL within 0.5
i	13,715	500 AGL	120	0	0	0	90	
j	36,000	500 AGL	120	0	0	0	90	

MCTAB Flight Profile CGU040DL - LZ Gull Departure - 180 deg
CH-53
on Flight Track GUD22-3L - 180 to 040 heading

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000

Scale in Feet 1:45,600 (1 inch = 3,800 feet)

N



Flight Profile CHK230

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle
a	16,000	1,500 AGL	120	0	0	0	90
b	5,000	500 AGL	80	0	0	0	90
c	2,000	200 AGL	60	0	0	0	90
d	1,000	100 AGL	45	0	0	0	90
e	0	20 AGL	0	0	0	0	90

MCTAB Flight Profile CHK230 - LZ Hawk Approach - Straight-in
CH-53
on Flight Track HK22-5 - straight-in

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000

Scale in Feet 1:48,600 (1 inch = 4,050 feet)

N

Flight Profile CHK230DR

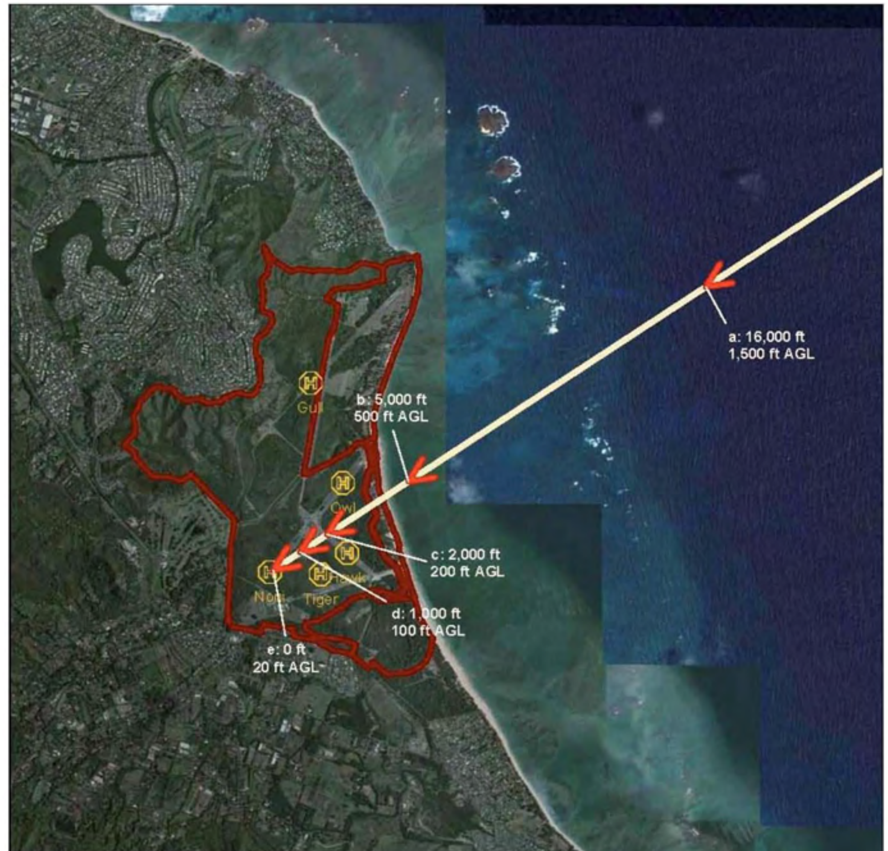
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	0	20 AGL	5	0	0	0	90	Depart LZ
b	1,400	98 AGL	80	0	0	0	90	begin to roll
c	1,500	104 AGL	80	0	0	-30	90	reach 30 deg roll angle; begin turn
d	4,542	300 AGL	80	0	0	-30	90	begin roll to wings level
e	4,642	300 AGL	80	0	0	0	90	end turn; wings level; climb to 500 ft AGL within 0.5
f	7,642	500 AGL	120	0	0	0	90	
g	36,000	500 AGL	120	0	0	0	90	

MCTAB Flight Profile CHK230DR - LZ Hawk Departure - 180 deg
CH-53
on Flight Track HKD22-3R - 180 to 060 heading

0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000 9,000

Scale in Feet 1:27,500 (1 inch = 2,290 feet)

N



Flight Profile CNO230

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle
a	16,000	1,500 AGL	120	0	0	0	90
b	5,000	500 AGL	80	0	0	0	90
c	2,000	200 AGL	60	0	0	0	90
d	1,000	100 AGL	45	0	0	0	90
e	0	20 AGL	0	0	0	0	90

MCTAB Flight Profile CNO230 - LZ Noni Approach - Straight-in
CH-53
on Flight Track NO22-5 - straight-in

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000

Scale in Feet 1:50,000 (1 inch = 4,160 feet)

N

Flight Profile CNO230DL

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	0	20 AGL	5	0	0	0	90	Depart LZ
b	300	39 AGL	50	0	0	0	90	begin to roll
c	400	46 AGL	55	0	0	30	90	reach 30 deg roll angle; begin turn
d	2,909	300 AGL	80	0	0	30	90	begin roll to wings level
e	3,009	300 AGL	80	0	0	0	90	end turn; wings level; climb to 500 ft AGL within 0.5
f	6,009	500 AGL	120	0	0	0	90	
g	36,000	500 AGL	120	0	0	0	90	

MCTAB Flight Profile CNO230DL - LZ Noni Departures - 180 deg

CH-53

on Flight Track NOD22-3L - 180 to 040 heading

Scale in Feet 1:28,000 (1 inch = 2,330 feet)

Flight Profile CNO230DR

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	0	20 AGL	5	0	0	0	90	Depart LZ
b	100	28 AGL	30	0	0	0	90	begin to roll
c	200	37 AGL	40	0	0	-30	90	reach 30 deg roll angle; begin turn
d	2,123	300 AGL	80	0	0	-30	90	begin roll to wings level
e	2,233	300 AGL	80	0	0	0	90	end turn; wings level; climb to 500 ft AGL within 0.5
f	5,233	500 AGL	120	0	0	0	90	
g	36,000	500 AGL	120	0	0	0	90	

MCTAB Flight Profile CNO230DR - LZ Noni Departure - 180 deg

CH-53

on Flight Track NOD22-3R - 180 to 040 heading

Scale in Feet 1:25,300 (1 inch = 2,110 feet)

Flight Profile COW230

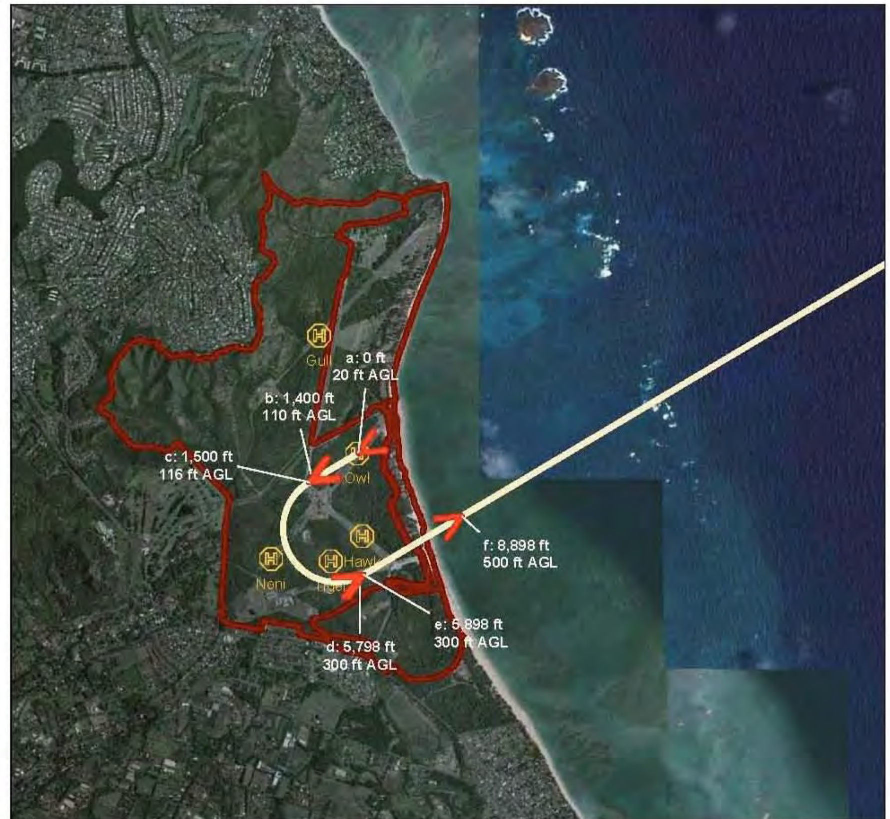
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle
a	16,000	1,500 AGL	120	0	0	0	90
b	5,000	500 AGL	80	0	0	0	90
c	2,000	200 AGL	60	0	0	0	90
d	1,000	100 AGL	45	0	0	0	90
e	0	20 AGL	0	0	0	0	90

MCTAB Flight Profile COW230 - LZ Owl Approach - Straight-in
CH-53
on Flight Track OW22-5 - straight-in

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000

Scale in Feet 1:47,500 (1 inch = 3,960 feet)

N



Flight Profile COW230DL

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	0	20 AGL	5	0	0	0	90	Depart LZ
b	1,400	110 AGL	80	0	0	0	90	begin to roll
c	1,500	116 AGL	80	0	0	30	90	reach 30 deg roll angle; begin turn
d	5,798	300 AGL	80	0	0	30	90	begin roll to wings level
e	5,898	300 AGL	80	0	0	0	90	end turn; wings level; climb to 500 ft AGL within 0.5
f	8,898	500 AGL	120	0	0	0	90	
g	36,000	500 AGL	120	0	0	0	90	

MCTAB Flight Profile COW230DL - LZ Owl Departure - 180 deg
CH-53
on Flight Track OWD22-3L - 180 to 040 heading

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000

Scale in Feet 1:42,400 (1 inch = 3,530 feet)

N

Flight Profile CTI230

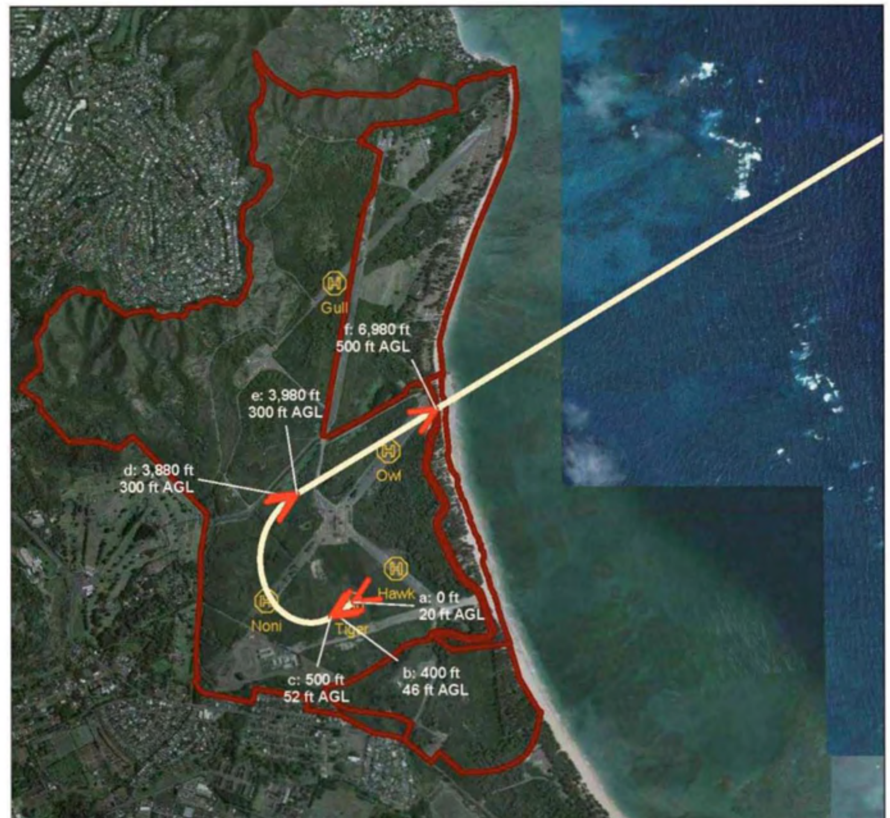
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle
a	16,000	1,500 AGL	120	0	0	0	90
b	5,000	500 AGL	80	0	0	0	90
c	2,000	200 AGL	60	0	0	0	90
d	1,000	100 AGL	45	0	0	0	90
e	0	20 AGL	0	0	0	0	90

MCTAB Flight Profile CTI230 - LZ Tiger Approach - Straight-in
CH-53
on Flight Track TI22-5 - straight-in

0 2,000 4000 6,000 8,000 10,000

Scale in Feet 1:33,900 (1 inch = 2,820 feet)

N



Flight Profile CTI230DR

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	0	20 AGL	5	0	0	0	90	Depart LZ
b	400	46 AGL	80	0	0	0	90	begin to roll
c	500	52 AGL	80	0	0	-30	90	reach 30 deg roll angle; begin turn
d	3,880	300 AGL	80	0	0	-30	90	begin roll to wings level
e	3,980	300 AGL	80	0	0	0	90	end turn; wings level; climb to 500 ft AGL within 0.5
f	6,980	500 AGL	120	0	0	0	90	
g	36,000	500 AGL	120	0	0	0	90	

MCTAB Flight Profile CTI230DR - LZ Tiger Departure - 180 deg
CH-53
on Flight Track TID22-3R - 180 to 040 heading

0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000 9,000 10,000

Scale in Feet 1:29,700 (1 inch = 2,480 feet)

N

D-2.2.2 MCTAB ALTERNATIVES A/B

D-2.2.2.1 Flight Track Utilization and Modeled Events

Table 2.2-3 MCTAB MV-22 Flight Track Utilization

LZ Name	Heading	Heading Utilization	Op Type	Turn Direction	Turn Direction Utilization	Track ID
Gull	050	100%	Ingress	right	100%	GU22-5
			Egress	Left	100%	GUD22-3L
				Right		
Hawk	230	100%	Ingress	Straight In	100%	HK22-5
			Egress	Left		
				Right	100%	HKD22-3R
Noni	230	100%	Ingress	Straight In	100%	NO22-5
			Egress	Left	50%	NOD22-3L
				Right	50%	NOD22-3R
Owl	230	100%	Ingress	Straight In	100%	OW22-5
			Egress	Left	100%	OWD22-3L
				Right		
Tiger	230	100%	Ingress	Straight In	100%	TI22-5
			Egress	Left		
				Right	100%	TID22-3R

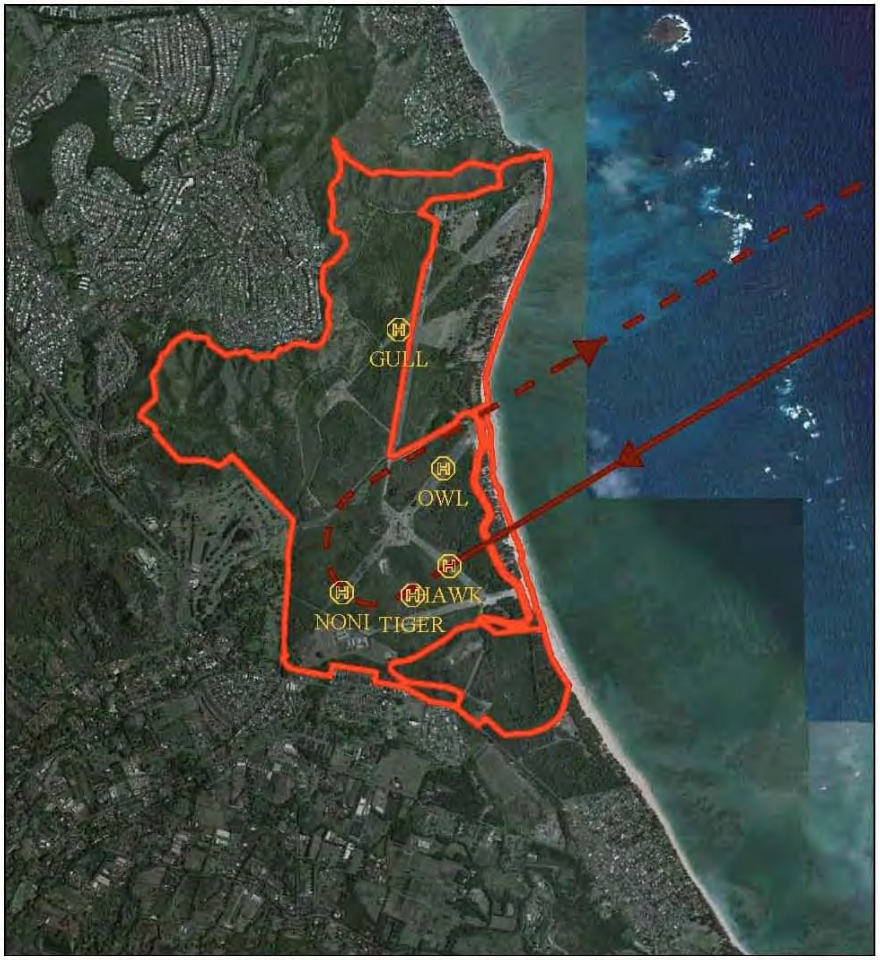
Table 2.2-4 Modeled Daily Events at MCTAB Landing Zones for Busiest Month for Alternatives A/B

LZ Name	Op Type	Turn Direction	Track ID	AH-1/UH-1			CH-53			Army helos (modeled as SH-60B)			MV-22		
				Profile ID	Day (0700 - 2200)	Night (2200 - 0700)	Profile ID	Day (0700 - 2200)	Night (2200 - 0700)	Profile ID	Day (0700 - 2200)	Night (2200 - 0700)	Profile ID	Day (0700 - 2200)	Night (2200 - 0700)
Gull	Ingress	right	GU22-5	AGU040	0.0986	0.0033	CGU040	0.0855	0.0033	HGU040	0	0	MGU040	0.0888	0.0033
	Egress	Left	GUD22-3L	AGU040DL	0.0986	0.0033	CGU040DL	0.0855	0.0033	HGU040DL	0	0	MGU040D	0.0888	0.0033
		Right			0	0		0	0		0	0		0	0
Hawk	Ingress	Straight In	HK22-5	AHK230	0.0986	0.0033	CHK230	0.0855	0.0033	HHK230	0	0	MHK230	0.0888	0.0033
	Egress	Left			0	0		0	0		0	0		0	0
		Right	HKD22-3R	AHK230DR	0.0986	0.0033	CHK230DR	0.0855	0.0033	HHK230DR	0	0	MHK230DI	0.0888	0.0033
Noni	Ingress	Straight In	NO22-5	ANO230	0.0493	0.0033	CNO230	0.0427	0.0000	HNO230	0	0	MNO230	0.046	0.0033
	Egress	Left	NOD22-3L	ANO230DL	0.0247	0.0016	CNO230DL	0.0214	0	HNO230DL	0	0	MNO230D	0.023	0.0016
		Right	NOD22-3R	ANO230DR	0.0247	0.0016	CNO230DR	0.0214	0	HNO230DR	0	0	MNO230D	0.023	0.0016
Owl	Ingress	Straight In	OW22-5	AOW230	0.0986	0.0033	COW230	0.0855	0.0033	HOW230	0	0	MOW230	0.0888	0.0033
	Egress	Left	OWD22-3L	AOW230DL	0.0986	0.0033	COW230DL	0.0855	0.0033	HOW230DL	0	0	MOW230D	0.0888	0.0033
		Right			0	0		0	0		0	0		0	0
Tiger	Ingress	Straight In	TI22-5	ATI230	0.0493	0.0033	CTI230	0.0427	0	HTI230	0	0	MTI230	0.046	0.0033
	Egress	Left			0	0		0	0		0	0		0	0
		Right	TID22-3R	ATI230DR	0.0493	0.0033	CTI230DR	0.0427	0	HTI230DR	0	0	MTI230DR	0.046	0.0033

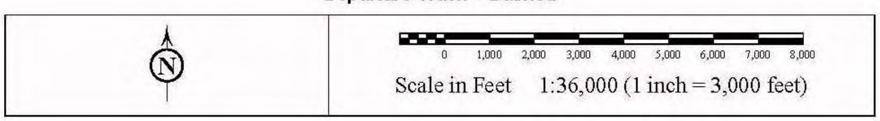
Notes: (1) Busy day factor of 1.2 (i.e., 120% of average daily events)

D-2.2.2.2 MCTAB – Modeled Flight Tracks

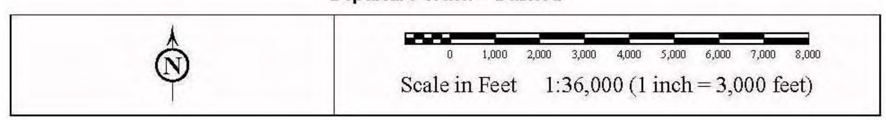
(MV-22 and AH/UH-1 only)

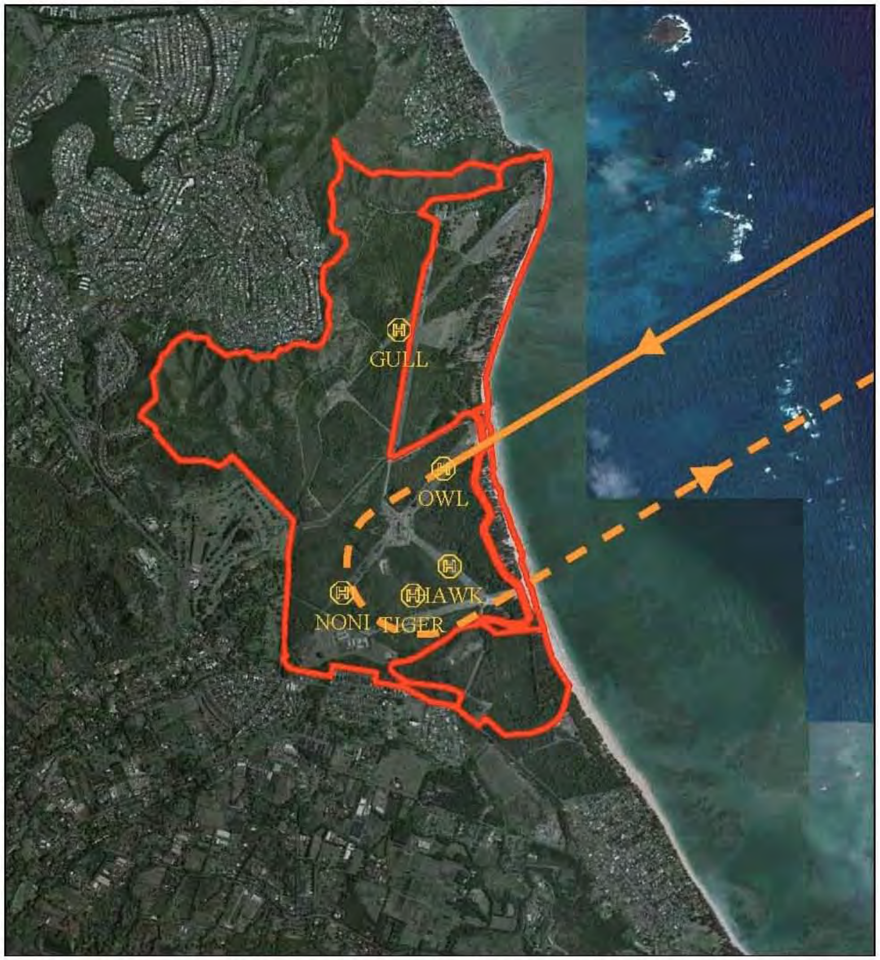


MCTAB - LZ Hawk Proposed MV-22 Flight Tracks
Approach Track = Solid Line
Departure Track = Dashed



MCTAB - LZ Noni Proposed MV-22 Flight Tracks
Approach Track = Solid Line
Departure Track = Dashed





MCTAB - LZ Owl Proposed MV-22 Flight Tracks
Approach Track = Solid Line
Departure Track = Dashed

N

0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000

Scale in Feet 1:36,000 (1 inch = 3,000 feet)

MCTAB - LZ Tiger Proposed MV-22 Flight Tracks
Approach Track = Solid Line
Departure Track = Dashed

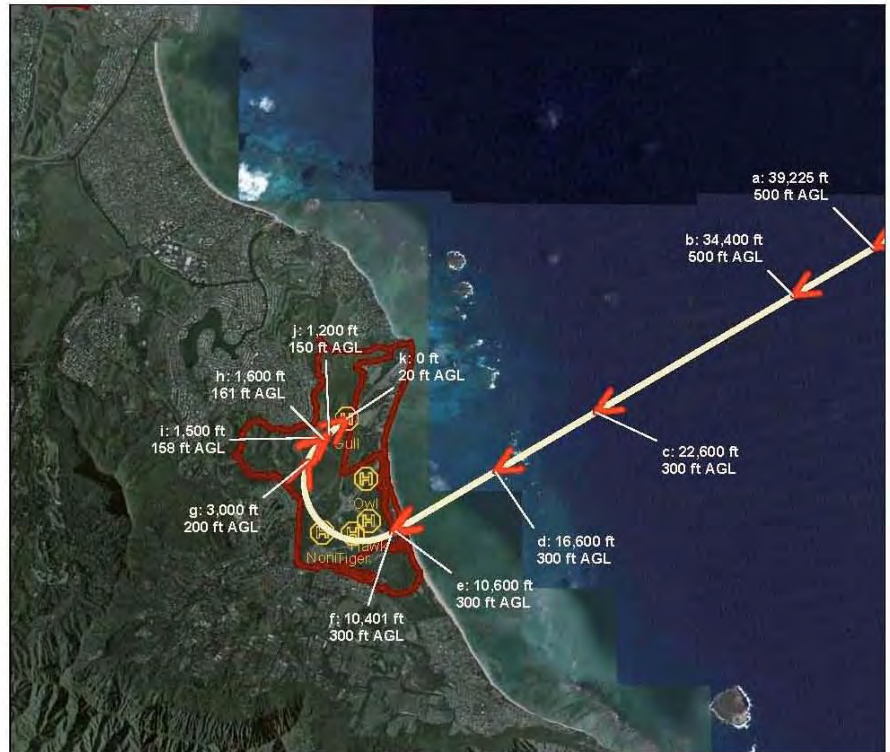
N

0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000

Scale in Feet 1:36,000 (1 inch = 3,000 feet)

D-2.2.2.3 MCTAB – Modeled Flight Profiles

(MV-22 and AH/UH-1 only)



Flight Profile MGU040

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	39,225	500 AGL	200	0	-1	0	0	@~5NM from LZ
b	34,400	500 AGL	200	0	-1	0	0	begin descent to 300 ft AGL
c	22,600	300 AGL	220	0	-1	0	0	hold alt and begin slow down to 100 kts @ 1NM prio
d	16,600	300 AGL	200	0	-1	0	0	1NM prior to turn; continue slowing to 100 kts
e	10,600	300 AGL	100	0	-1	0	65	reach 100 kts; begin roll
f	10,401	300 AGL	100	0	-1	-25	65	reach roll angle; begin turn
g	3,000	200 AGL	80	0	-1	-25	85	
h	1,600	161 AGL	57	0	-1	-25	89	ADDED pt; begin roll to wings level
i	1,500	158 AGL	55	0	-1	0	89	ADDED pt; end of turn and wings level
j	1,200	150 AGL	50	0	5	0	90	300 fpm desc; 6deg gs
k	0	20 AGL	5	0	0	0	90	5 knot stop

MCTAB Flight Profile MGU040 - LZ Gull - Arrival Right turn to 040
MV-22
on Flight Track GU040 - LZ Gull - Arrival

0 4,000 8,000 12,000 16,000 20,000 24,000

Scale in Feet 1:83,300 (1 inch = 6,940 feet)

N

Flight Profile MGU040DL

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	0	20 AGL	5	0	0	0	87	liftoff and rotate 180 deg within 1 min; modeled as a
b	10	20 AGL	5	0	0	30	87	reach roll angle and begin 180 deg turn
c	314	20 AGL	5	0	0	30	87	begin roll to wings level
d	324	20 AGL	5	0	0	0	87	depart LZ and climb to 300' AGL within about 0.5NM
e	1,714	178 AGL	80	0	0	0	78	begin roll
f	1,814	189 AGL	80	0	0	25	78	reach roll angle; begin turn
g	3,000	300 AGL	80	0	0	25	78	reach 300 ft AGL
h	10,514	300 AGL	80	0	-1	25	78	begin to roll wings level
i	10,714	300 AGL	80	0	-1	0	78	wings level; begin accel and climb to 500 ft AGL wit
j	16,714	500 AGL	200	0	-1	0	0	
k	36,000	500 AGL	200	0	-1	0	0	

MCTAB Flight Profile MGU040DL - LZ Gull - Departure from 040 heading
MV-22
on Flight Track GU040D - LZ Gull - Departure

0 4,000 8,000 12,000 16,000 20,000

Scale in Feet 1:67,400 (1 inch = 5,620 feet)

N

Flight Profile MHK230

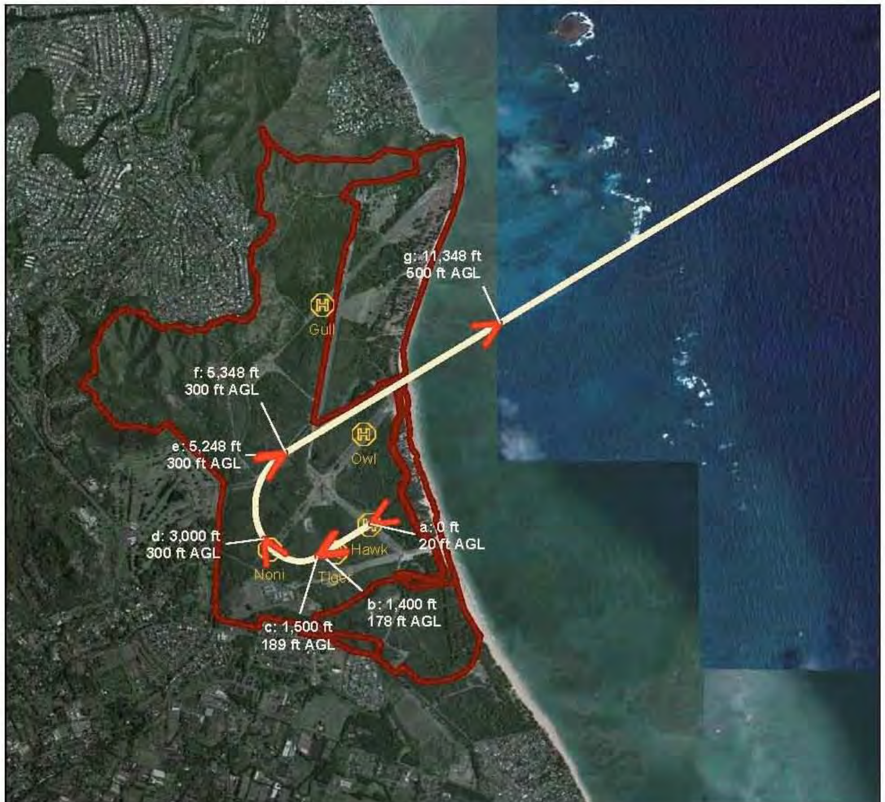
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	47,000	500 AGL	200	0	-1	0	0	
b	30,200	500 AGL	200	0	-1	0	0	@~5NM from LZ
c	29,800	500 AGL	200	0	-1	0	0	begin descent to 300 ft AGL
d	18,000	300 AGL	220	0	-1	0	0	hold alt and begin slow down ro 100 kts @ 1NM
e	12,000	300 AGL	200	0	-1	0	0	
f	6,000	300 AGL	100	0	-1	0	65	
g	3,000	200 AGL	80	0	-1	0	85	
h	1,200	150 AGL	50	0	5	0	90	300 fpm desc; 6deg gs
i	0	20 AGL	5	0	0	0	90	5 knot stop

MCTAB Flight Profile MHK230 - LZ Hawk - 220 Arrival (SI)
MV-22
on Flight Track HK220 - LZ Hawk - Arrival

0 4,000 8,000 12,000 16,000 20,000 24,000

Scale in Feet 1:76,200 (1 inch = 6,350 feet)

N



Flight Profile MHK230DR

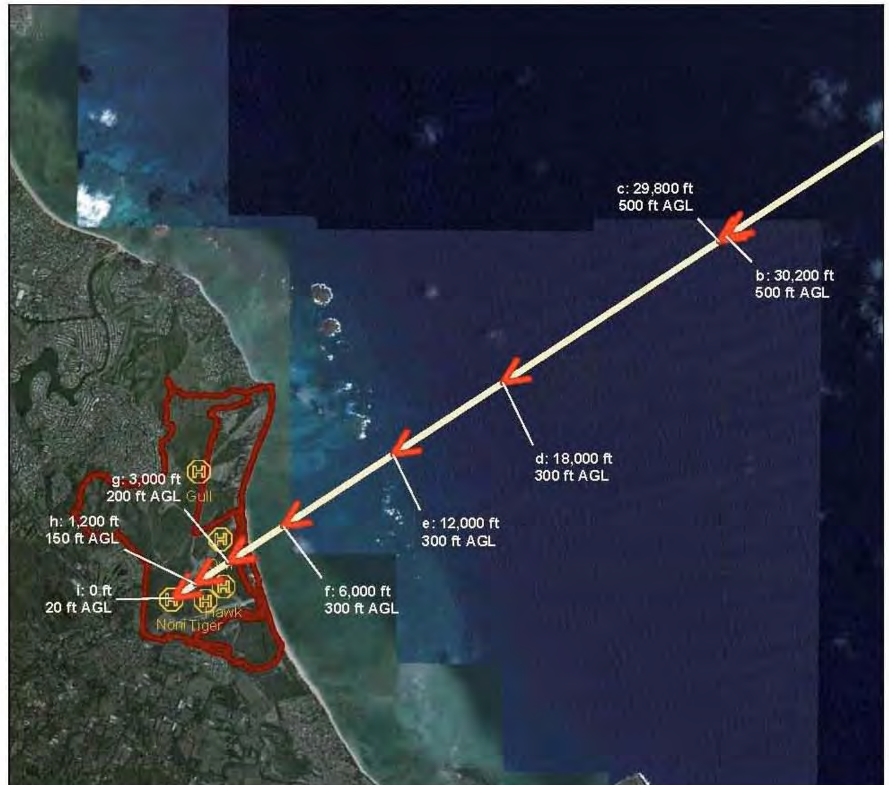
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	0	20 AGL	5	0	0	0	87	liftoff and depart LZ
b	1,400	178 AGL	80	0	0	0	78	begin roll
c	1,500	189 AGL	80	0	0	-25	78	reach roll angle; begin turn
d	3,000	300 AGL	80	0	0	-25	78	reach 300 ft AGL
e	5,248	300 AGL	80	0	-1	-25	78	begin to roll wings level
f	5,348	300 AGL	80	0	-1	0	78	wings level; begin accel and climb to 500 ft AGL wit
g	11,348	500 AGL	200	0	-1	0	0	
h	36,000	500 AGL	200	0	-1	0	0	

MCTAB Flight Profile MHK230DR - LZ Hawk- Departure from 220 heading
MV-22
on Flight Track HK220D - LZ Hawk - Departure

0 2,000 4,000 6,000 8,000 10,000 12,000

Scale in Feet 1:38,700 (1 inch = 3,230 feet)

N



Flight Profile MNO230

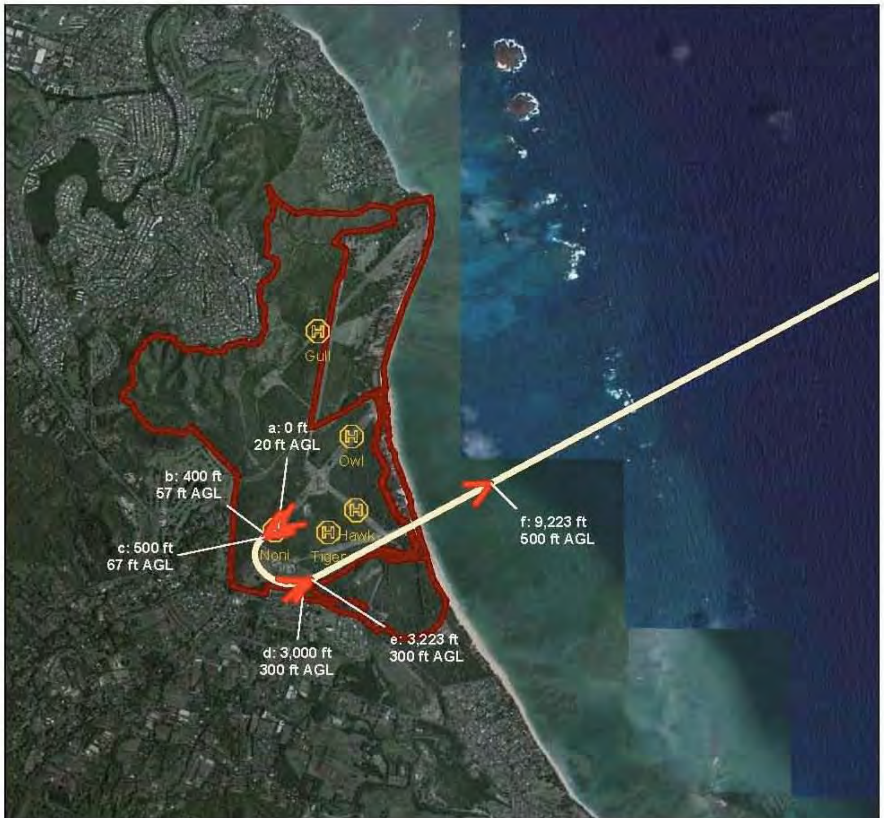
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	47,000	500 AGL	200	0	-1	0	0	
b	30,200	500 AGL	200	0	-1	0	0	@ ~5NM from LZ
c	29,800	500 AGL	200	0	-1	0	0	begin descent to 300 ft AGL
d	18,000	300 AGL	220	0	-1	0	0	hold alt and begin slow down ro 100 kts @ 1NM
e	12,000	300 AGL	200	0	-1	0	0	
f	6,000	300 AGL	100	0	-1	0	65	
g	3,000	200 AGL	80	0	-1	0	85	
h	1,200	150 AGL	50	0	5	0	90	300 fpm desc; 6deg gs
i	0	20 AGL	5	0	0	0	90	5 knot stop

MCTAB Flight Profile MNO230 - LZ Noni - 220 Arrival (SI)
MV-22
on Flight Track NO220 - LZ Noni - Arrival

0 4,000 8,000 12,000 16,000 20,000 24,000

Scale in Feet 1:73,900 (1 inch = 6,160 feet)

N



Flight Profile MNO230DL

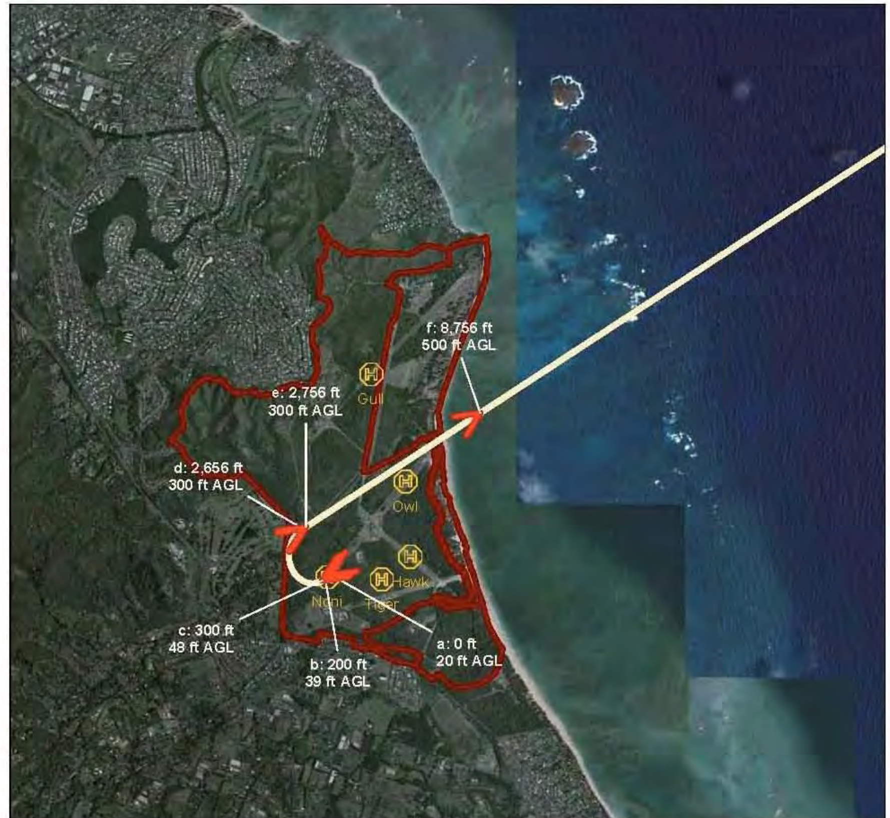
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	0	20 AGL	5	0	0	0	87	liftoff and depart LZ
b	400	57 AGL	60	0	0	0	85	begin roll
c	500	67 AGL	65	0	0	25	85	reach roll angle; begin turn
d	3,000	300 AGL	80	0	0	25	78	reach 300 ft AGL; begin to roll to wings level
e	3,223	300 AGL	80	0	-1	0	78	wings level; begin accel and climb to 500 ft AGL wit
f	9,223	500 AGL	200	0	-1	0	0	
g	36,000	500 AGL	200	0	-1	0	0	

MCTAB Flight Profile MNO230DL - LZ Noni Departure from 220 heading Left turn
MV-22
on Flight Track NO220_L - LZ Noni - Departure

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000

Scale in Feet 1:47,500 (1 inch = 3,960 feet)

N



Flight Profile MNO230DR

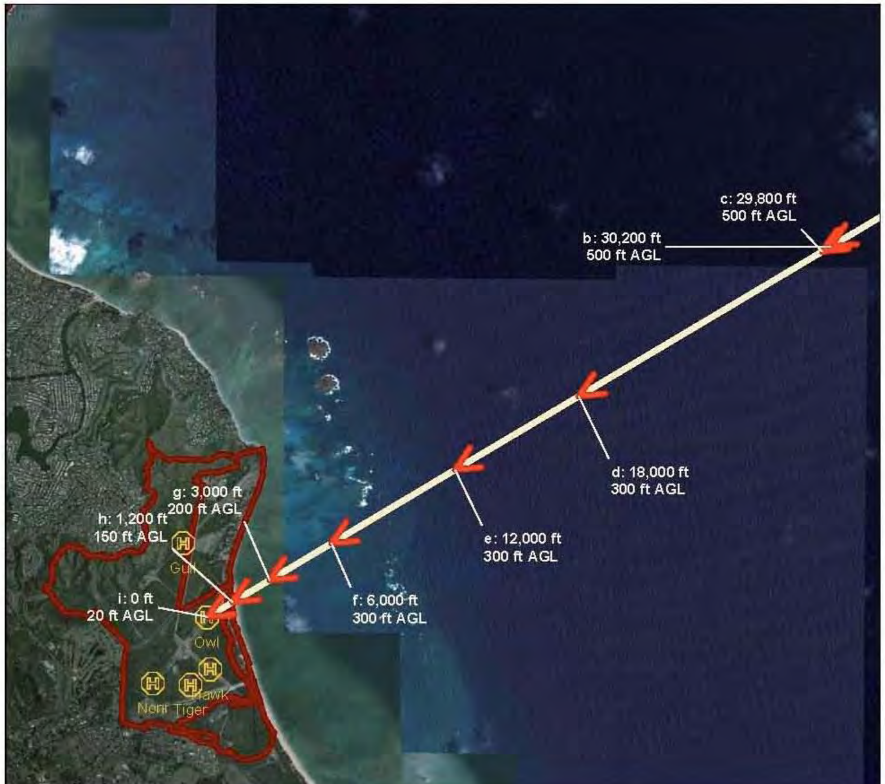
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	0	20 AGL	5	0	0	0	87	liftoff and depart LZ
b	200	39 AGL	60	0	0	0	85	begin roll
c	300	48 AGL	65	0	0	-25	85	reach roll angle; begin turn
d	2,656	300 AGL	80	0	0	-25	78	reach 300 ft AGL; begin to roll to wings level
e	2,756	300 AGL	80	0	-1	0	78	wings level; begin accel and climb to 500 ft AGL wit
f	8,756	500 AGL	200	0	-1	0	0	
g	36,000	500 AGL	200	0	-1	0	0	

MCTAB Flight Profile MNO230DR - LZ Noni Departure 220 heading Right turn
MV-22
on Flight Track NO220_R - LZ Noni - Departure

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000

Scale in Feet 1:46,600 (1 inch = 3,880 feet)

N



Flight Profile MOW230

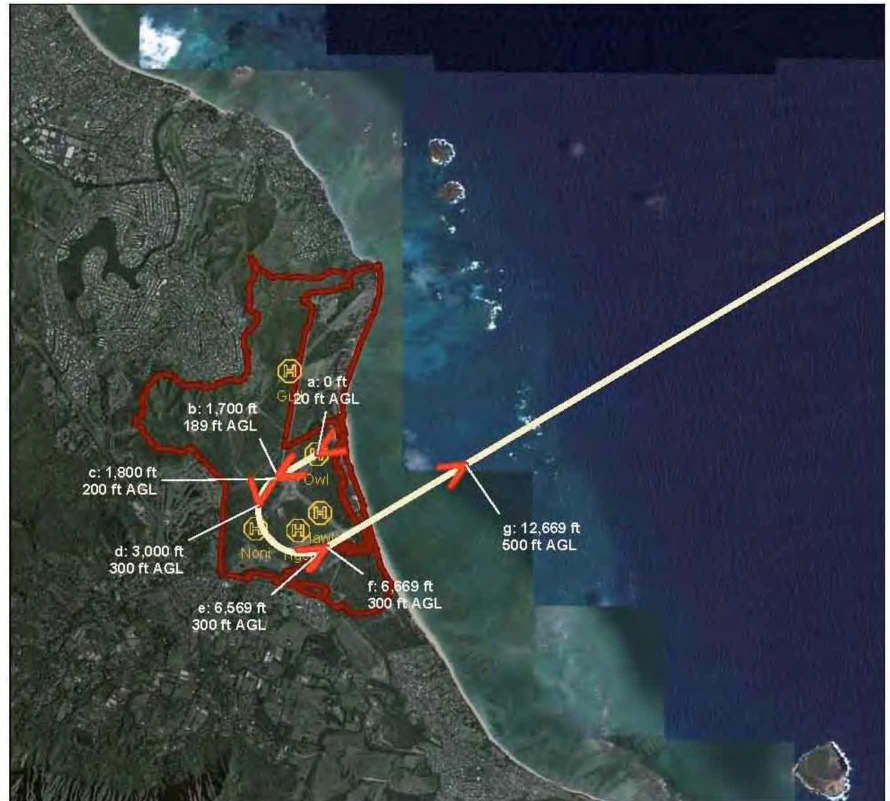
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	47,000	500 AGL	200	0	-1	0	0	
b	30,200	500 AGL	200	0	-1	0	0	@ ~5NM from LZ
c	29,800	500 AGL	200	0	-1	0	0	begin descent to 300 ft AGL
d	18,000	300 AGL	220	0	-1	0	0	hold alt and begin slow down ro 100 kts @ 1NM
e	12,000	300 AGL	200	0	-1	0	0	
f	6,000	300 AGL	100	0	-1	0	65	
g	3,000	200 AGL	80	0	-1	0	85	
h	1,200	150 AGL	50	0	5	0	90	300 fpm desc; 6deg gs
i	0	20 AGL	5	0	0	0	90	5 knot stop

MCTAB Flight Profile MOW230 - LZ Hawk - 220 Arrival (SI)
MV-22
on Flight Track OW220 - LZ Owl - Arrival

0 4,000 8,000 12,000 16,000 20,000

Scale in Feet 1:67,400 (1 inch = 5,620 feet)

N



Flight Profile MOW230DL

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	0	20 AGL	5	0	0	0	87	liftoff and depart LZ
b	1,700	189 AGL	80	0	0	0	78	begin roll
c	1,800	200 AGL	80	0	0	25	78	reach roll angle; begin turn
d	3,000	300 AGL	80	0	0	25	78	reach 300 ft AGL
e	6,569	300 AGL	80	0	-1	25	78	begin to roll wings level
f	6,669	300 AGL	80	0	-1	0	78	wings level; begin accel and climb to 500 ft AGL wit
g	12,669	500 AGL	200	0	-1	0	0	
h	36,000	500 AGL	200	0	-1	0	0	

MCTAB Flight Profile MOW230DL - LZ Owl Departure from 220 heading Left turn
MV-22
on Flight Track OW220D - LZ Owl - Departure

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000 18,000 20,000

Scale in Feet 1:60,000 (1 inch = 5,000 feet)

N

Flight Profile MTI230

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	47,000	500 AGL	200	0	-1	0	0	
b	30,200	500 AGL	200	0	-1	0	0	@ ~5NM from LZ
c	29,800	500 AGL	200	0	-1	0	0	begin descent to 300 ft AGL
d	18,000	300 AGL	220	0	-1	0	0	hold alt and begin slow down ro 100 kts @ 1NM
e	12,000	300 AGL	200	0	-1	0	0	
f	6,000	300 AGL	100	0	-1	0	65	
g	3,000	200 AGL	80	0	-1	0	85	
h	1,200	150 AGL	50	0	5	0	90	300 fpm desc; 6deg gs
i	0	20 AGL	5	0	0	0	90	5 knot stop

MCTAB Flight Profile MTI230 - LZ Tiger - 220 Arrival (SI)
MV-22
on Flight Track TI220 - LZ Tiger - Arrival

0 4,000 8,000 12,000 16,000 20,000 24,000

Scale in Feet 1:82,000 (1 inch = 6,830 feet)

N

Flight Profile MTI230DR

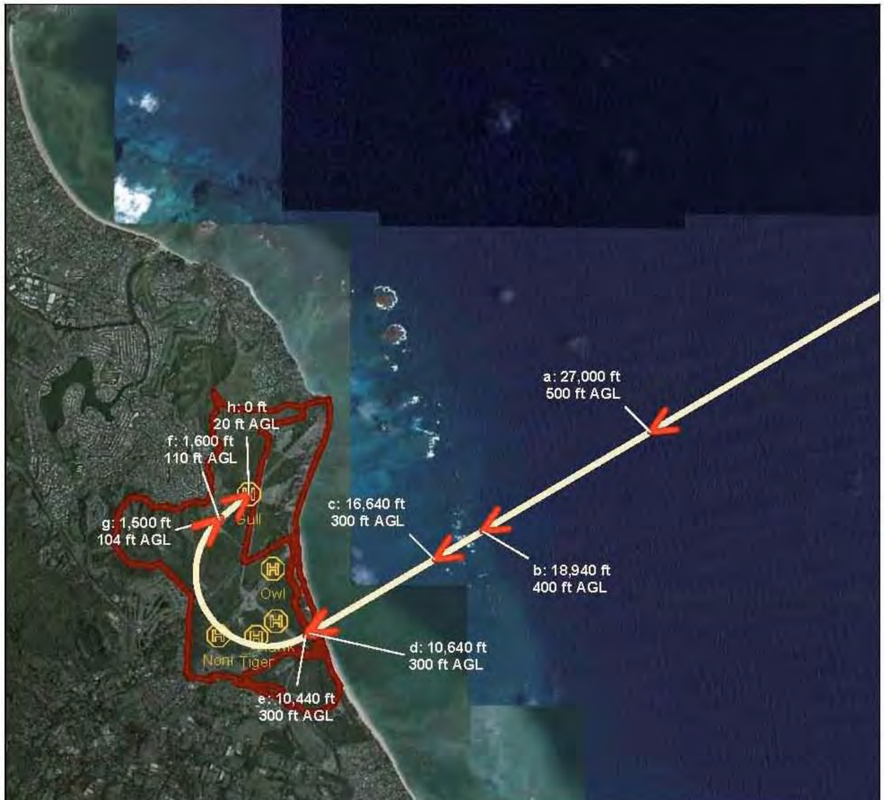
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	0	20 AGL	5	0	0	0	87	liftoff and depart LZ
b	900	122 AGL	80	0	0	0	78	begin roll
c	1,000	132 AGL	80	0	0	-25	78	reach roll angle; begin turn
d	3,000	300 AGL	80	0	0	-25	78	reach 300 ft AGL
e	4,851	300 AGL	80	0	-1	-25	78	begin to roll wings level
f	4,951	300 AGL	80	0	-1	0	78	wings level; begin accel and climb to 500 ft AGL wit
g	10,951	500 AGL	200	0	-1	0	0	
h	36,000	500 AGL	200	0	-1	0	0	

MCTAB Flight Profile MTI230DR - LZ Tiger - Departure 220 heading Right turn
MV-22
on Flight Track TI220D - LZ Tiger - Departure

0 4,000 8,000 12,000 16,000 20,000

Scale in Feet 1:66,900 (1 inch = 5,580 feet)

N



Flight Profile AGU040

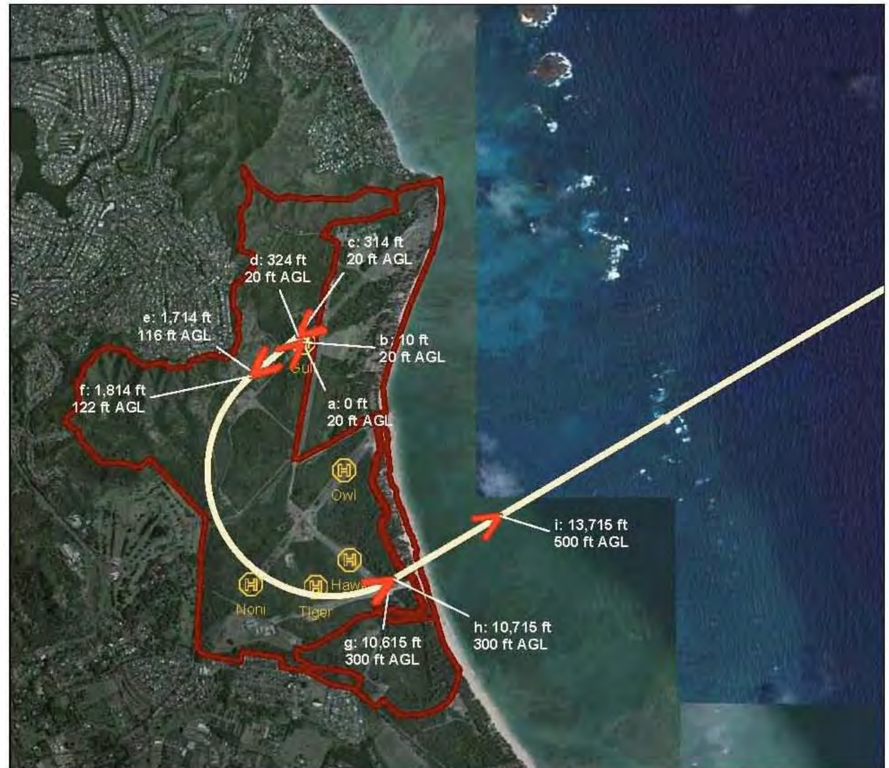
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	27,000	500 AGL	80	0	0	0	90	
b	18,940	400 AGL	80	0	0	0	90	
c	16,640	300 AGL	80	0	0	0	90	
d	10,640	300 AGL	80	0	0	0	90	begin to roll
e	10,440	300 AGL	80	0	0	-30	90	reach 30 deg roll angle; begin turn
f	1,600	110 AGL	80	0	0	-30	90	begin roll to wings level
g	1,500	104 AGL	80	0	0	0	90	end turn; wings level
h	0	20 AGL	0	0	0	0	90	

MCTAB Flight Profile AGU040 - LZ Gull Approach - 180 deg
AH-1/UH-1
on Flight Track GU22-5 - 180 to 040 heading

0 4,000 8,000 12,000 16,000 20,000

Scale in Feet 1:66,900 (1 inch = 5,570 feet)

N



Flight Profile AGU040DL

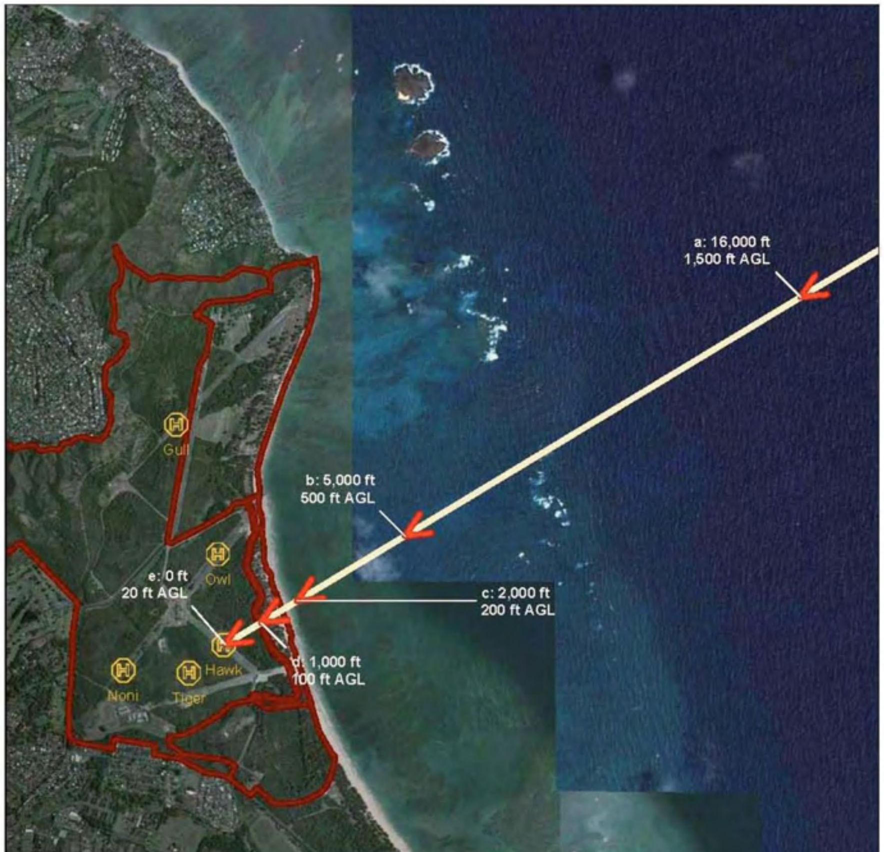
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	0	20 AGL	5	0	0	0	90	liftoff and rotate 180 deg within 1 min; modeled as a
b	10	20 AGL	5	0	0	30	90	reach roll angle and begin 180 deg turn
c	314	20 AGL	5	0	0	30	90	begin roll to wings level
d	324	20 AGL	5	0	0	0	90	depart LZ and climb to 300' AGL
e	1,714	116 AGL	80	0	0	0	90	begin to roll
f	1,814	122 AGL	80	0	0	30	90	reach 30 deg roll angle; begin turn
g	10,615	300 AGL	80	0	0	30	90	begin roll to wings level
h	10,715	300 AGL	80	0	0	0	90	end turn; wings level; climb to 500 ft AGL within 0.5
i	13,715	500 AGL	80	0	0	0	90	
j	36,000	500 AGL	80	0	0	0	90	

MCTAB Flight Profile AGU040DL - LZ Gull Departure - 180 deg
AH-1/UH-1
on Flight Track GUD22-3L - 180 to 040 heading

0 2,000 4,000 6,000 8,000 10,000 12,000

Scale in Feet 1:39,100 (1 inch = 3,260 feet)

N



Flight Profile AHK230

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle
a	16,000	1,500 AGL	80	0	0	0	90
b	5,000	500 AGL	80	0	0	0	90
c	2,000	200 AGL	60	0	0	0	90
d	1,000	100 AGL	45	0	0	0	90
e	0	20 AGL	5	0	0	0	90

MCTAB Flight Profile AHK230 - LZ Hawk Approach - Straight-in

AH-1/UH-1

on Flight Track HK22-5 - straight-in

0 2,000 4,000 6,000 8,000 10,000 12,000

Scale in Feet 1:38,400 (1 inch = 3,200 feet)

N

Flight Profile AHK230DR

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	0	20 AGL	5	0	0	0	90	Depart LZ
b	1,400	98 AGL	80	0	0	0	90	begin to roll
c	1,500	104 AGL	80	0	0	-30	90	reach 30 deg roll angle; begin turn
d	4,542	300 AGL	80	0	0	-30	90	begin roll to wings level
e	4,642	300 AGL	80	0	0	0	90	end turn; wings level; climb to 500 ft AGL within 0.5
f	7,642	500 AGL	80	0	0	0	90	
g	36,000	500 AGL	80	0	0	0	90	

MCTAB Flight Profile AHK230DR - LZ Hawk Departure - 180 deg

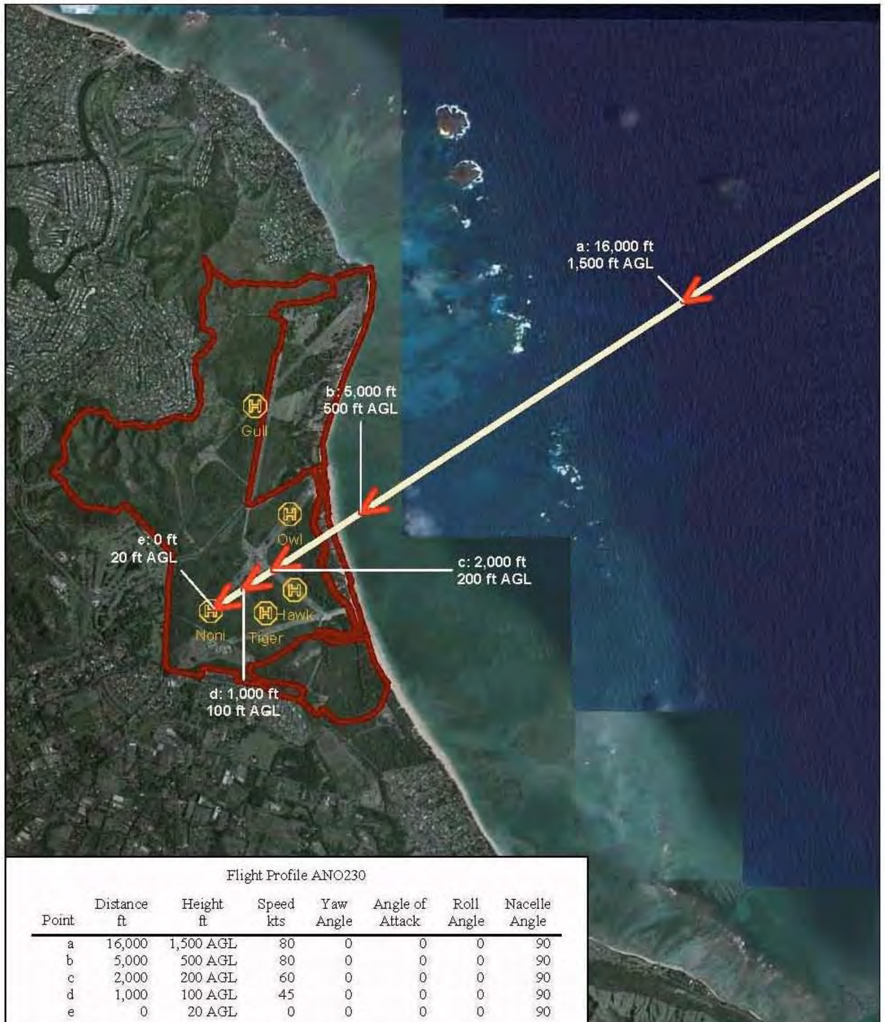
AH-1/UH-1

on Flight Track HKD22-3R - 180 to 060 heading

0 2,000 4,000 6,000 8,000 10,000

Scale in Feet 1:32,400 (1 inch = 2,700 feet)

N



Flight Profile ANO230

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle
a	16,000	1,500 AGL	80	0	0	0	90
b	5,000	500 AGL	80	0	0	0	90
c	2,000	200 AGL	60	0	0	0	90
d	1,000	100 AGL	45	0	0	0	90
e	0	20 AGL	0	0	0	0	90

MCTAB Flight Profile ANO230 - LZ Noni Approach - Straight-in

AH-1/UH-1

on Flight Track NO22-5 - straight-in

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000

Scale in Feet 1:46,100 (1 inch = 3,850 feet)

N

Flight Profile ANO230DL

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	0	20 AGL	5	0	0	0	90	Depart LZ
b	300	39 AGL	50	0	0	0	90	begin to roll
c	400	46 AGL	55	0	0	30	90	reach 30 deg roll angle; begin turn
d	2,909	300 AGL	80	0	0	30	90	begin roll to wings level
e	3,009	300 AGL	80	0	0	0	90	end turn; wings level; climb to 500 ft AGL within 0.5
f	6,009	500 AGL	80	0	0	0	90	
g	36,000	500 AGL	80	0	0	0	90	

MCTAB Flight Profile ANO230DL - LZ Noni Departures - 180 deg

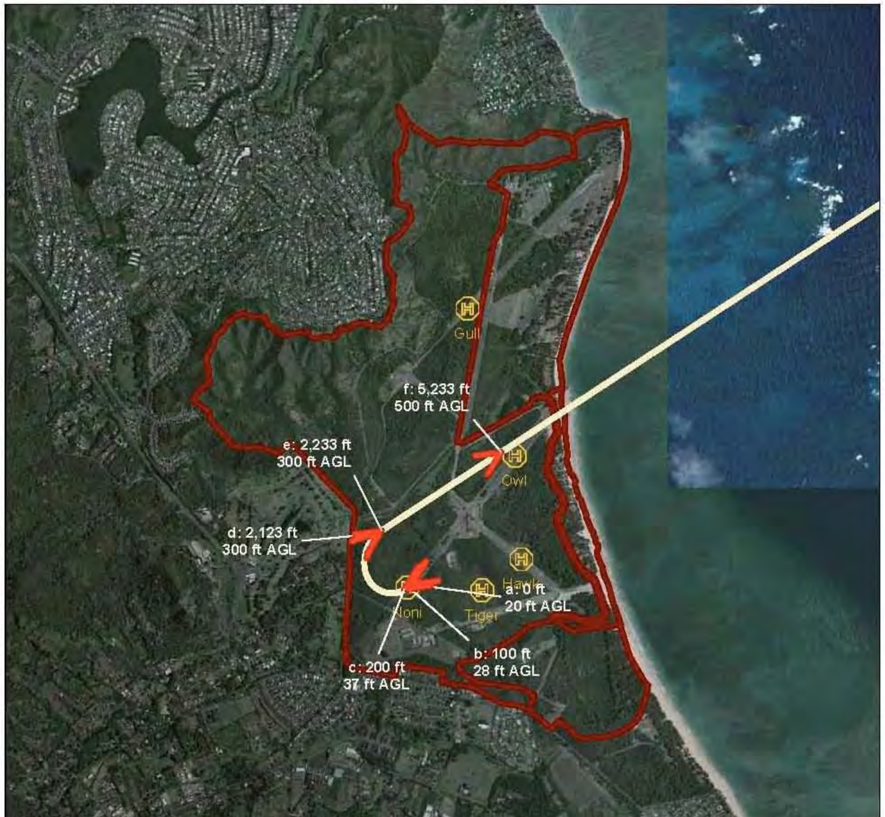
AH-1/UH-1

on Flight Track NOD22-3L - 180 to 040 heading

0 2,000 4,000 6,000 8,000 10,000 12,000

Scale in Feet 1:36,500 (1 inch = 3,040 feet)

N



Flight Profile ANO230DR

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	0	20 AGL	5	0	0	0	90	Depart LZ
b	100	28 AGL	30	0	0	0	90	begin to roll
c	200	37 AGL	40	0	0	-30	90	reach 30 deg roll angle; begin turn
d	2,123	300 AGL	80	0	0	-30	90	begin roll to wings level
e	2,233	300 AGL	80	0	0	0	90	end turn; wings level; climb to 500 ft AGL within 0.5
f	5,233	500 AGL	80	0	0	0	90	
g	36,000	500 AGL	80	0	0	0	90	

MCTAB Flight Profile ANO230DR - LZ Noni Departure - 180 deg
AH-1/UH-1
on Flight Track NOD22-3R - 180 to 040 heading

0 2,000 4,000 6,000 8,000 10,000

Scale in Feet 1:33,900 (1 inch = 2,830 feet)

N

Flight Profile AOW230

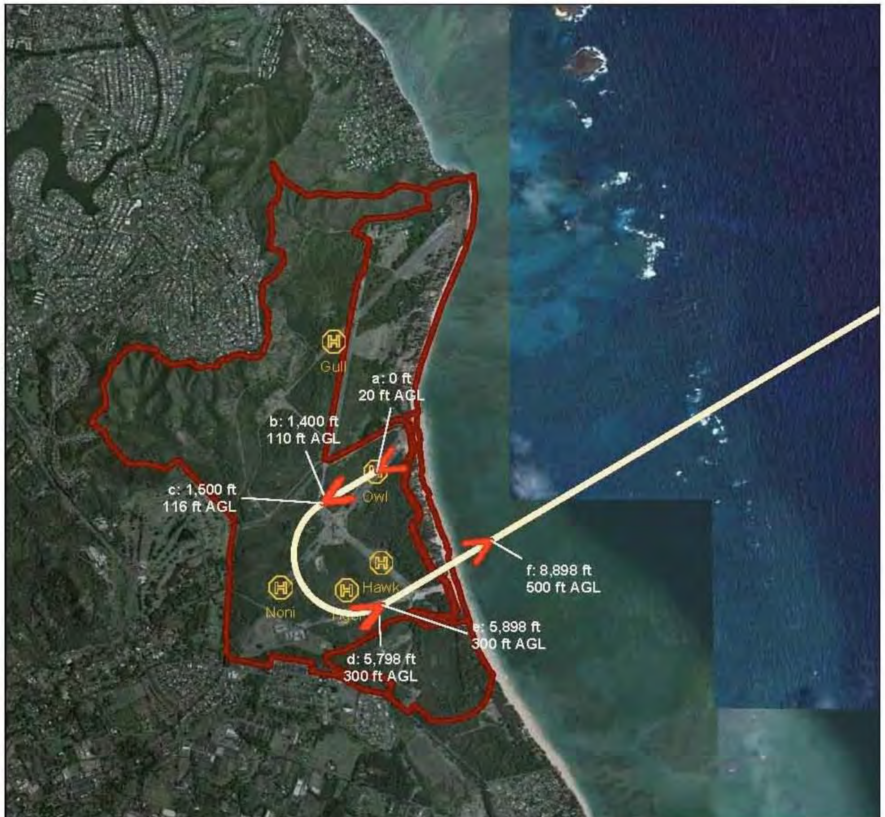
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle
a	16,000	1,500 AGL	80	0	0	0	90
b	5,000	500 AGL	80	0	0	0	90
c	2,000	200 AGL	60	0	0	0	90
d	1,000	100 AGL	45	0	0	0	90
e	0	20 AGL	0	0	0	0	90

MCTAB Flight Profile AOW230 - LZ Owl Approach - Straight-in
AH-1/UH-1
on Flight Track OW22-5 - straight-in

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000

Scale in Feet 1:51,000 (1 inch = 4,250 feet)

N



Flight Profile AOW230DL

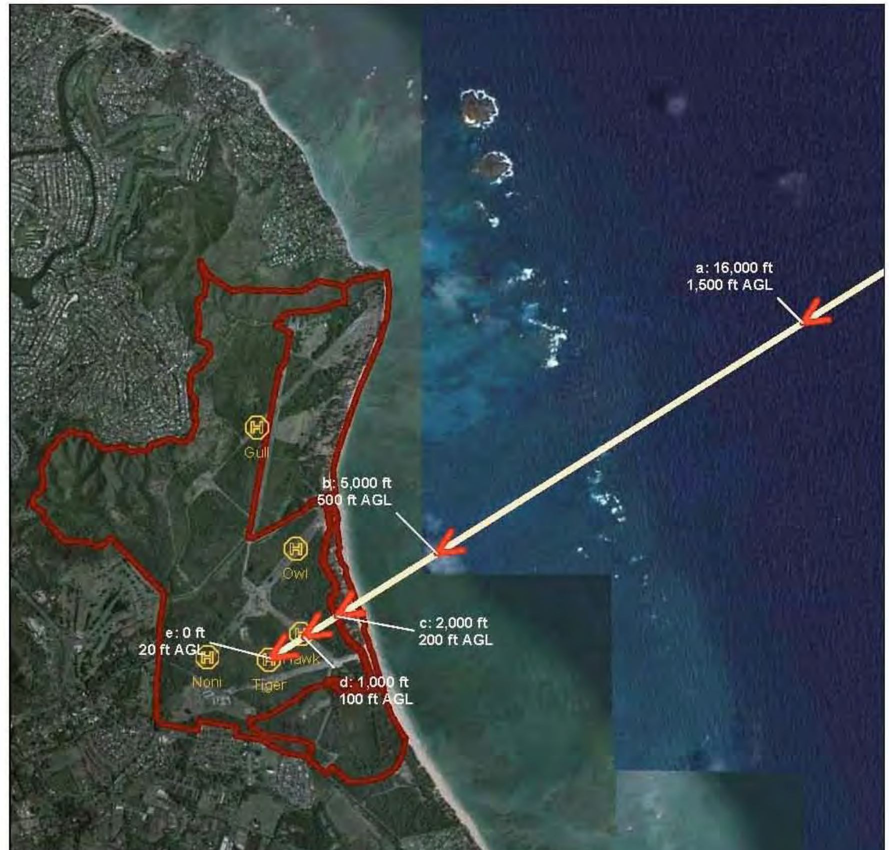
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	0	20 AGL	5	0	0	0	90	Depart LZ
b	1,400	110 AGL	80	0	0	0	90	begin to roll
c	1,500	116 AGL	80	0	0	30	90	reach 30 deg roll angle; begin turn
d	5,798	300 AGL	80	0	0	30	90	begin roll to wings level
e	5,898	300 AGL	80	0	0	0	90	end turn; wings level; climb to 500 ft AGL within 0.5
f	8,898	500 AGL	80	0	0	0	90	
g	36,000	500 AGL	80	0	0	0	90	

MCTAB Flight Profile AOW230DL - LZ Owl Departure - 180 deg
AH-1/UH-1
on Flight Track OWD22-3L - 180 to 040 heading

0 2,000 4,000 6,000 8,000 10,000 12,000

Scale in Feet 1:38,400 (1 inch = 3,200 feet)

N



Flight Profile ATI230

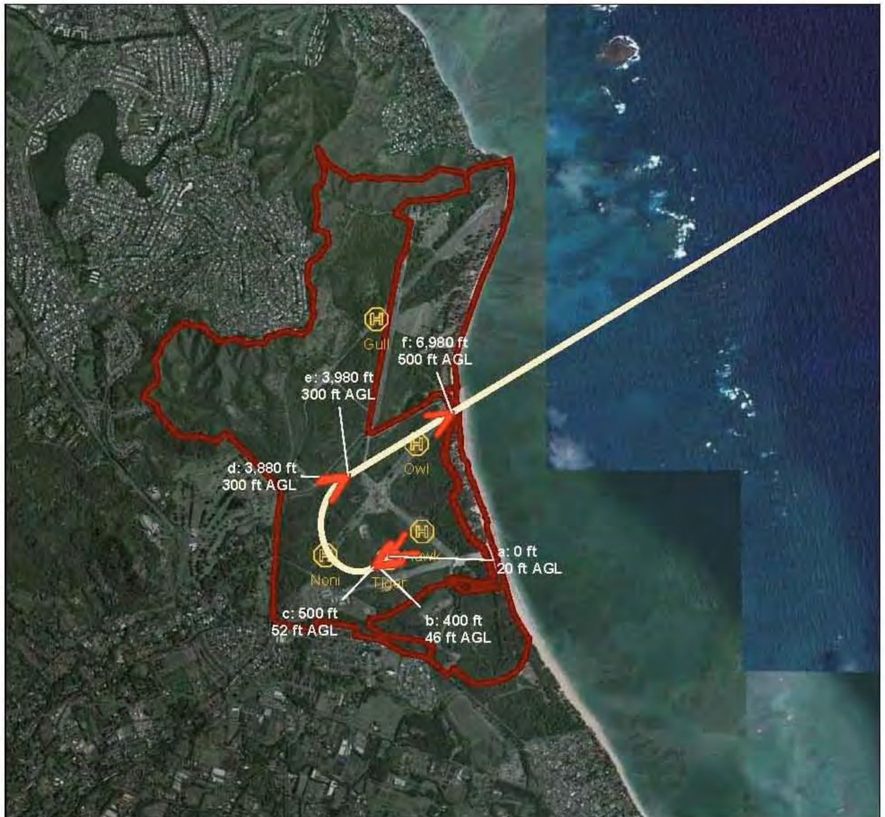
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle
a	16,000	1,500 AGL	80	0	0	0	90
b	5,000	500 AGL	80	0	0	0	90
c	2,000	200 AGL	60	0	0	0	90
d	1,000	100 AGL	45	0	0	0	90
e	0	20 AGL	0	0	0	0	90

MCTAB Flight Profile ATI230 - LZ Tiger Approach - Straight-in
AH-1/UH-1
on Flight Track TI22-5 - straight-in

0 2,000 4,000 6,000 8,000 10,000 12,000

Scale in Feet 1:41,100 (1 inch = 3,430 feet)

N



Flight Profile ATI230DR

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	0	20 AGL	5	0	0	0	90	Depart LZ
b	400	46 AGL	80	0	0	0	90	begin to roll
c	500	52 AGL	80	0	0	-30	90	reach 30 deg roll angle; begin turn
d	3,880	300 AGL	80	0	0	-30	90	begin roll to wings level
e	3,980	300 AGL	80	0	0	0	90	end turn; wings level; climb to 500 ft AGL within 0.5
f	6,980	500 AGL	80	0	0	0	90	
g	36,000	500 AGL	80	0	0	0	90	

MCTAB Flight Profile ATI230DR - LZ Tiger Departure - 180 deg
AH-1/UH-1
on Flight Track TID22-3R - 180 to 040 heading

0 2,000 4,000 6,000 8,000 10,000 12,000

Scale in Feet 1:40,000 (1 inch = 3,340 feet)

N

D-2.2.3 MCTAB ALTERNATIVE C (NO ACTION)

D-2.2.3.1 Modeled Events

Table 2.2-5 Modeled Daily Events at MCTAB Landing Zones for Busiest Month Alternative C (No Action)

LZ Name	Op Type	Turn Direction	Track ID	CH-53		
				Profile ID	Day (0700 - 2200)	Night (2200 - 0700)
Gull	Ingress	right	GU22-5	CGU040	0.1197	0.0046
	Egress	Left	GUD22-3L	CGU040DL	0.1197	0.0046
		Right			0	0
Hawk	Ingress	Straight In	HK22-5	CHK230	0.1197	0.0046
	Egress	Left			0	0
		Right	HKD22-3R	CHK230DR	0.1197	0.0046
Noni	Ingress	Straight In	NO22-5	CNO230	0.0598	0.0000
	Egress	Left	NOD22-3L	CNO230DL	0.03	0
		Right	NOD22-3R	CNO230DR	0.03	0
Owl	Ingress	Straight In	OW22-5	COW230	0.1197	0.0046
	Egress	Left	OWD22-3L	COW230DL	0.1197	0.0046
		Right			0	0
Tiger	Ingress	Straight In	TI22-5	CTI230	0.0598	0
	Egress	Left			0	0
		Right	TID22-3R	CTI230DR	0.0598	0

Notes: (1) Busy day factor of 1.2 (i.e., 120% of average daily events)

D-2.3 KAWAILOA TRAINING AREA (KLOA)

D-2.3.1 KLOA BASELINE SCENARIO

D-2.3.1.1 Flight Track Utilization and Modeled Events

Table 2.3-1 Flight Track Utilization for Helicopters at KLOA, SBER and Kalaupapa

Heading	Heading Utilization	Op Type	Op Type Utilization	Turn Direction	Turn Direction Utilization	Track Type	Track ID	Track Type Utilization
50	85%	Ingress	20%	Straight In	33%	Straight In	ABK08-5	100%
				Left	33%	180 deg	ABK08-1L	25%
						90 deg	ABK08-2L	25%
						270 deg	ABK08-3L	25%
						Hasty	ABK08-4L	25%
				Right	34%	180 deg	ABK08-1R	25%
						90 deg	ABK08-2R	25%
						270 deg	ABK08-3R	25%
						Hasty	ABK08-4R	25%
		Pattern	80%	Left	50%	Left Pattern	ABKT08-1L	100%
				Right	50%	Right Pattern	ABKT08-1R	100%
		Egress	20%	Left	33%	Departure	ABKD08-1L	50%
						Departure	ABKD08-2L	50%
				Right	33%	Departure	ABKD08-1R	50%
						Departure	ABKD08-2R	50%
				Straight Out	34%	Straight Out	ABKD08-5	100%
230	15%	Ingress	20%	Straight In	34%	Straight In	ABK26-5	100%
				Left	33%	180 deg	ABK26-1L	25%
						90 deg	ABK26-2L	25%
						270 deg	ABK26-3L	25%
						Hasty	ABK26-4L	25%
				Right	33%	180 deg	ABK26-1R	25%
						90 deg	ABK26-2R	25%
						270 deg	ABK26-3R	25%
						Hasty	ABK26-4R	25%
		Pattern	80%	Left	50%	Left Pattern	ABKT26-1L	100%
				Right	50%	Right Pattern	ABKT26-1R	100%
		Egress	20%	Left	33%	Departure	ABKD26-1L	50%
						Departure	ABKD26-2L	50%
				Right	33%	Departure	ABKD26-1R	50%
						Departure	ABKD26-2R	50%
				Straight Out	34%	Straight Out	ABKD26-5	100%

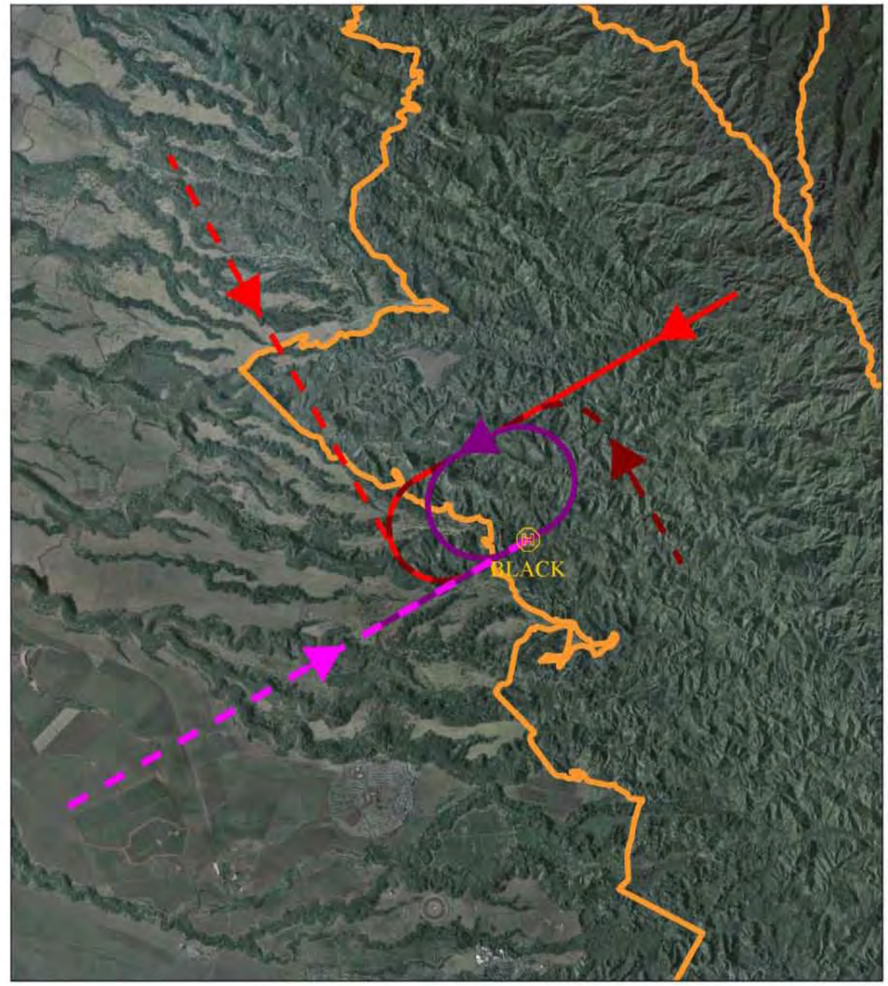
Notes: All other LZs at SBER, DMR and Kalaupapa use the same track utilization

Table 2.3-2 Modeled Daily Events for Helicopters at LZ Black for Baseline Busiest Month

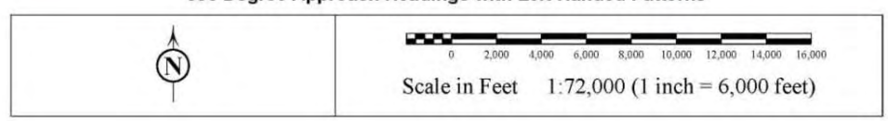
Heading	Op Type	Turn Direction	Track Type	Track ID	CH-53 Profile ID	Day (0700 - 2200)	Night (2200 - 0700)	Army Helos Profile ID	Day (0700 - 2200)	Night (2200 - 0700)
50	Ingress	Straight In	Straight In	ABK08-5	CBK05-5_2	0.170604	0.004981	HBK05-5_2	0.194781	0.003306
		Left	180 deg	ABK08-1L	CBK05-1L3	0.042651	0.001245	HBK05-1L3	0.048695	0.000826
			90 deg	ABK08-2L	CBK05-2L2	0.042651	0.001245	HBK05-2L2	0.048695	0.000826
			270 deg	ABK08-3L	CBK05-3L2	0.042651	0.001245	HBK05-3L2	0.048695	0.000826
			Hasty	ABK08-4L	CBK05-4L3	0.042651	0.001245	HBK05-4L3	0.048695	0.000826
		Right	180 deg	ABK08-1R	CBK05-1R3	0.043943	0.001283	HBK05-1R3	0.050171	0.000852
			90 deg	ABK08-2R	CBK05-2R2	0.043943	0.001283	HBK05-2R2	0.050171	0.000852
			270 deg	ABK08-3R	CBK05-3R2	0.043943	0.001283	HBK05-3R2	0.050171	0.000852
			Hasty	ABK08-4R	CBK05-4R3	0.043943	0.001283	HBK05-4R3	0.050171	0.000852
	Pattern	Left	Left Pattern	ABKT08-1L	CBKT05-1L	1.033965	0.030189	HBKT05-1L	1.180490	0.020036
		Right	Right Pattern	ABKT08-1R	CBKT05-1R	1.033965	0.030189	HBKT05-1R	1.180490	0.020036
	Egress	Left	Departure	ABKD08-1L	CBKD05-1L3	0.085302	0.002491	HBKD05-1L3	0.097390	0.001653
			Departure	ABKD08-2L	CBKD05-2L3	0.085302	0.002491	HBKD05-2L3	0.097390	0.001653
		Right	Departure	ABKD08-1R	CBKD05-1R3	0.085302	0.002491	HBKD05-1R3	0.097390	0.001653
			Departure	ABKD08-2R	CBKD05-2R3	0.085302	0.002491	HBKD05-2R3	0.097390	0.001653
		Straight Out	Straight Out	ABKD08-5	CBKD05-5_3	0.175774	0.005132	HBKD05-5_3	0.200683	0.003406
230	Ingress	Straight In	Straight In	ABK26-5	CBK23-5_2	0.031019	0.000906	HBK23-5_2	0.035415	0.000601
		Left	180 deg	ABK26-1L	CBK23-1L3	0.007527	0.000220	HBK23-1L3	0.008593	0.000146
			90 deg	ABK26-2L	CBK23-2L2	0.007527	0.000220	HBK23-2L2	0.008593	0.000146
			270 deg	ABK26-3L	CBK23-3L2	0.007527	0.000220	HBK23-3L2	0.008593	0.000146
			Hasty	ABK26-4L	CBK23-4L3	0.007527	0.000220	HBK23-4L3	0.008593	0.000146
		Right	180 deg	ABK26-1R	CBK23-1R3	0.007527	0.000220	HBK23-1R3	0.008593	0.000146
			90 deg	ABK26-2R	CBK23-2R2	0.007527	0.000220	HBK23-2R2	0.008593	0.000146
			270 deg	ABK26-3R	CBK23-3R2	0.007527	0.000220	HBK23-3R2	0.008593	0.000146
			Hasty	ABK26-4R	CBK23-4R3	0.007527	0.000220	HBK23-4R3	0.008593	0.000146
	Pattern	Left	Left Pattern	ABKT26-1L	CBKT23-1L	0.182464	0.005327	HBKT23-1L	0.208322	0.003536
		Right	Right Pattern	ABKT26-1R	CBKT23-1R	0.182464	0.005327	HBKT23-1R	0.208322	0.003536
	Egress	Left	Departure	ABKD26-1L	CBKD23-1L3	0.015053	0.000440	HBKD23-1L3	0.017187	0.000292
			Departure	ABKD26-2L	CBKD23-2L3	0.015053	0.000440	HBKD23-2L3	0.017187	0.000292
		Right	Departure	ABKD26-1R	CBKD23-1R3	0.015053	0.000440	HBKD23-1R3	0.017187	0.000292
			Departure	ABKD26-2R	CBKD23-2R3	0.015053	0.000440	HBKD23-2R3	0.017187	0.000292
		Straight Out	Straight Out	ABKD26-5	CBKD23-5_3	0.031019	0.000906	HBKD23-5_3	0.035415	0.000601

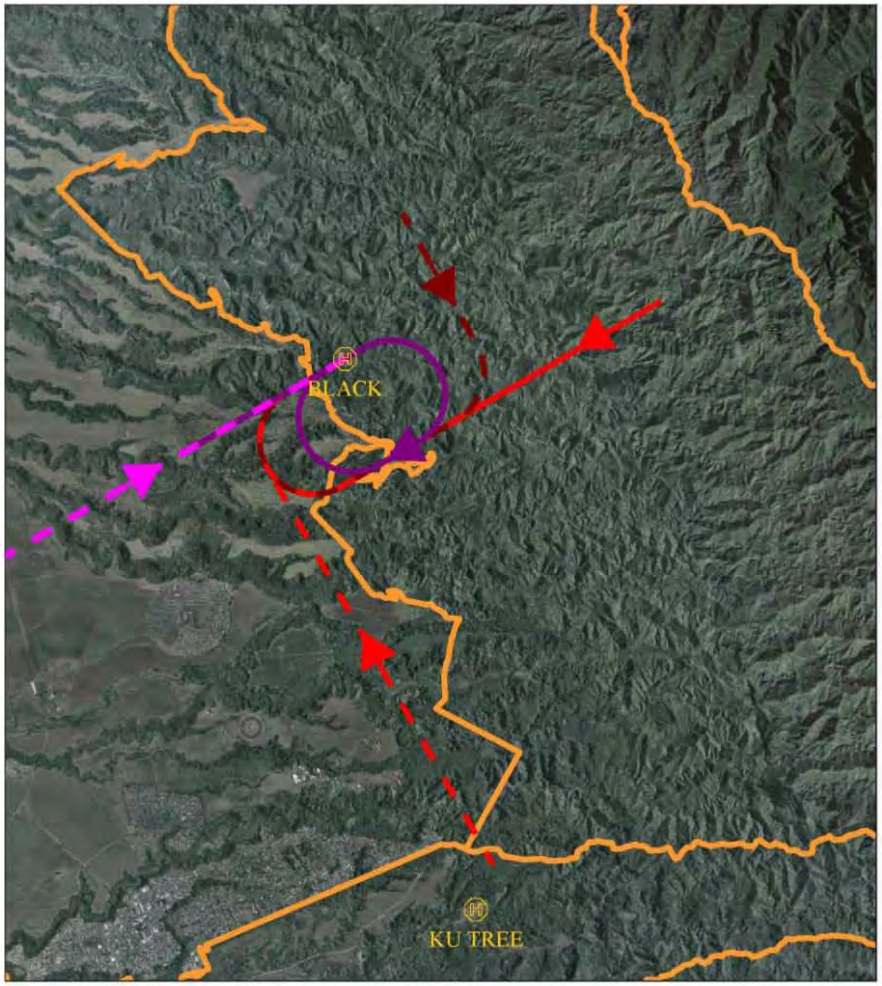
Notes: (1) LZ Black shown above
(2) All other LZs at SB East Range and Kalaupapa use the same track utilization

D-2.3.1.2 KLOA – Modeled Flight Tracks (LZ Black only)

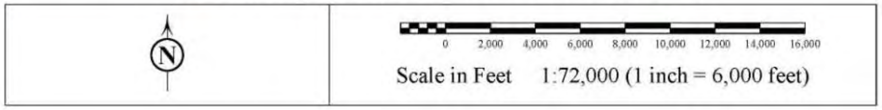


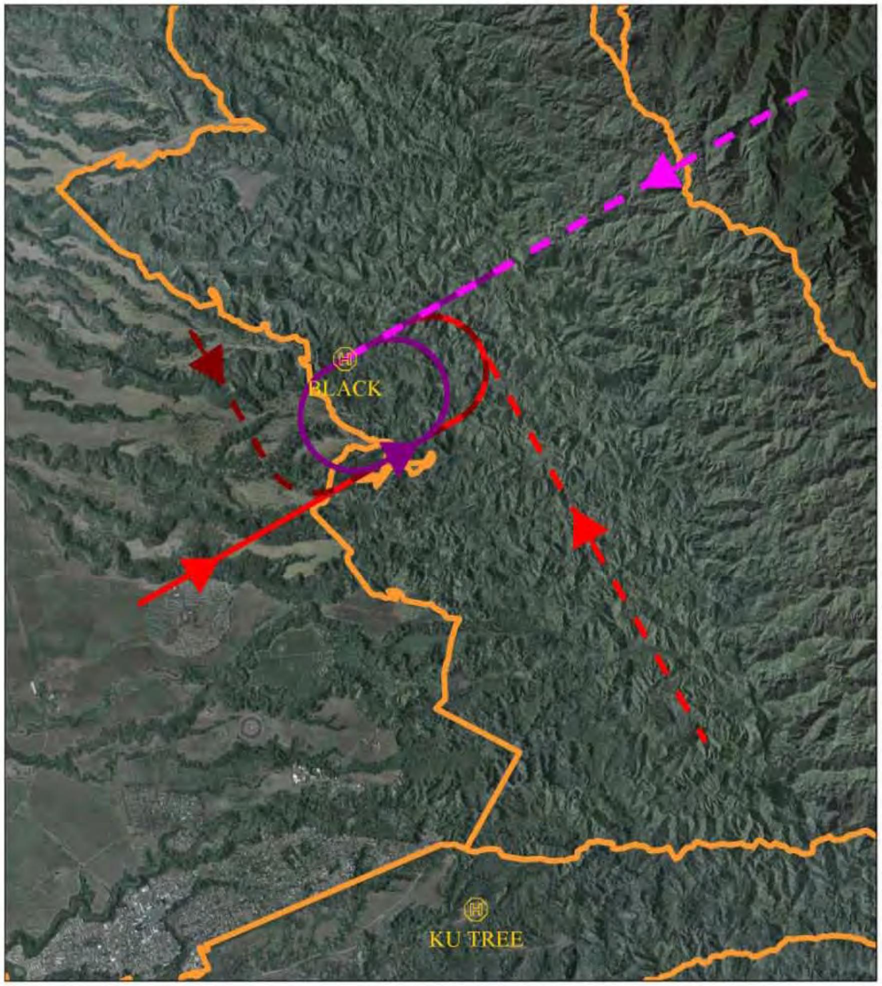
Modeled Helicopter Flight Tracks to LZ Black
050 Degree Approach Headings with Left Handed Patterns



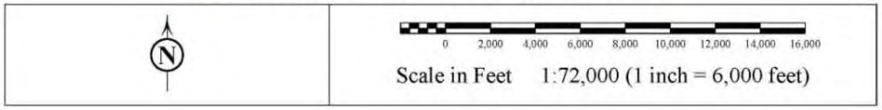


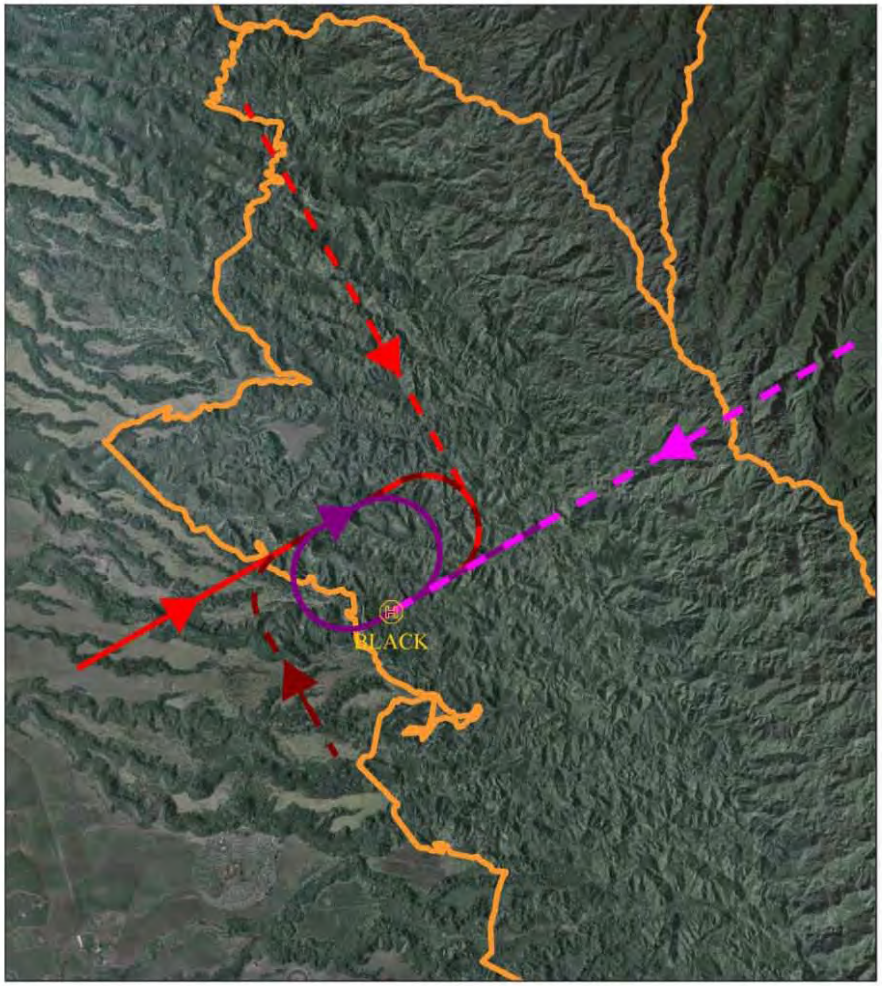
Modeled Helicopter Flight Tracks to LZ Black
050 Degree Approach Headings with Right Handed Patterns





Modeled Helicopter Flight Tracks to LZ Black
230 Degree Approach Headings with Left Handed Patterns



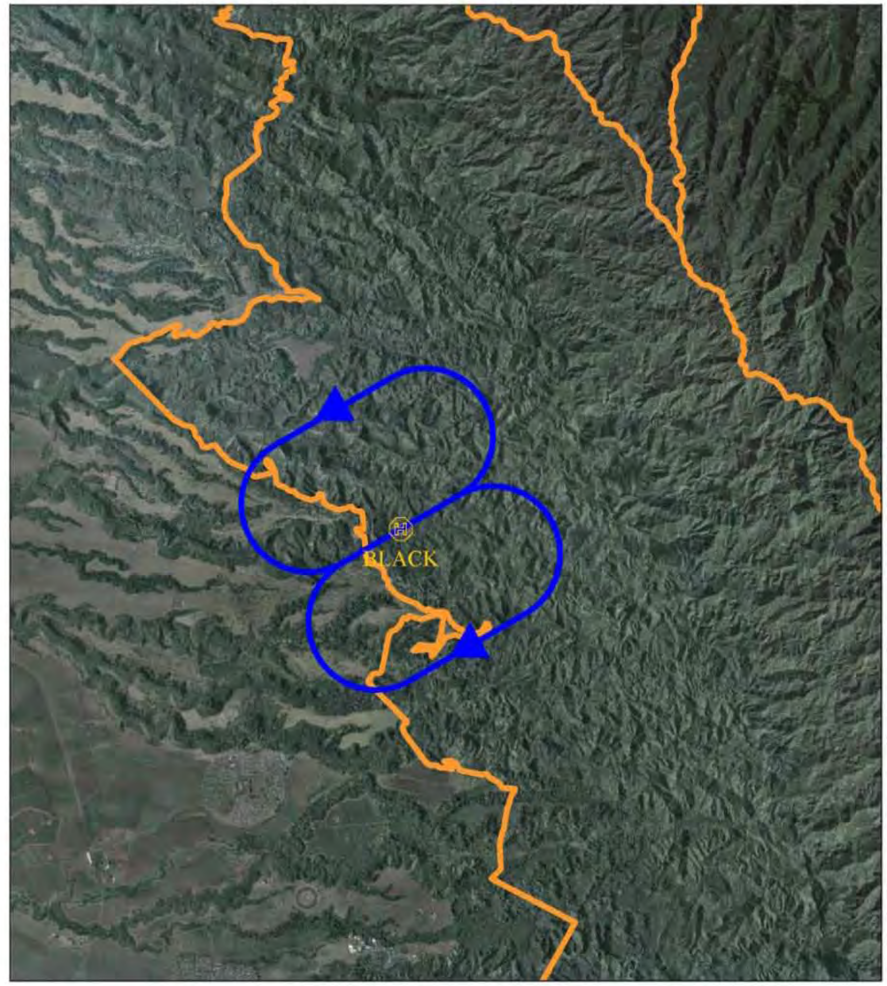


Modeled Helicopter Flight Tracks to LZ Black
230 Degree Approach Headings with Right Handed Patterns

N

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000

Scale in Feet 1:72,000 (1 inch = 6,000 feet)

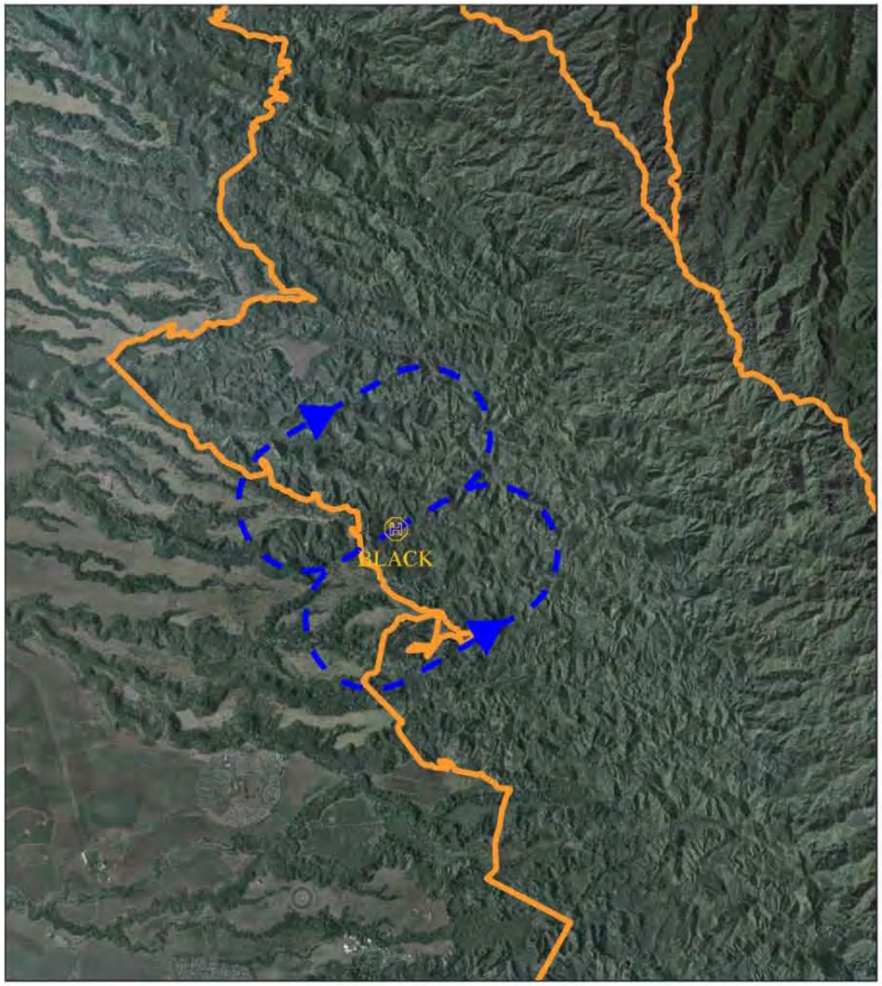


Modeled Helicopter Closed Pattern Flight Tracks at LZ Black
050 Degree Heading

N

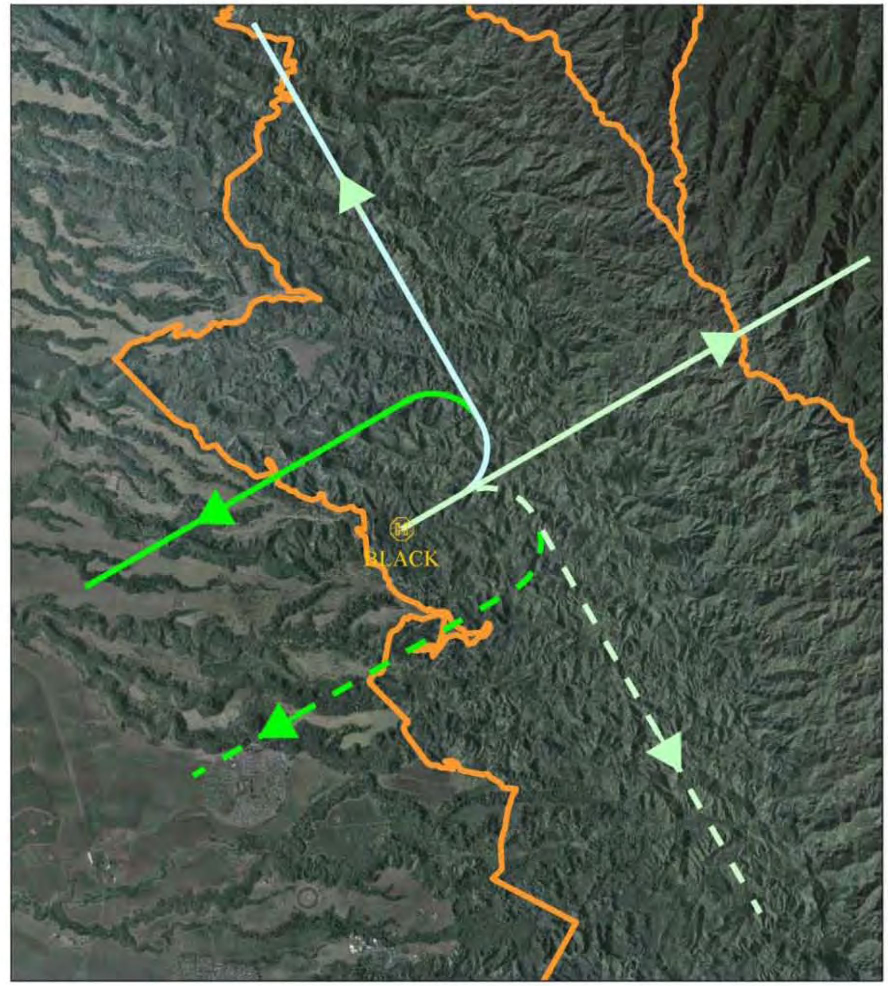
0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000

Scale in Feet 1:72,000 (1 inch = 6,000 feet)



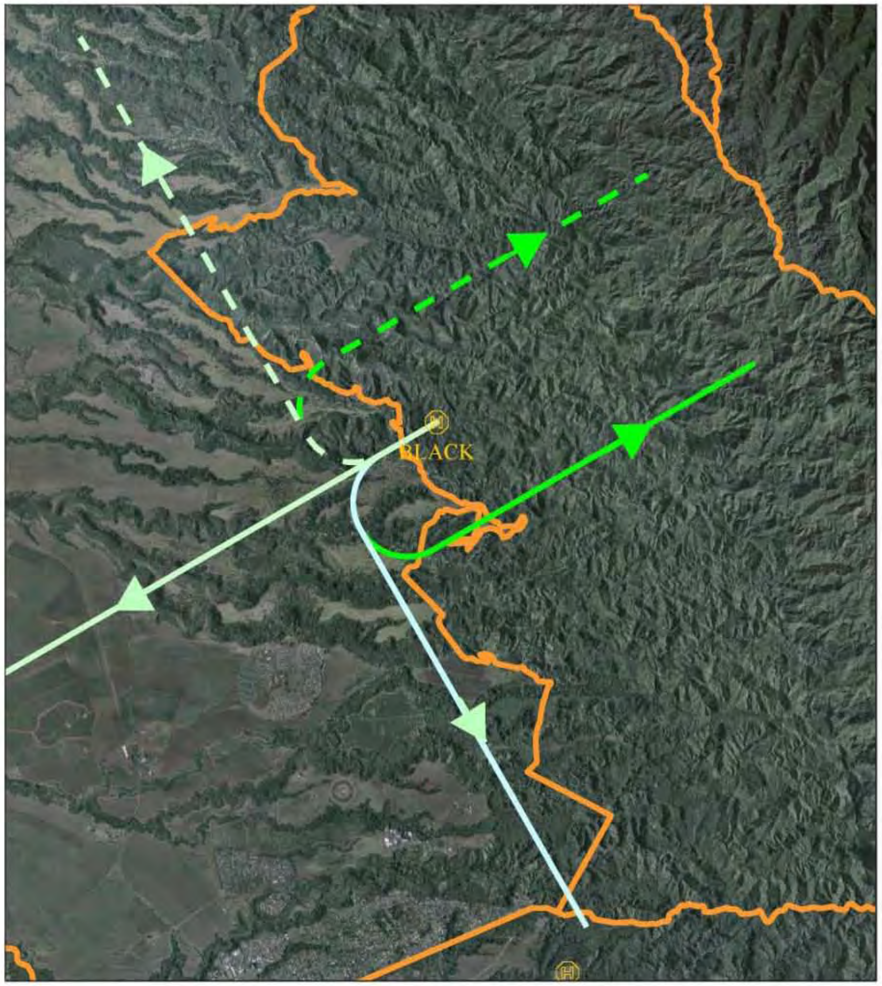
Modeled Helicopter Closed Pattern Flight Tracks at LZ Black
230 Degree Heading

N	0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000 Scale in Feet 1:72,000 (1 inch = 6,000 feet)

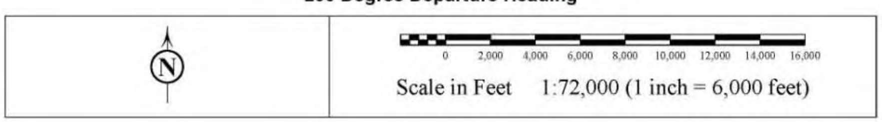


Modeled Helicopter Flight Tracks from LZ Black
050 Degree Departure Heading

N	0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000 Scale in Feet 1:72,000 (1 inch = 6,000 feet)



Modeled Helicopter Flight Tracks from LZ Black
230 Degree Departure Heading



D-2.3.1.3 KLOA – Modeled Flight Profiles

Flight Profile CBK05-1L3

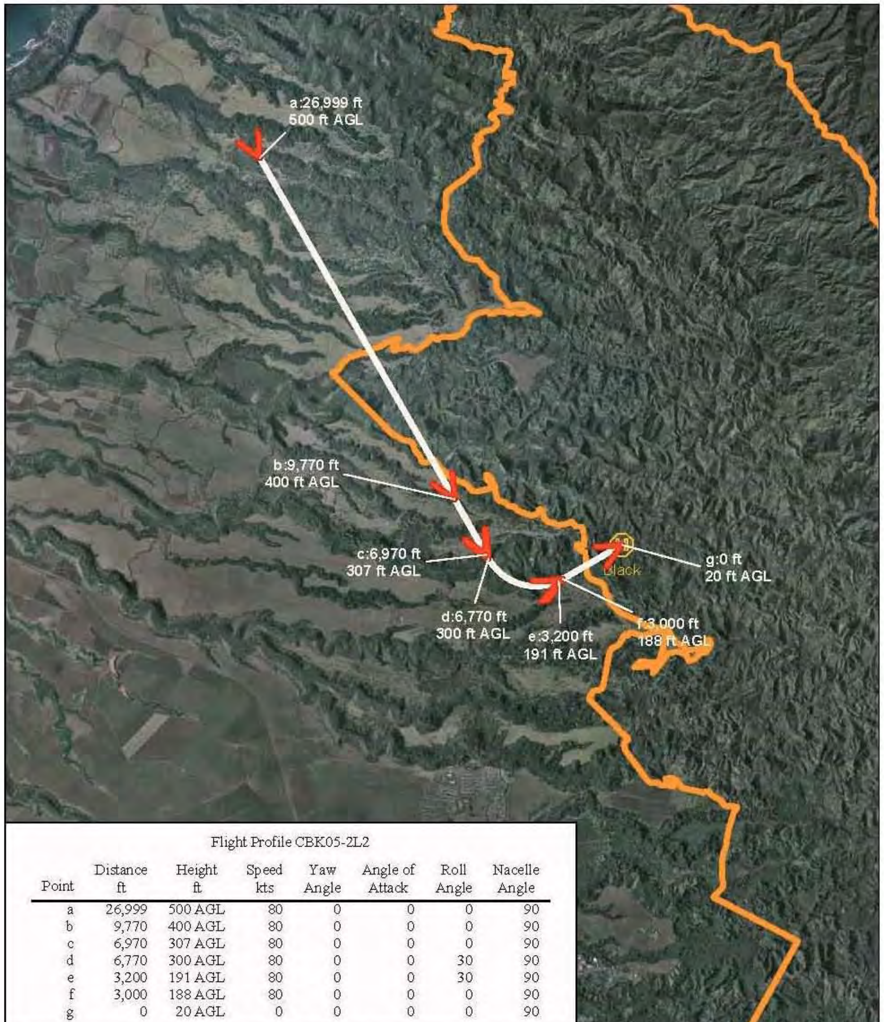
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle
a	26,999	500 AGL	80	0	0	0	90
b	18,940	400 AGL	80	0	0	0	90
c	16,540	300 AGL	80	0	0	0	90
d	13,540	300 AGL	80	0	0	0	90
e	10,740	300 AGL	80	0	0	0	90
f	10,540	300 AGL	80	0	0	30	90
g	3,200	191 AGL	80	0	0	30	90
h	3,000	188 AGL	80	0	0	0	90
i	0	20 AGL	0	0	0	0	90

KTA Flight Profile CBK05-1L3 - LZ Black - 180 deg Approach
CH-53
on Flight Track ABK05-1L - to 050 Heading

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000

Scale in Feet 1:48,000 (1 inch = 4,000 feet)

N



Flight Profile CBK05-2L2

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle
a	26,999	500 AGL	80	0	0	0	90
b	9,770	400 AGL	80	0	0	0	90
c	6,970	307 AGL	80	0	0	0	90
d	6,770	300 AGL	80	0	0	30	90
e	3,200	191 AGL	80	0	0	30	90
f	3,000	188 AGL	80	0	0	0	90
g	0	20 AGL	0	0	0	0	90

KTA Flight Profile CBK05-2L2 - LZ Black - 90 deg Approach

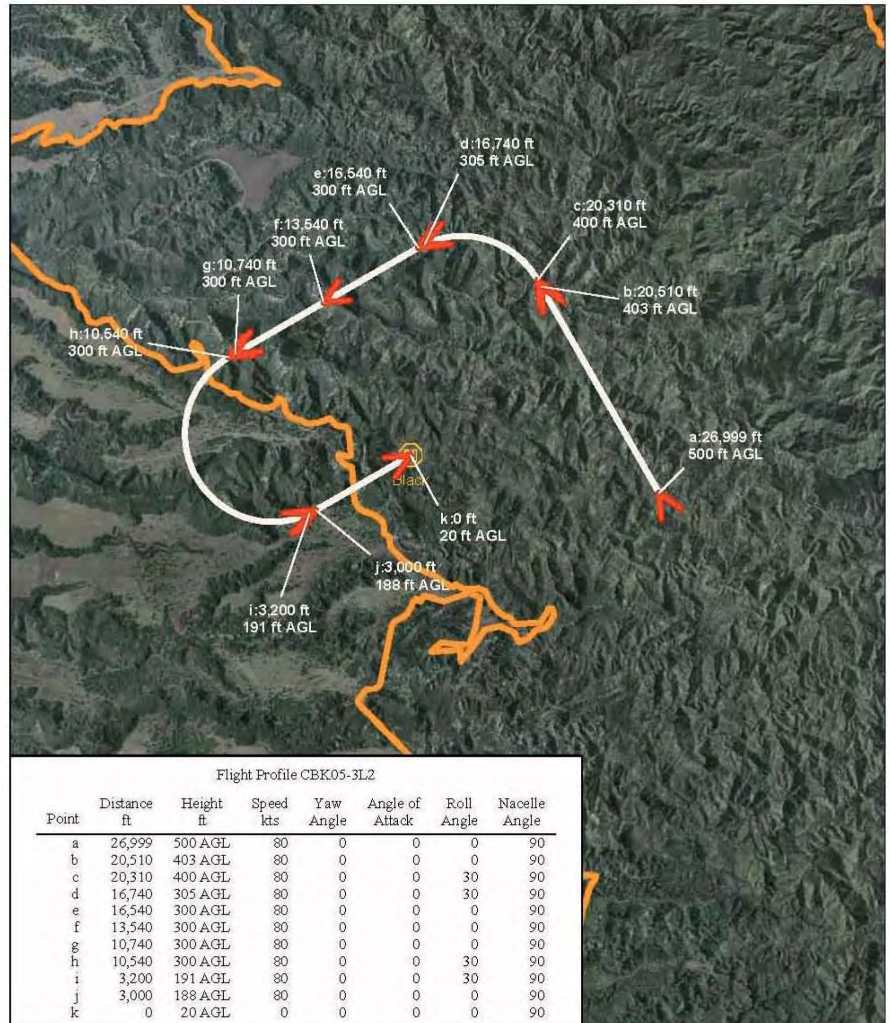
CH-53

on Flight Track ABK05-2L - to 050 Heading

0 4,000 8,000 12,000 16,000 20,000

Scale in Feet 1:71,100 (1 inch = 5,930 feet)

N



Flight Profile CBK05-3L2

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle
a	26,999	500 AGL	80	0	0	0	90
b	20,510	403 AGL	80	0	0	0	90
c	20,310	400 AGL	80	0	0	30	90
d	16,740	305 AGL	80	0	0	30	90
e	16,540	300 AGL	80	0	0	0	90
f	13,540	300 AGL	80	0	0	0	90
g	10,740	300 AGL	80	0	0	0	90
h	10,540	300 AGL	80	0	0	30	90
i	3,200	191 AGL	80	0	0	30	90
j	3,000	188 AGL	80	0	0	0	90
k	0	20 AGL	0	0	0	0	90

KTA Flight Profile CBK05-3L2 - LZ Black - 270 deg Approach

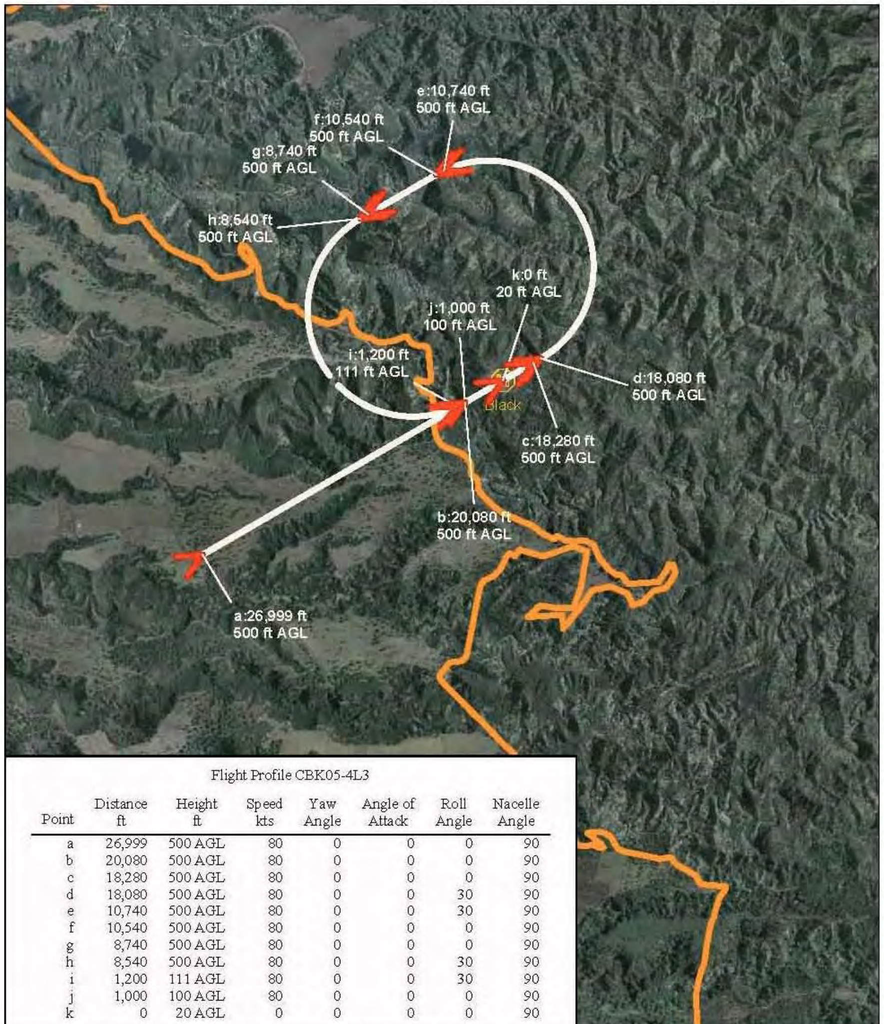
CH-53

on Flight Track ABK05-3L - to 050 Heading

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000

Scale in Feet 1:44,300 (1 inch = 3,690 feet)

N



Flight Profile CBK05-4L3

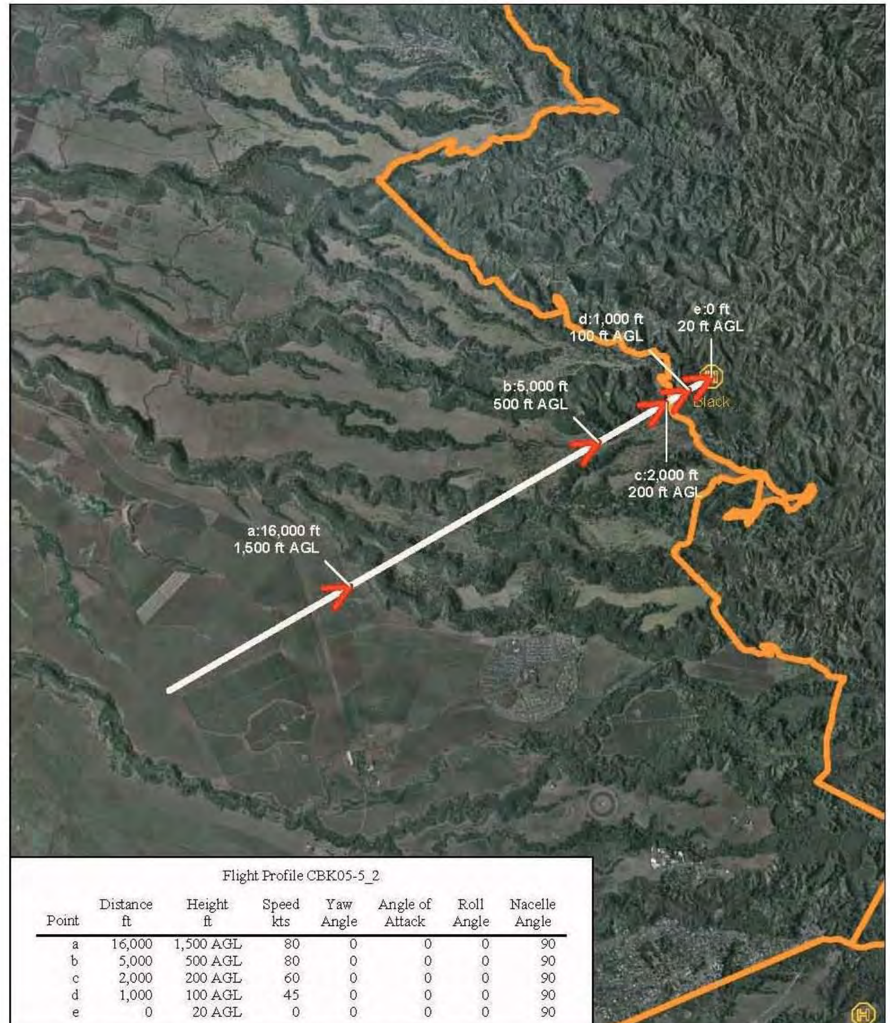
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle
a	26,999	500 AGL	80	0	0	0	90
b	20,080	500 AGL	80	0	0	0	90
c	18,280	500 AGL	80	0	0	0	90
d	18,080	500 AGL	80	0	0	30	90
e	10,740	500 AGL	80	0	0	30	90
f	10,540	500 AGL	80	0	0	0	90
g	8,740	500 AGL	80	0	0	0	90
h	8,540	500 AGL	80	0	0	30	90
i	1,200	111 AGL	80	0	0	30	90
j	1,000	100 AGL	80	0	0	0	90
k	0	20 AGL	0	0	0	0	90

KTA Flight Profile CBK05-4L3 - LZ Black - 360 deg Approach
CH-53
on Flight Track ABK05-4L - to 050 Heading

0 2,000 4,000 6,000 8,000 10,000 12,000

Scale in Feet 1:36,800 (1 inch = 3,070 feet)

N



Flight Profile CBK05-5_2

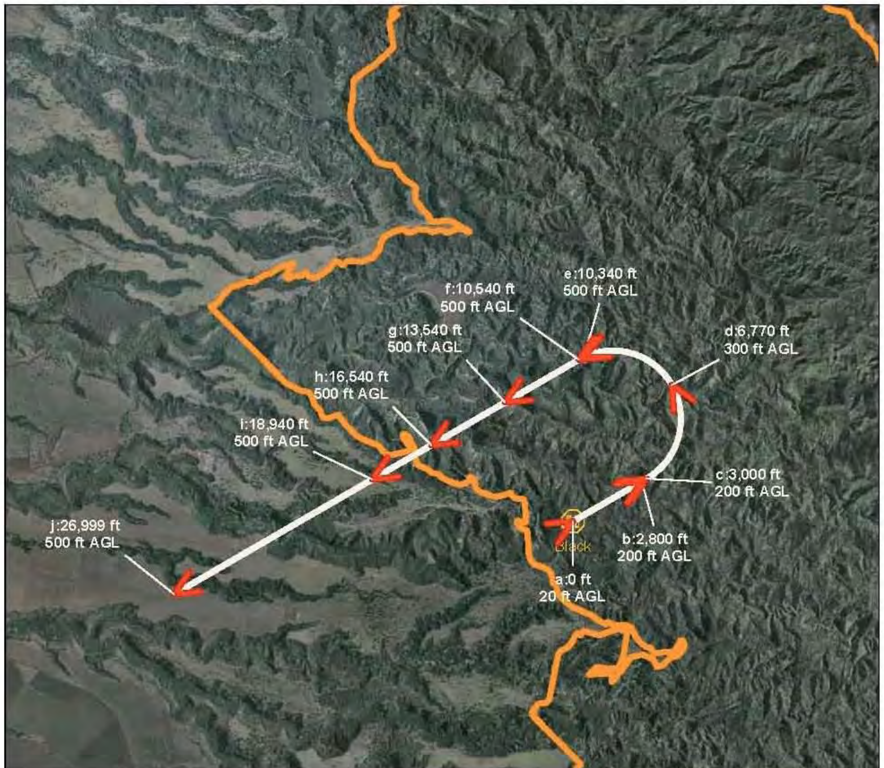
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle
a	16,000	1,500 AGL	80	0	0	0	90
b	5,000	500 AGL	80	0	0	0	90
c	2,000	200 AGL	60	0	0	0	90
d	1,000	100 AGL	45	0	0	0	90
e	0	20 AGL	0	0	0	0	90

KTA Flight Profile CBK05-5_2 - LZ Black - Straight-in Approach
CH-53
on Flight Track ABK05-5 - to 050 Heading

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000 18,000 20,000

Scale in Feet 1:61,900 (1 inch = 5,160 feet)

N



Flight Profile CBKD05-1L3

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle
a	0	20 AGL	0	0	0	0	90
b	2,800	200 AGL	80	0	0	0	90
c	3,000	200 AGL	80	0	0	30	90
d	6,770	300 AGL	80	0	0	30	90
e	10,340	500 AGL	80	0	0	30	90
f	10,540	500 AGL	80	0	0	0	90
g	13,540	500 AGL	80	0	0	0	90
h	16,540	500 AGL	80	0	0	0	90
i	18,940	500 AGL	80	0	0	0	90
j	26,999	500 AGL	80	0	0	0	90

KTA Flight Profile CBKD05-1L3 - LZ Black - 180 deg Departure
CH-53
on Flight Track ABKD05-1L - 050 Heading

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000 18,000

Scale in Feet 1:56,800 (1 inch = 4,740 feet)

N

Flight Profile CBKD05-2L3

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle
a	0	20 AGL	0	0	0	0	90
b	2,800	200 AGL	75	0	0	0	90
c	3,000	200 AGL	80	0	0	30	90
d	6,570	295 AGL	80	0	0	30	90
e	6,770	300 AGL	80	0	0	0	90
f	9,770	500 AGL	80	0	0	0	90
g	26,999	500 AGL	80	0	0	0	90

KTA Flight Profile CBKD05-2L3 - LZ Black - 90 deg Departure
CH-53
on Flight Track ABKD05-2L - 050 Heading

0 4,000 8,000 12,000 16,000 20,000 24,000

Scale in Feet 1:78,000 (1 inch = 6,500 feet)

N

Flight Profile CBKD05-5_3

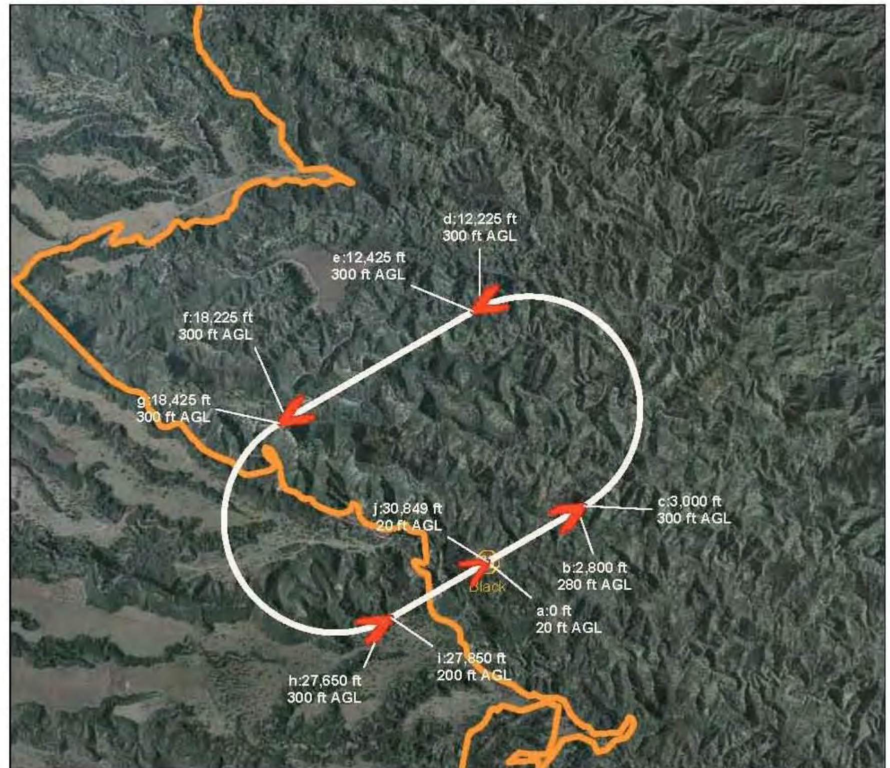
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	0	20 AGL	0	0	0	0	90	
b	3,000	200 AGL	80	0	0	0	90	
c	5,400	300 AGL	80	0	0	0	90	
d	17,400	1,100 AGL	80	0	0	0	90	Alitutude adjusted to avoide terrain
e	23,999	1,100 AGL	80	0	0	0	90	Alitutude adjusted to avoide terrain

KTA Flight Profile CBKD05-5_3 - LZ Black - Straight Departure
CH-53
on Flight Track ABKD05-5 - 050 Heading

0 4,000 8,000 12,000 16,000 20,000

Scale in Feet 1:65,500 (1 inch = 5,460 feet)

N



Flight Profile CBKT05-1L

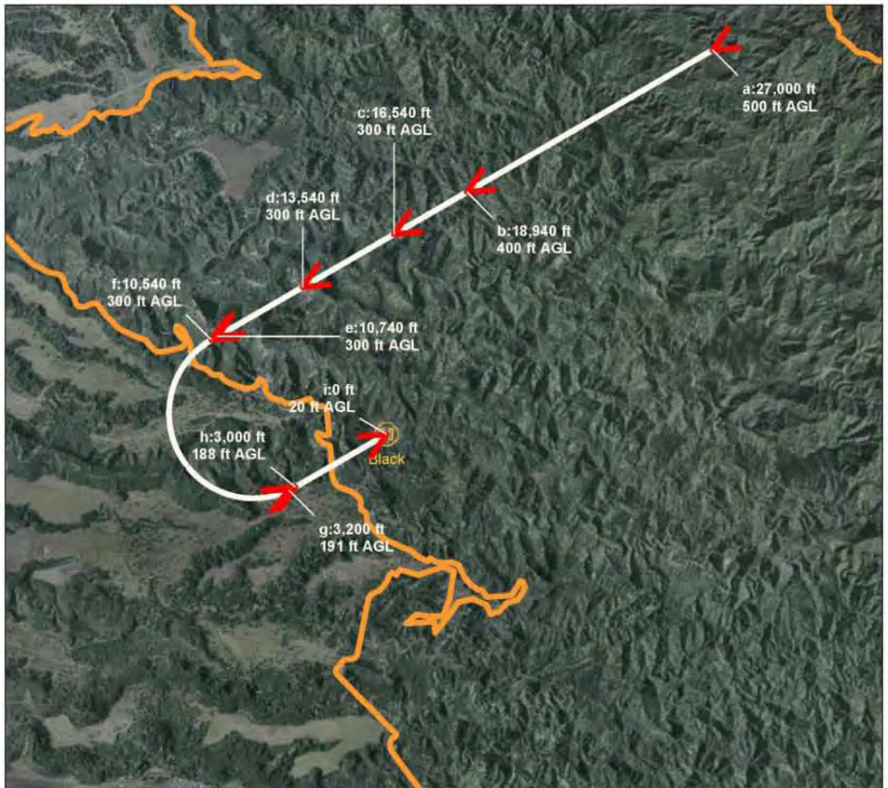
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle
a	0	20 AGL	5	0	0	0	90
b	2,800	280 AGL	68	0	0	0	90
c	3,000	300 AGL	71	0	0	25	90
d	12,225	300 AGL	80	0	0	25	90
e	12,425	300 AGL	80	0	0	0	90
f	18,225	300 AGL	80	0	0	0	90
g	18,425	300 AGL	80	0	0	25	90
h	27,650	300 AGL	80	0	0	25	90
i	27,850	200 AGL	80	0	0	0	90
j	30,849	20 AGL	5	0	0	0	90

KTA Flight Profile CBKT05-1L - LZ Black - Left Handed Pattern
CH-53
on Flight Track ABKT05-1L - 050 Heading

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000

Scale in Feet 1:43,400 (1 inch = 3,620 feet)

N



Flight Profile HBK05-1L3

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	27,000	500 AGL	80	0	0	0	90	
b	18,940	400 AGL	80	0	0	0	90	
c	16,540	300 AGL	80	0	0	0	90	
d	13,540	300 AGL	80	0	0	0	90	
e	10,740	300 AGL	80	0	0	0	90	begin to roll
f	10,540	300 AGL	80	0	0	30	90	reach 30 deg roll angle; begin turn
g	3,200	191 AGL	80	0	0	30	90	begin roll to wings level
h	3,000	188 AGL	80	0	0	0	90	end turn; wings level
i	0	20 AGL	0	0	0	0	90	

KTA Flight Profile HBK05-1L3 - LZ Black - 180 deg Approach
Army and HIARNG Helicopters - Modeled as SH-60B
on Flight Track ABK05-1L - to 050 Heading

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000

Scale in Feet 1:46,100 (1 inch = 3,840 feet)

N

Flight Profile HBK05-2L2

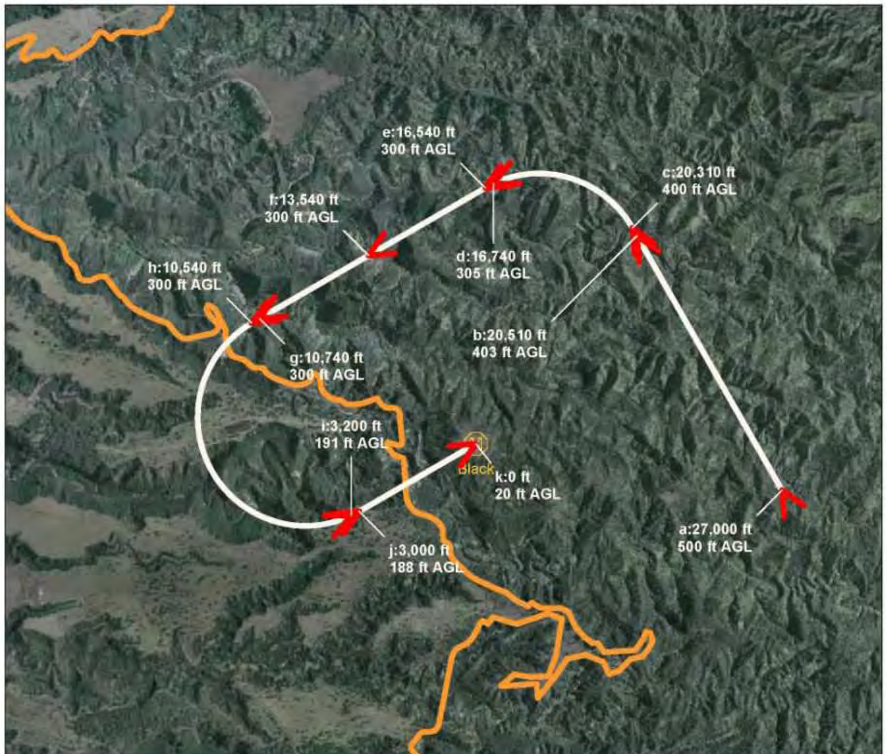
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	27,000	500 AGL	80	0	0	0	90	
b	9,770	400 AGL	80	0	0	0	90	
c	6,970	307 AGL	80	0	0	0	90	begin to roll
d	6,770	300 AGL	80	0	0	30	90	reach 30 deg roll angle; begin turn
e	3,200	191 AGL	80	0	0	30	90	begin roll to wings level
f	3,000	188 AGL	80	0	0	0	90	end turn; wings level
g	0	20 AGL	0	0	0	0	90	

KTA Flight Profile HBK05-2L2 - LZ Black - 90 deg Approach
Army and HIARNG Helicopters - Modeled as SH-60B
on Flight Track ABK05-2L - to 050 Heading

0 4,000 8,000 12,000 16,000 20,000 24,000

Scale in Feet 1:77,000 (1 inch = 6,420 feet)

N



Flight Profile HBK05-3L2

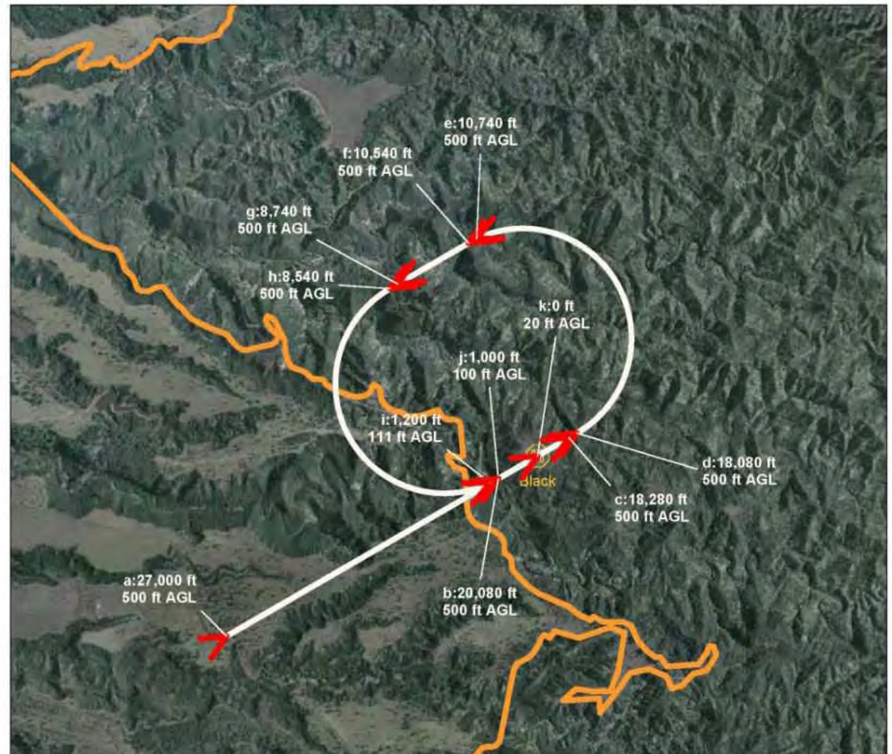
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	27,000	500 AGL	80	0	0	0	90	
b	20,510	403 AGL	80	0	0	0	90	begin to roll
c	20,310	400 AGL	80	0	0	30	90	reach 30 deg roll angle; begin turn
d	16,740	305 AGL	80	0	0	30	90	begin roll to wings level
e	16,540	300 AGL	80	0	0	0	90	end turn; wings level
f	13,540	300 AGL	80	0	0	0	90	
g	10,740	300 AGL	80	0	0	0	90	begin to roll
h	10,540	300 AGL	80	0	0	30	90	reach 30 deg roll angle; begin turn
i	3,200	191 AGL	80	0	0	30	90	begin roll to wings level
j	3,000	188 AGL	80	0	0	0	90	end turn; wings level
k	0	20 AGL	0	0	0	0	90	

KTA Flight Profile HBK05-3L2 - LZ Black - 270 deg Approach
Army and HIARNG Helicopters - Modeled as SH-60B
on Flight Track ABK05-3L - to 050 Heading

0 2,000 4,000 6,000 8,000 10,000

Scale in Feet 1:36,100 (1 inch = 3,000 feet)

N



Flight Profile HBK05-4L3

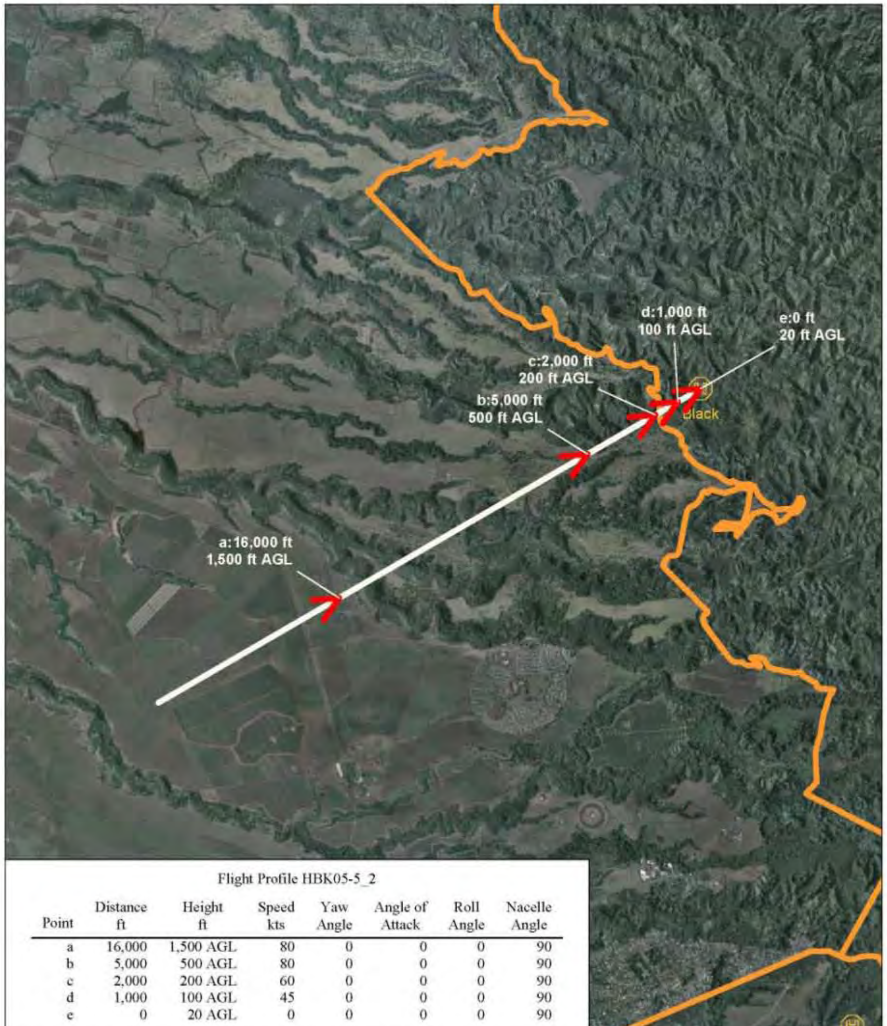
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	27,000	500 AGL	80	0	0	0	90	
b	20,080	500 AGL	80	0	0	0	90	
c	18,280	500 AGL	80	0	0	0	90	begin to roll
d	18,080	500 AGL	80	0	0	30	90	reach 30 deg roll angle; begin turn
e	10,740	500 AGL	80	0	0	30	90	begin roll to wings level
f	10,540	500 AGL	80	0	0	0	90	end turn; wings level
g	8,740	500 AGL	80	0	0	0	90	begin to roll
h	8,540	500 AGL	80	0	0	30	90	reach 30 deg roll angle; begin turn
i	1,200	111 AGL	80	0	0	30	90	begin roll to wings level
j	1,000	100 AGL	80	0	0	0	90	end turn; wings level
k	0	20 AGL	0	0	0	0	90	

KTA Flight Profile HBK05-4L3 - LZ Black - 360 deg Approach
Army and HIARNG Helicopters - Modeled as SH-60B
on Flight Track ABK05-4L - to 050 Heading

0 2,000 4,000 6,000 8,000 10,000

Scale in Feet 1:35,700 (1 inch = 2,980 feet)

N



Flight Profile HBK05-5_2

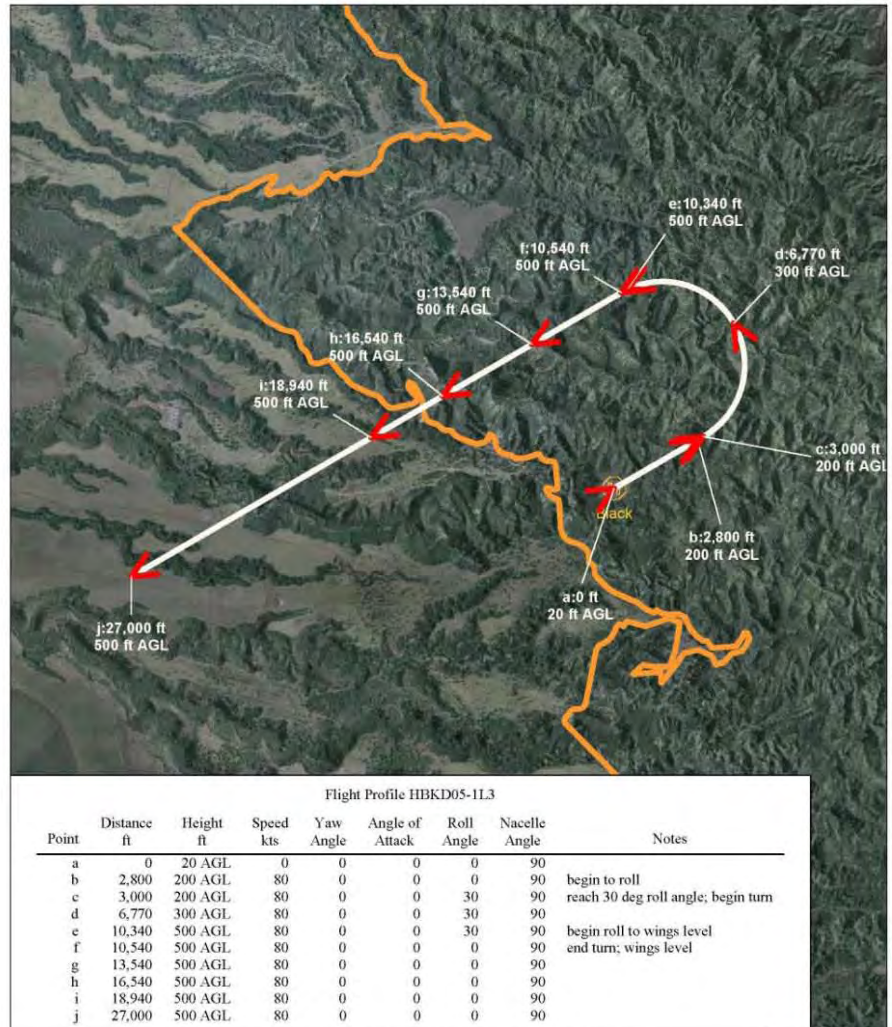
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle
a	16,000	1,500 AGL	80	0	0	0	90
b	5,000	500 AGL	80	0	0	0	90
c	2,000	200 AGL	60	0	0	0	90
d	1,000	100 AGL	45	0	0	0	90
e	0	20 AGL	0	0	0	0	90

KTA Flight Profile HBK05-5_2 - LZ Black - Straight-in Approach
Army and HIARNG Helicopters - Modeled as SH-60B
on Flight Track ABK05-5 - to 050 Heading

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000 18,000 20,000

Scale in Feet 1:62,100 (1 inch = 5,180 feet)

N



Flight Profile HBKD05-1L3

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	0	20 AGL	0	0	0	0	90	
b	2,800	200 AGL	80	0	0	0	90	begin to roll
c	3,000	200 AGL	80	0	0	30	90	reach 30 deg roll angle; begin turn
d	6,770	300 AGL	80	0	0	30	90	
e	10,340	500 AGL	80	0	0	30	90	begin roll to wings level
f	10,540	500 AGL	80	0	0	0	90	end turn; wings level
g	13,540	500 AGL	80	0	0	0	90	
h	16,540	500 AGL	80	0	0	0	90	
i	18,940	500 AGL	80	0	0	0	90	
j	27,000	500 AGL	80	0	0	0	90	

KTA Flight Profile HBKD05-1L3 - LZ Black - 180 deg Departure
Army and HIARNG Helicopters - Modeled as SH-60B
on Flight Track ABKD05-1L - 050 Heading

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000

Scale in Feet 1:47,100 (1 inch = 3,930 feet)

N

Flight Profile HBKD05-2L3

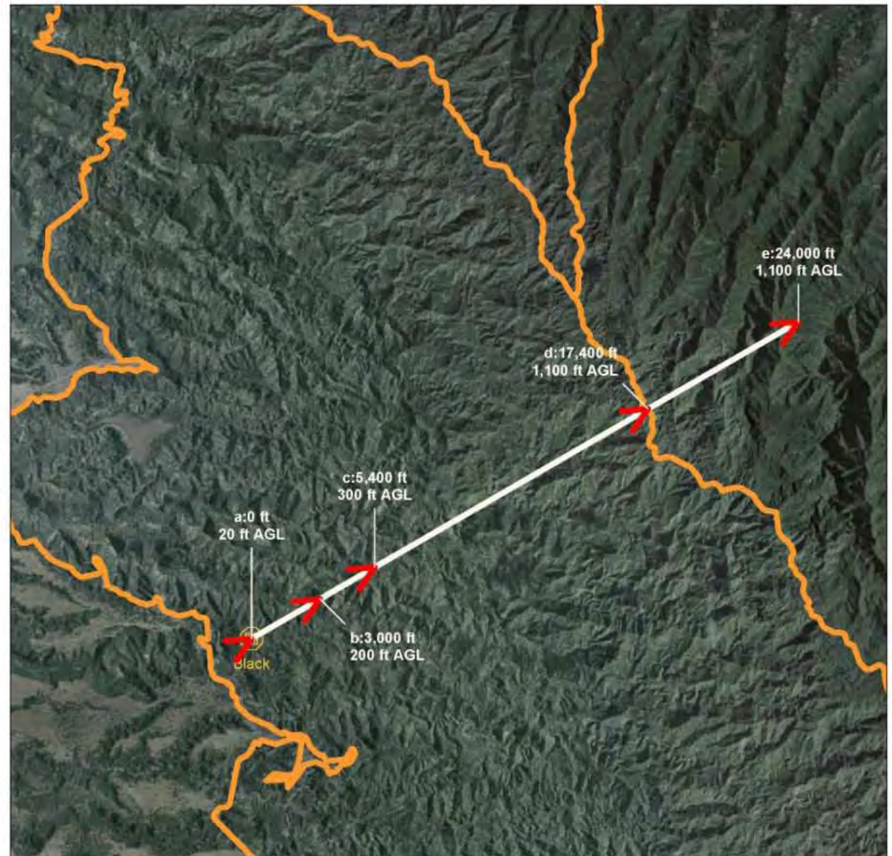
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	0	20 AGL	0	0	0	0	90	
b	2,800	200 AGL	75	0	0	0	90	begin to roll
c	3,000	200 AGL	80	0	0	30	90	reach 30 deg roll angle; begin turn
d	6,570	295 AGL	80	0	0	30	90	begin roll to wings level
e	6,770	300 AGL	80	0	0	0	90	end turn; wings level
f	9,770	500 AGL	80	0	0	0	90	
g	27,000	500 AGL	80	0	0	0	90	

KTA Flight Profile HBKD05-2L3 - LZ Black - 90 deg Departure
Army and HIARNG Helicopters - Modeled as SH-60B
on Flight Track ABKD05-2L - 050 Heading

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000

Scale in Feet 1:95,400 (1 inch = 7,950 feet)

N



Flight Profile HBKD05-5_3

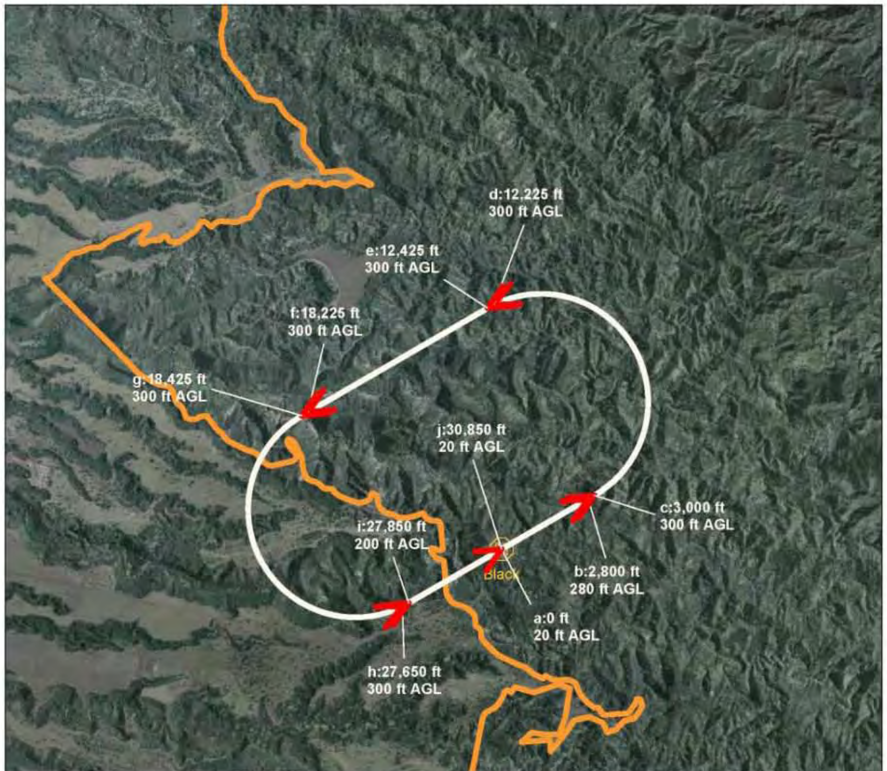
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	0	20 AGL	0	0	0	0	90	
b	3,000	200 AGL	80	0	0	0	90	
c	5,400	300 AGL	80	0	0	0	90	
d	17,400	1,100 AGL	80	0	0	0	90	added pt to avoid terrain
e	24,000	1,100 AGL	80	0	0	0	90	

KTA Flight Profile HBKD05-5_3 - LZ Black - Straight Departure
Army and HIARNG Helicopters - Modeled as SH-60B
on Flight Track ABKD05-5 - 050 Heading

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000 18,000 20,000

Scale in Feet 1:61,600 (1 inch = 5,130 feet)

N



Flight Profile HBKT05-1L

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	0	20 AGL	5	0	0	0	90	
b	2,800	280 AGL	68	0	0	0	90	begin roll
c	3,000	300 AGL	71	0	0	25	90	reach roll angle; begin turn
d	12,225	300 AGL	80	0	0	25	90	begin to roll to wings level
e	12,425	300 AGL	80	0	0	0	90	wings level
f	18,225	300 AGL	80	0	0	0	90	begin roll
g	18,425	300 AGL	80	0	0	25	90	reach roll angle; begin turn
h	27,650	300 AGL	80	0	0	25	90	begin to roll to wings level
i	27,850	200 AGL	80	0	0	0	90	wings level
j	30,850	20 AGL	5	0	0	0	90	

KTA Flight Profile HBKT05-1L - LZ Black - Left Handed Pattern

Army and HIARNG Helicopters - Modeled as SH-60B

on Flight Track ABKT05-1L - 050 Heading

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000

Scale in Feet 1:45,300 (1 inch = 3,780 feet)

N

D-2.3.2 KLOA ALTERNATIVES A/B

D-2.3.2.1 Flight Track Utilization and Modeled Events

Table 2.3-3 Modeled Daily Events for Helicopters at LZ Black for Busiest Month for Alternatives A/B

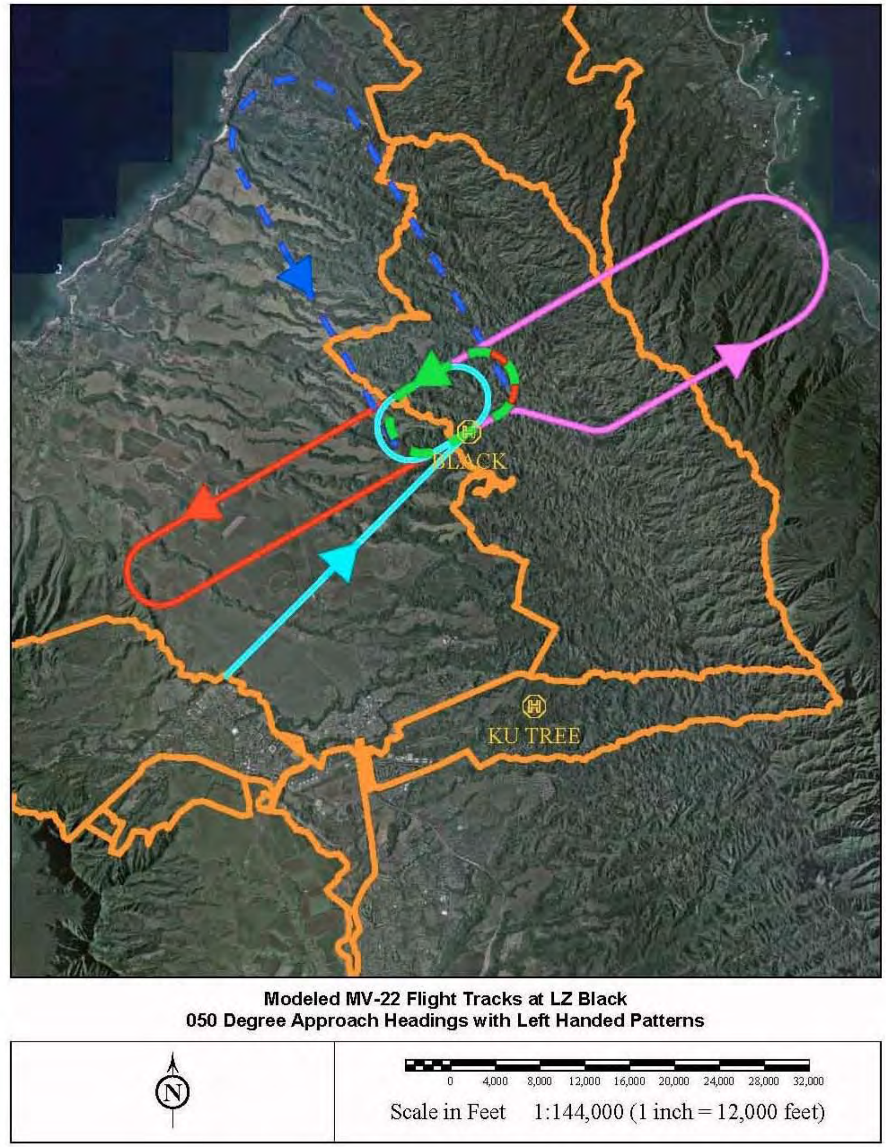
Heading	Op Type	Turn Direction	Track Type	Track ID	CH-53 Profile ID	Day	Night	AH-1/ UH-1 Profile ID	Day	Night	Army Helos Profile ID	Day	Night
50	Ingress	Straight In	Straight In	ABK08-5	CBK05-5_2	0.075804	0.002213	ABK05-5_2	0.017891	0.000553	HBK05-5_2	0.402076	0.006824
		Left	180 deg	ABK08-1L	CBK05-1L3	0.018951	0.000553	ABK05-1L3	0.004473	0.000138	HBK05-1L3	0.100519	0.001706
			90 deg	ABK08-2L	CBK05-2L2	0.018951	0.000553	ABK05-2L2	0.004473	0.000138	HBK05-2L2	0.100519	0.001706
			270 deg	ABK08-3L	CBK05-3L2	0.018951	0.000553	ABK05-3L2	0.004473	0.000138	HBK05-3L2	0.100519	0.001706
			Hasty	ABK08-4L	CBK05-4L3	0.018951	0.000553	ABK05-4L3	0.004473	0.000138	HBK05-4L3	0.100519	0.001706
		Right	180 deg	ABK08-1R	CBK05-1R3	0.019525	0.000570	ABK05-1R3	0.004608	0.000143	HBK05-1R3	0.103565	0.001758
			90 deg	ABK08-2R	CBK05-2R2	0.019525	0.000570	ABK05-2R2	0.004608	0.000143	HBK05-2R2	0.103565	0.001758
			270 deg	ABK08-3R	CBK05-3R2	0.019525	0.000570	ABK05-3R2	0.004608	0.000143	HBK05-3R2	0.103565	0.001758
			Hasty	ABK08-4R	CBK05-4R3	0.019525	0.000570	ABK05-4R3	0.004608	0.000143	HBK05-4R3	0.103565	0.001758
	Pattern	Left	Left Pattern	ABKT08-1L	CBKT05-1L	0.459419	0.013414	ABKT05-1L	0.108427	0.003353	HBKT05-1L	2.436822	0.041359
		Right	Right Pattern	ABKT08-1R	CBKT05-1R	0.459419	0.013414	ABKT05-1R	0.108427	0.003353	HBKT05-1R	2.436822	0.041359
	Egress	Left	Departure	ABKD08-1L	CBKD05-1L3	0.037902	0.001107	ABKD05-1L3	0.008945	0.000277	HBKD05-1L3	0.201038	0.003412
			Departure	ABKD08-2L	CBKD05-2L3	0.037902	0.001107	ABKD05-2L3	0.008945	0.000277	HBKD05-2L3	0.201038	0.003412
		Right	Departure	ABKD08-1R	CBKD05-1R3	0.037902	0.001107	ABKD05-1R3	0.008945	0.000277	HBKD05-1R3	0.201038	0.003412
			Departure	ABKD08-2R	CBKD05-2R3	0.037902	0.001107	ABKD05-2R3	0.008945	0.000277	HBKD05-2R3	0.201038	0.003412
		Straight Out	Straight Out	ABKD08-5	CBKD05-5_3	0.078101	0.002280	ABKD05-5_3	0.018433	0.000570	HBKD05-5_3	0.414260	0.007031
230	Ingress	Straight In	Straight In	ABK26-5	CBK23-5_2	0.013783	0.000402	ABK23-5_2	0.003253	0.000101	HBK23-5_2	0.073105	0.001241
		Left	180 deg	ABK26-1L	CBK23-1L3	0.003344	0.000098	ABK23-1L3	0.000789	0.000024	HBK23-1L3	0.017739	0.000301
			90 deg	ABK26-2L	CBK23-2L2	0.003344	0.000098	ABK23-2L2	0.000789	0.000024	HBK23-2L2	0.017739	0.000301
			270 deg	ABK26-3L	CBK23-3L2	0.003344	0.000098	ABK23-3L2	0.000789	0.000024	HBK23-3L2	0.017739	0.000301
			Hasty	ABK26-4L	CBK23-4L3	0.003344	0.000098	ABK23-4L3	0.000789	0.000024	HBK23-4L3	0.017739	0.000301
		Right	180 deg	ABK26-1R	CBK23-1R3	0.003344	0.000098	ABK23-1R3	0.000789	0.000024	HBK23-1R3	0.017739	0.000301
			90 deg	ABK26-2R	CBK23-2R2	0.003344	0.000098	ABK23-2R2	0.000789	0.000024	HBK23-2R2	0.017739	0.000301
			270 deg	ABK26-3R	CBK23-3R2	0.003344	0.000098	ABK23-3R2	0.000789	0.000024	HBK23-3R2	0.017739	0.000301
			Hasty	ABK26-4R	CBK23-4R3	0.003344	0.000098	ABK23-4R3	0.000789	0.000024	HBK23-4R3	0.017739	0.000301
	Pattern	Left	Left Pattern	ABKT26-1L	CBKT23-1L	0.081074	0.002367	ABKT23-1L	0.019134	0.000592	HBKT23-1L	0.430027	0.007299
		Right	Right Pattern	ABKT26-1R	CBKT23-1R	0.081074	0.002367	ABKT23-1R	0.019134	0.000592	HBKT23-1R	0.430027	0.007299
	Egress	Left	Departure	ABKD26-1L	CBKD23-1L3	0.006689	0.000195	ABKD23-1L3	0.001579	0.000049	HBKD23-1L3	0.035477	0.000602
			Departure	ABKD26-2L	CBKD23-2L3	0.006689	0.000195	ABKD23-2L3	0.001579	0.000049	HBKD23-2L3	0.035477	0.000602
		Right	Departure	ABKD26-1R	CBKD23-1R3	0.006689	0.000195	ABKD23-1R3	0.001579	0.000049	HBKD23-1R3	0.035477	0.000602
			Departure	ABKD26-2R	CBKD23-2R3	0.006689	0.000195	ABKD23-2R3	0.001579	0.000049	HBKD23-2R3	0.035477	0.000602
		Straight Out	Straight Out	ABKD26-5	CBKD23-5_3	0.013783	0.000402	ABKD23-5_3	0.003253	0.000101	HBKD23-5_3	0.073105	0.001241

Table 2.3-4 Modeled Daily Events for MV-22 at LZ Black for Busiest Month for Alternative A/B

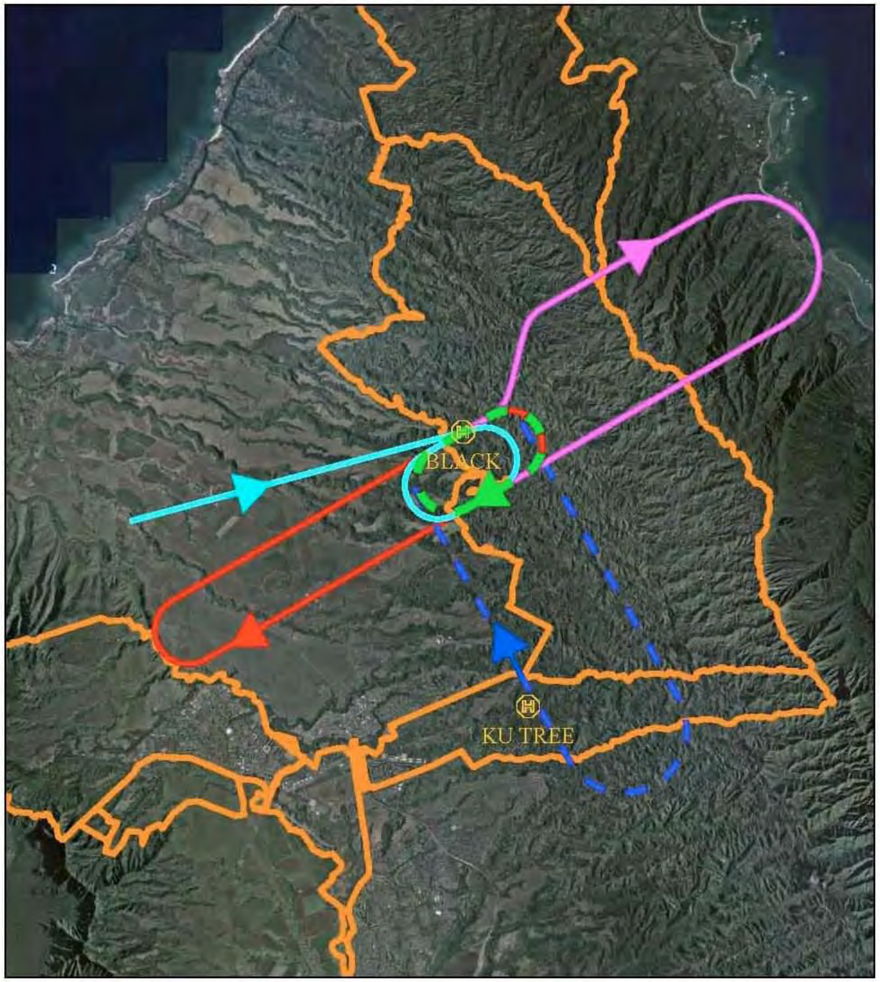
LZ Name	Heading	Heading Utilization	Turn Direction	Direction Utilization	Profile Type	Type Utilization	Track ID	Profile ID	Day	Night
Black	080	85%	Left	50%	Straight in	28.6%	BK05-1L	BK05-1L	0.0998	0.0447
					90 deg	28.6%	BK05-2L	BK05-2L	0.0998	0.0447
					180 deg	14.3%	BK05-3L	BK05-3L	0.0499	0.0224
					Hasty	14.3%	BK05-4L	BK05-4L	0.0499	0.0224
					Conversion	14.3%	BK05-5L	BK05-5L	0.0499	0.0224
			Right	50%	Straight in	28.6%	BK05-1R	BK05-1R	0.0998	0.0447
					90 deg	28.6%	BK05-2R	BK05-2R	0.0998	0.0447
					180 deg	14.3%	BK05-3R	BK05-3R	0.0499	0.0224
					Hasty	14.3%	BK05-4R	BK05-4R	0.0499	0.0224
					Conversion	14.3%	BK05-5R	BK05-5R	0.0499	0.0224
	260	15%	Left	50%	Straight in	28.6%	BK23-1L	BK23-1L	0.0176	0.0079
					90 deg	28.6%	BK23-2L	BK23-2L	0.0176	0.0079
					180 deg	14.3%	BK23-3L	BK23-3L	0.0088	0.0039
					Hasty	14.3%	BK23-4L	BK23-4L	0.0088	0.0039
					Conversion	14.3%	BK23-5L	BK23-5L	0.0088	0.0039
			Right	50%	Straight in	28.6%	BK23-1R	BK23-1R	0.0176	0.0079
					90 deg	28.6%	BK23-2R	BK23-2R	0.0176	0.0079
					180 deg	14.3%	BK23-3R	BK23-3R	0.0088	0.0039
					Hasty	14.3%	BK23-4R	BK23-4R	0.0088	0.0039
					Conversion	14.3%	BK23-5R	BK23-5R	0.0088	0.0039

Notes: (1) LZ Black shown above
(2) All other LZs at SB East Range and Kalaupapa use the same track utilization

D-2.3.2.1 KLOA – Modeled Flight Tracks (MV-22 only)



Modeled MV-22 Flight Tracks at LZ Black
050 Degree Approach Headings with Left Handed Patterns

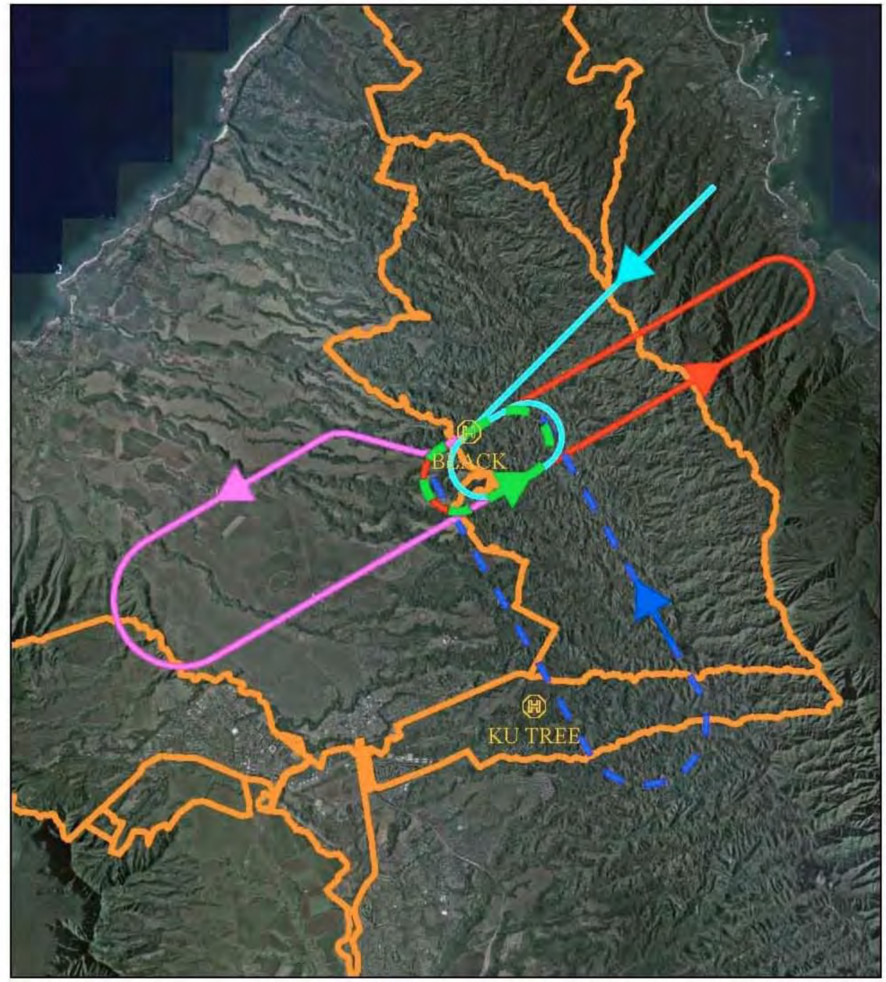


Modeled MV-22 Flight Tracks at LZ Black
050 Degree Approach Headings with Right Handed Patterns

N

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000

Scale in Feet 1:144,000 (1 inch = 12,000 feet)

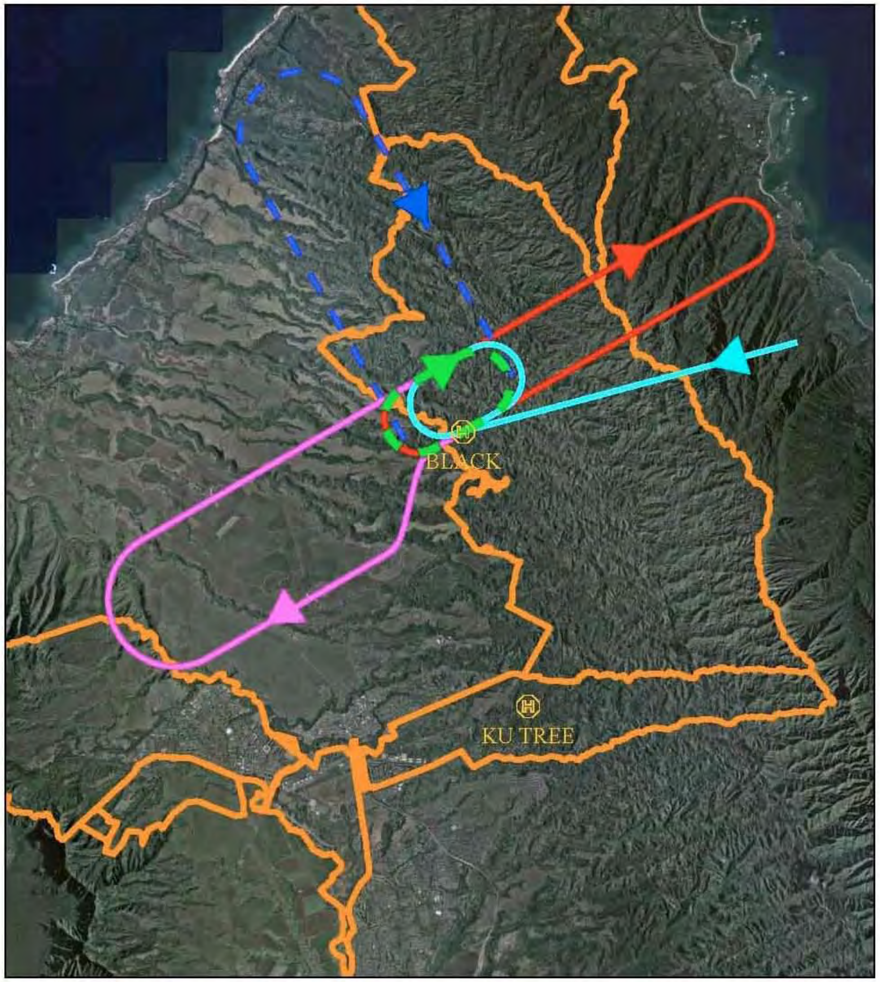


Modeled MV-22 Flight Tracks at LZ Black
230 Degree Approach Headings with Left Handed Patterns

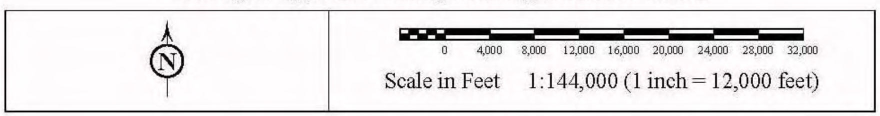
N

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000

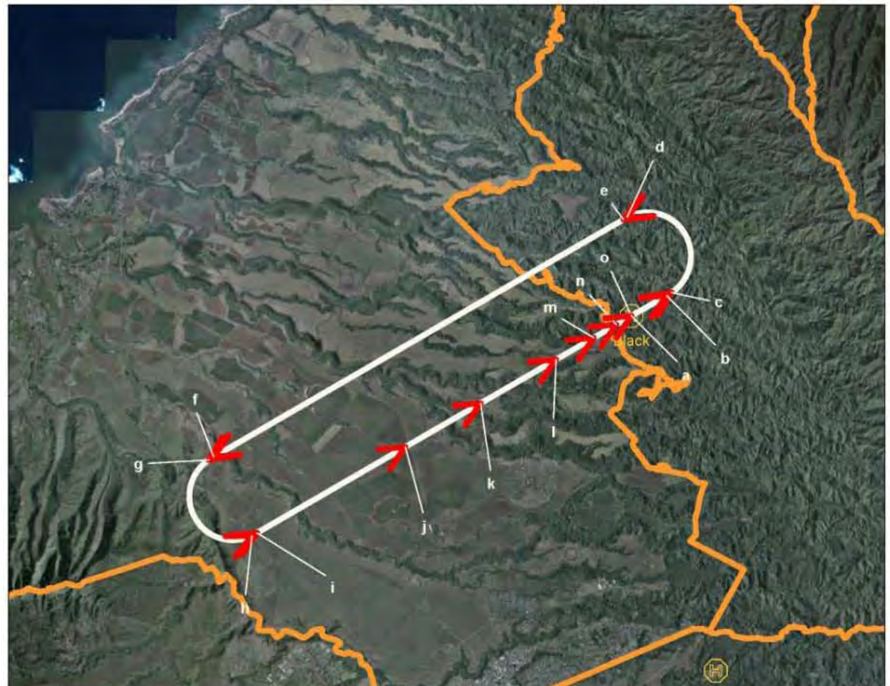
Scale in Feet 1:144,000 (1 inch = 12,000 feet)



Modeled MV-22 Flight Tracks at LZ Black
230 Degree Approach Headings with Right Handed Patterns



D-2.3.2.3 KLOA Modeled Flight Profiles (MV-22 and AH/UH-1 only)



Flight Profile BK05-1L

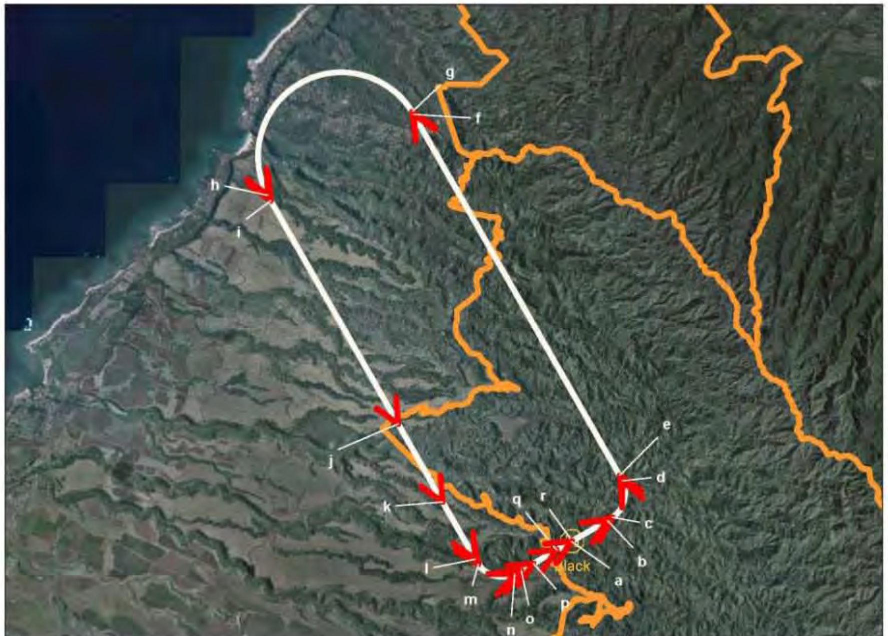
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	84,850	20 AGL	5	0	0	0	90	depart LZ and climb to 500' AGL within about 0.5NM
b	82,050	500 AGL	170	0	0	0	90	begin roll prior to turn
c	81,650	500 AGL	170	0	0	25	90	begin turn to downwind
d	72,525	500 AGL	200	0	0	25	90	start roll out to wings level
e	72,225	500 AGL	200	0	0	0	90	begin downwind
f	39,625	500 AGL	200	0	0	0	90	begin roll prior to turn
g	39,225	500 AGL	200	0	0	25	90	@ ~5NM from LZ begin crosswind turn to final
h	30,200	500 AGL	200	0	0	25	90	start roll out to wings level
i	29,800	500 AGL	200	0	0	0	90	begin final
j	18,000	300 AGL	220	0	0	0	90	hold alt and begin slow down ro 100 kts @ 1NM
k	12,000	300 AGL	200	0	0	0	90	
l	6,000	300 AGL	100	0	0	0	90	
m	3,000	200 AGL	80	0	0	0	90	
n	1,200	150 AGL	50	0	0	0	90	300 fpm desc; 6deg gs
o	0	20 AGL	5	0	0	0	90	5 knot stop

LZ Black Flight Profile BK05-1L - LZ Black - Arrival (SI) to the North Left
MV-22
on Flight Track BK05_1L - LZ Black - Arrival (SI) to the North Left

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000

Scale in Feet 1:112,000 (1 inch = 9,300 feet)

N



Flight Profile BK05-2L

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	87,129	20 AGL	5	0	0	0	87	depart LZ and climb to 500' AGL within about 0.5NM
b	84,329	500 AGL	170	0	0	0	0	begin to roll
c	83,929	500 AGL	170	0	0	25	0	begin turn to downwind
d	81,188	500 AGL	200	0	-1	25	0	start roll out to wings level
e	80,788	500 AGL	200	0	-1	0	0	start downwind
f	52,988	500 AGL	200	0	-1	0	0	begin roll
g	52,788	500 AGL	200	0	-1	25	0	@ ~5NM from LZ begin turn back towards LZ
h	35,595	500 AGL	200	0	-1	25	0	start roll out to wings level
i	35,195	500 AGL	200	0	-1	0	0	begin final
j	18,000	300 AGL	220	0	-1	0	0	hold alt and begin slow down ro 100 kts @ 1NM
k	12,000	300 AGL	200	0	-1	0	0	
l	7,595	300 AGL	170	0	-1	0	0	begin roll prior to turn
m	7,195	300 AGL	170	0	-1	25	0	begin turn to final
n	4,453	300 AGL	100	0	-1	25	65	start roll out to wings level
o	3,953	300 AGL	100	0	-1	0	65	on final with wings level
p	3,000	200 AGL	80	0	-1	0	85	
q	1,200	150 AGL	50	0	5	0	90	300 fpm desc; 6deg gs
r	0	20 AGL	5	0	0	0	90	5 knot stop

LZ Black Flight Profile BK05-2L - LZ Black - Arrival (90deg) to the North Left

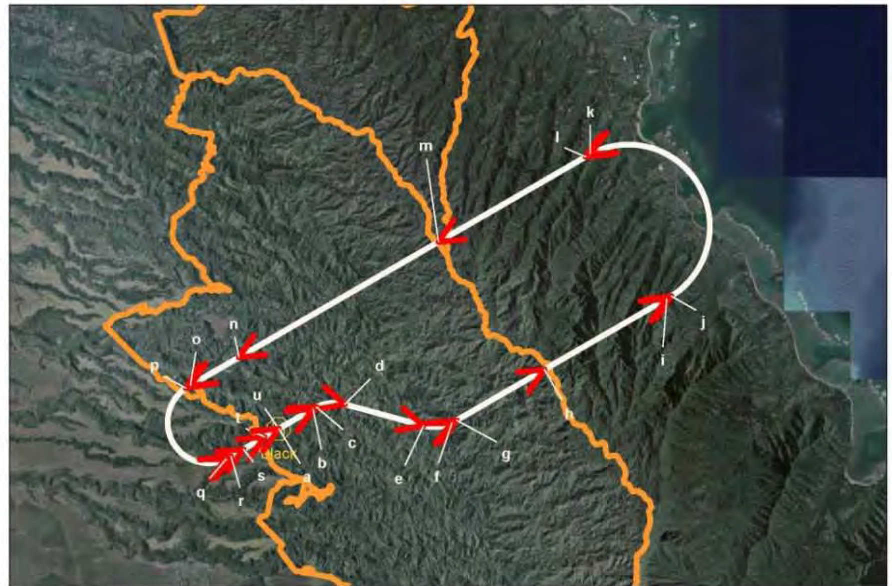
MV-22

on Flight Track BK05_2L - LZ Black - Arrival (90deg) to the North Left

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000

Scale in Feet 1:109,000 (1 inch = 9,080 feet)

N



Flight Profile BK05-3L

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	98,490	20 AGL	5	0	0	0	87	depart LZ and climb to 500' AGL within about 0.5N
b	95,590	500 AGL	170	0	0	0	0	begin roll prior to turn
c	95,290	500 AGL	170	0	0	-25	0	begin turn towards outbound
d	93,134	500 AGL	170	0	0	-25	0	
e	87,134	700 AGL	170	0	0	25	0	begin turn to outbound of 1NM abeam of reference
f	84,977	700 AGL	200	0	-1	25	0	start roll out to wings level
g	84,577	700 AGL	200	0	-1	0	0	begin outbound
h	77,118	1,100 AGL	200	0	-1	0	0	Point added to ensure avoidance of terrain
i	66,727	700 AGL	200	0	-1	0	0	begin roll prior to turn
j	66,327	700 AGL	200	0	-1	25	0	@ ~5NM from LZ begin crosswind turn to inbound
k	47,878	700 AGL	200	0	-1	25	0	start roll out to wings level
l	47,478	700 AGL	200	0	-1	0	0	begin inbound
m	34,968	700 AGL	200	0	-1	0	0	Point added to ensure avoidance of terrain
n	18,000	300 AGL	220	0	-1	0	0	hold alt and begin slow down ro 100 kts @ 1NM
o	13,878	300 AGL	170	0	-1	0	0	
p	13,478	300 AGL	170	0	-1	25	0	
q	4,453	300 AGL	100	0	-1	25	65	begin roll out
r	4,053	300 AGL	100	0	-1	0	65	begin final
s	3,000	200 AGL	80	0	-1	0	85	
t	1,200	150 AGL	50	0	5	0	90	300 fpm desc; 6deg gs
u	0	20 AGL	5	0	0	0	90	5 knot stop

LZ Black Flight Profile BK05-3L - LZ Black - Arrival (180deg) to the North Left

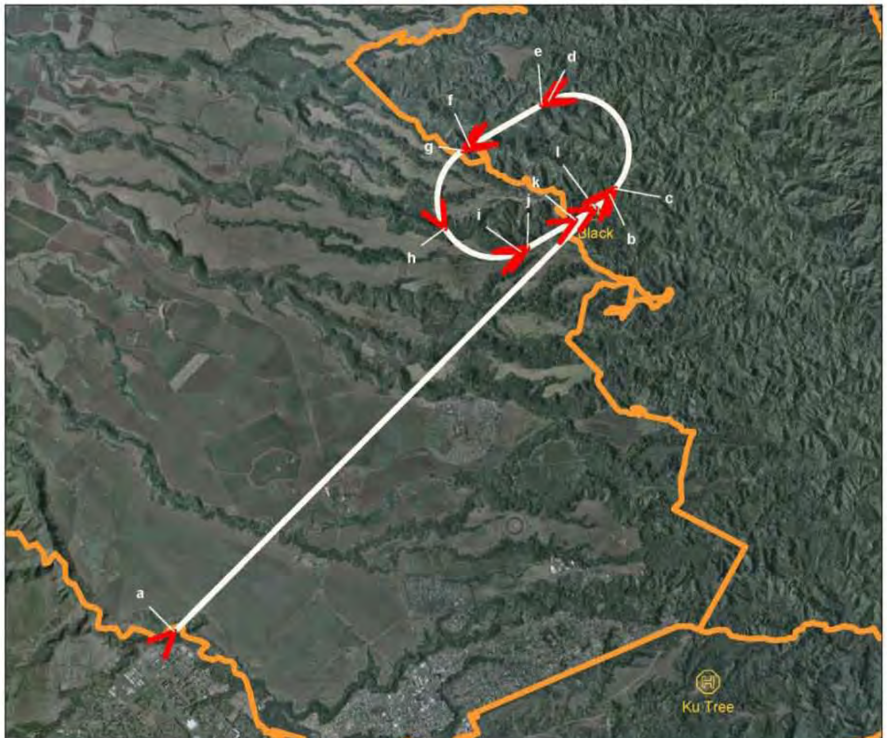
MV-22

on Flight Track BK05_3L - LZ Black - Arrival (180deg) to the North Left

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000

Scale in Feet 1:119,000 (1 inch = 9,950 feet)

N



Flight Profile BK05-4L

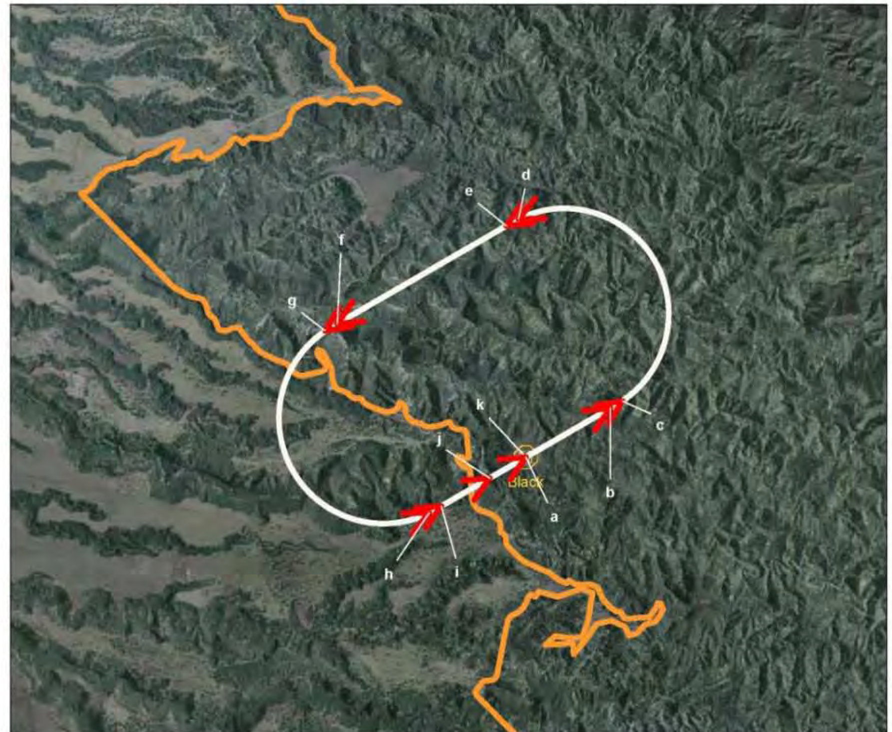
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	58,700	300 AGL	170	0	-1	0	0	
b	26,900	300 AGL	170	0	-1	0	0	begin roll prior to turn
c	26,500	300 AGL	170	0	-1	25	0	begin turn to downwind
d	18,578	300 AGL	170	0	-1	25	0	start roll out to wings level
e	18,178	300 AGL	170	0	-1	0	0	begin downwind, wings level
f	13,878	300 AGL	170	0	-1	0	0	begin roll prior to turn
g	13,478	300 AGL	170	0	-1	25	0	begin descending decelerating turn to final
h	8,966	300 AGL	140	0	-1	25	0	90 degree position
i	4,453	200 AGL	80	0	-1	25	85	begin roll out
j	4,053	200 AGL	80	0	-1	0	85	final approach with wings level
k	1,200	150 AGL	50	0	5	0	90	300 fpm desc; 6deg gs
l	0	20 AGL	5	0	0	0	90	5 knot stop

LZ Black Flight Profile BK05-4L - LZ Black - Arrival (Hasty) to the North Left
MV-22
on Flight Track BK05_4L - LZ Black - Arrival (Hasty) to the North Left

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000

Scale in Feet 1:83,700 (1 inch = 6,980 feet)

N



Flight Profile BK05-5L

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	30,850	20 AGL	5	0	0	0	87	depart LZ and climb to 300' AGL within about 0.5NM
b	28,050	300 AGL	80	0	0	0	85	begin roll prior to turn
c	27,650	300 AGL	80	0	0	25	85	begin turn to downwind
d	18,625	300 AGL	80	0	-1	25	85	hold alt and begin slow down ro 100 kts @ 1NM
e	18,225	300 AGL	80	0	-1	0	85	hold alt and begin slow down ro 100 kts @ 1NM
f	12,625	300 AGL	80	0	-1	0	85	
g	12,225	300 AGL	80	0	-1	25	85	
h	3,200	200 AGL	80	0	-1	25	85	begin roll out
i	2,800	200 AGL	80	0	-1	0	85	Final approach, wings level
j	1,200	150 AGL	50	0	5	0	90	300 fpm desc; 6deg gs
k	0	20 AGL	5	0	0	0	90	5 knot stop

LZ Black Flight Profile BK05-5L - LZ Black - Arrival (conversion) to the North Left
MV-22
on Flight Track BK05_5L - LZ Black - Arrival (conversion) to the North Left

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000

Scale in Feet 1:46,500 (1 inch = 3,870 feet)

N

Flight Profile ABK05-1L3

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	27,000	500 AGL	80	0	0	0	90	
b	18,940	400 AGL	80	0	0	0	90	
c	16,540	300 AGL	80	0	0	0	90	
d	13,540	300 AGL	80	0	0	0	90	
e	10,740	300 AGL	80	0	0	0	90	begin to roll
f	10,540	300 AGL	80	0	0	30	90	reach 30 deg roll angle; begin turn
g	3,200	191 AGL	80	0	0	30	90	begin roll to wings level
h	3,000	188 AGL	80	0	0	0	90	end turn; wings level
i	0	20 AGL	0	0	0	0	90	

LZ Black Flight Profile ABK05-1L3 - LZ Black - 180 deg Approach
AH-1/UH-1
on Flight Track ABK05-1L - to 050 Heading

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000 18,000

Scale in Feet 1:54,300 (1 inch = 4,520 feet)

N

Flight Profile ABK05-2L2

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	27,000	500 AGL	80	0	0	0	90	
b	9,770	400 AGL	80	0	0	0	90	
c	6,970	307 AGL	80	0	0	0	90	begin to roll
d	6,770	300 AGL	80	0	0	30	90	reach 30 deg roll angle; begin turn
e	3,200	191 AGL	80	0	0	30	90	begin roll to wings level
f	3,000	188 AGL	80	0	0	0	90	end turn; wings level
g	0	20 AGL	0	0	0	0	90	

LZ Black Flight Profile ABK05-2L2 - LZ Black - 90 deg Approach
AH-1/UH-1
on Flight Track ABK05-2L - to 050 Heading

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000

Scale in Feet 1:105,000 (1 inch = 8,760 feet)

N

Flight Profile ABK05-3L2

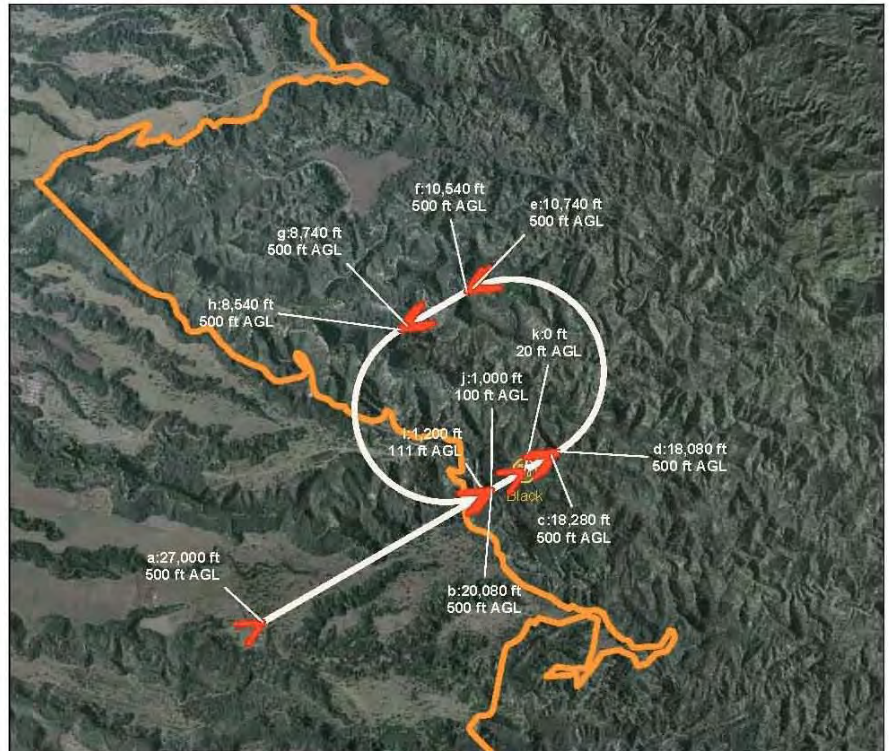
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	27,000	500 AGL	80	0	0	0	90	
b	20,510	403 AGL	80	0	0	0	90	begin to roll
c	20,310	400 AGL	80	0	0	30	90	reach 30 deg roll angle; begin turn
d	16,740	305 AGL	80	0	0	30	90	begin roll to wings level
e	16,540	300 AGL	80	0	0	0	90	end turn; wings level
f	13,540	300 AGL	80	0	0	0	90	
g	10,740	300 AGL	80	0	0	0	90	begin to roll
h	10,540	300 AGL	80	0	0	30	90	reach 30 deg roll angle; begin turn
i	3,200	191 AGL	80	0	0	30	90	begin roll to wings level
j	3,000	188 AGL	80	0	0	0	90	end turn; wings level
k	0	20 AGL	0	0	0	0	90	

LZ Black Flight Profile ABK05-3L2 - LZ Black - 270 deg Approach
AH-1/UH-1
on Flight Track ABK05-3L - to 050 Heading

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000 18,000 20,000

Scale in Feet 1:61,000 (1 inch = 5,080 feet)

N



Flight Profile ABK05-4L3

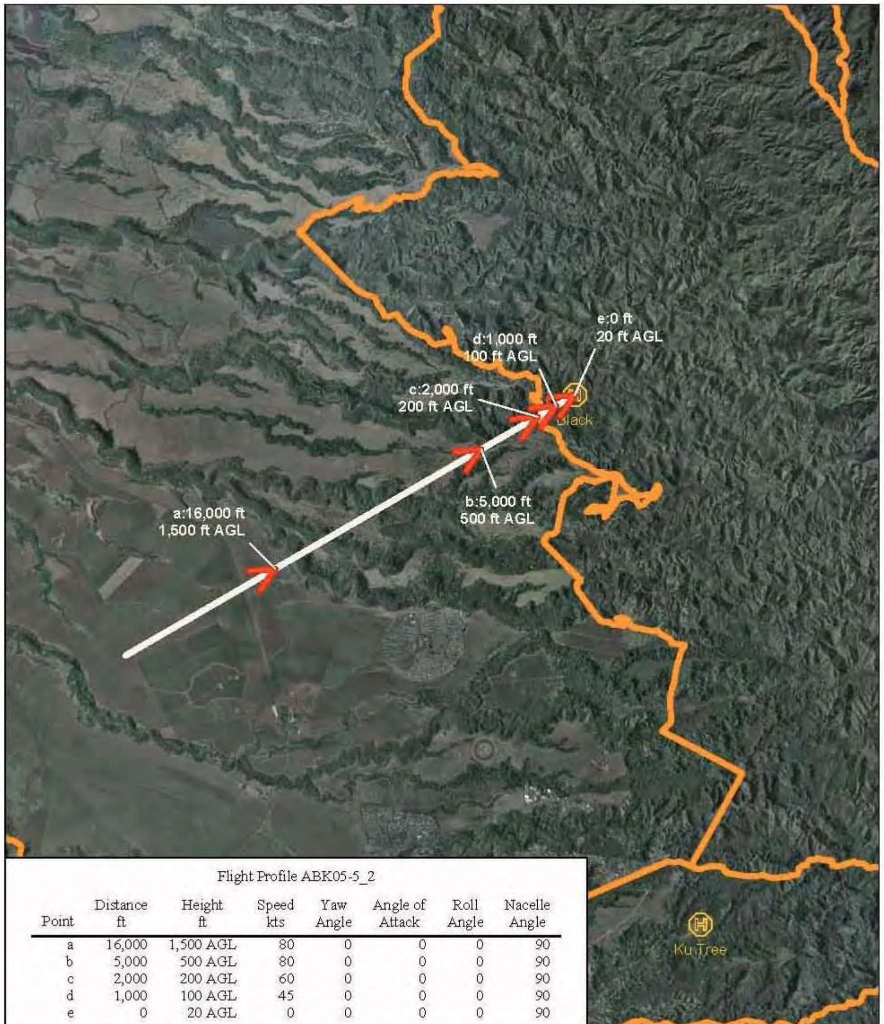
Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	27,000	500 AGL	80	0	0	0	90	
b	20,080	500 AGL	80	0	0	0	90	
c	18,280	500 AGL	80	0	0	0	90	begin to roll
d	18,080	500 AGL	80	0	0	30	90	reach 30 deg roll angle; begin turn
e	10,740	500 AGL	80	0	0	30	90	begin roll to wings level
f	10,540	500 AGL	80	0	0	0	90	end turn; wings level
g	8,740	500 AGL	80	0	0	0	90	begin to roll
h	8,540	500 AGL	80	0	0	30	90	reach 30 deg roll angle; begin turn
i	1,200	111 AGL	80	0	0	30	90	begin roll to wings level
j	1,000	100 AGL	80	0	0	0	90	end turn; wings level
k	0	20 AGL	0	0	0	0	90	

LZ Black Flight Profile ABK05-4L3 - LZ Black - 360 deg Approach
AH-1/UH-1
on Flight Track ABK05-4L - to 050 Heading

0 2,000 4,000 6,000 8,000 10,000 12,000 14000

Scale in Feet 1:42,300 (1 inch = 3,520 feet)

N



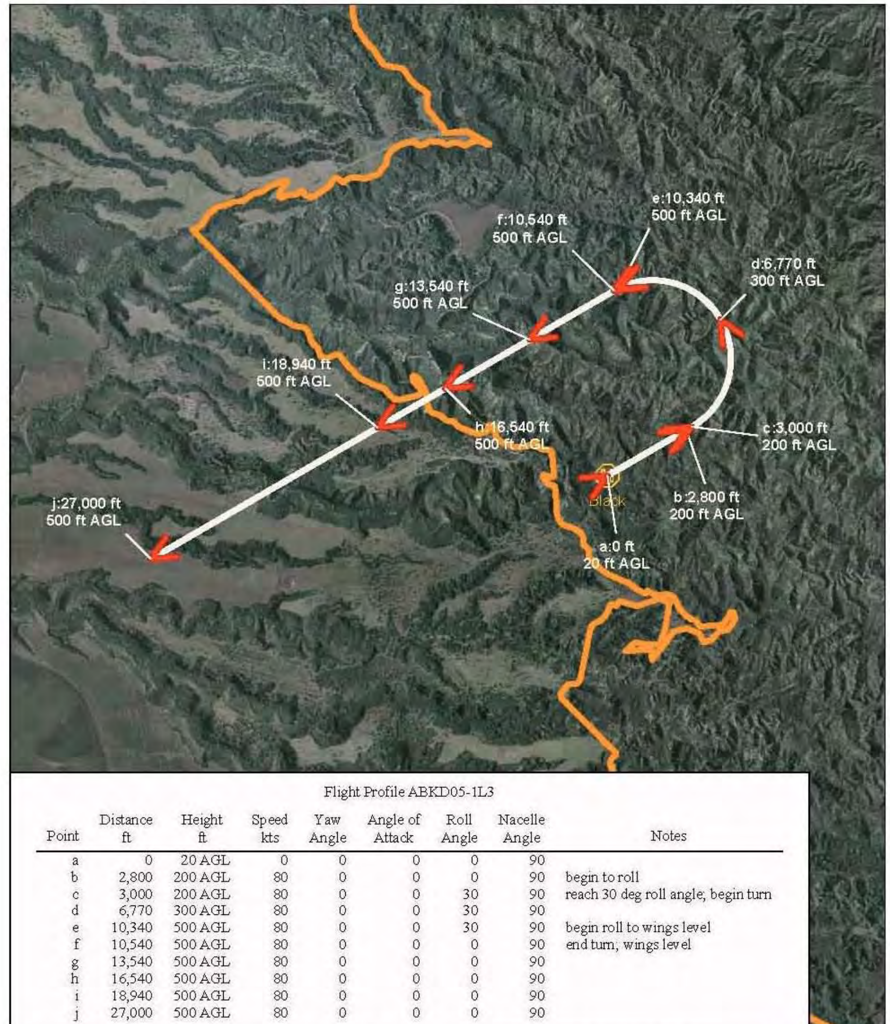
Flight Profile ABK05-5_2

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle
a	16,000	1,500 AGL	80	0	0	0	90
b	5,000	500 AGL	80	0	0	0	90
c	2,000	200 AGL	60	0	0	0	90
d	1,000	100 AGL	45	0	0	0	90
e	0	20 AGL	0	0	0	0	90

LZ Black Flight Profile ABK05-5_2 - LZ Black - Straight-in Approach
AH-1/UH-1
on Flight Track ABK05-5 - to 050 Heading

0 4,000 8,000 12,000 16,000 20,000 24,000

Scale in Feet 1:74,600 (1 inch = 6,220 feet)



Flight Profile ABKD05-1L3

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	0	20 AGL	0	0	0	0	90	
b	2,800	200 AGL	80	0	0	0	90	begin to roll
c	3,000	200 AGL	80	0	0	30	90	reach 30 deg roll angle; begin turn
d	6,770	300 AGL	80	0	0	30	90	
e	10,340	500 AGL	80	0	0	30	90	begin roll to wings level
f	10,540	500 AGL	80	0	0	0	90	end turn; wings level
g	13,540	500 AGL	80	0	0	0	90	
h	16,540	500 AGL	80	0	0	0	90	
i	18,940	500 AGL	80	0	0	0	90	
j	27,000	500 AGL	80	0	0	0	90	

LZ Black Flight Profile ABKD05-1L3 - LZ Black - 180 deg Departure
AH-1/UH-1
on Flight Track ABKD05-1L - 050 Heading

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000

Scale in Feet 1:49,700 (1 inch = 4,140 feet)

Flight Profile ABKD05-2L3

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	0	20 AGL	0	0	0	0	90	
b	2,800	200 AGL	75	0	0	0	90	begin to roll
c	3,000	200 AGL	80	0	0	30	90	reach 30 deg roll angle; begin turn
d	6,570	295 AGL	80	0	0	30	90	begin roll to wings level
e	6,770	300 AGL	80	0	0	0	90	end turn; wings level
f	9,770	500 AGL	80	0	0	0	90	
g	27,000	500 AGL	80	0	0	0	90	

LZ Black Flight Profile ABKD05-2L3 - LZ Black - 90 deg Departure
AH-1/UH-1
on Flight Track ABKD05-2L - 050 Heading

0 4,000 8,000 12,000 16,000 20,000

Scale in Feet 1:72,900 (1 inch = 6,070 feet)

N

Flight Profile ABKD05-5_3

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	0	20 AGL	0	0	0	0	90	
b	3,000	200 AGL	80	0	0	0	90	
c	5,400	300 AGL	80	0	0	0	90	
d	17,400	1,100 AGL	80	0	0	0	90	added pt to avoid terrain
e	24,000	1,100 AGL	80	0	0	0	90	

LZ Black Flight Profile ABKD05-5_3 - LZ Black - Straight Departure
AH-1/UH-1
on Flight Track ABKD05-5 - 050 Heading

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000 18,000

Scale in Feet 1:56,300 (1 inch = 4,690 feet)

N

Flight Profile ABKT05-1L

Point	Distance ft	Height ft	Speed kts	Yaw Angle	Angle of Attack	Roll Angle	Nacelle Angle	Notes
a	0	20 AGL	5	0	0	0	90	
b	2,800	280 AGL	68	0	0	0	90	begin roll
c	3,000	300 AGL	71	0	0	25	90	reach roll angle; begin turn
d	12,225	300 AGL	80	0	0	25	90	begin to roll to wings level
e	12,425	300 AGL	80	0	0	0	90	wings level
f	18,225	300 AGL	80	0	0	0	90	begin roll
g	18,425	300 AGL	80	0	0	25	90	reach roll angle; begin turn
h	27,650	300 AGL	80	0	0	25	90	begin to roll to wings level
i	27,850	200 AGL	80	0	0	0	90	wings level
j	30,850	20 AGL	5	0	0	0	90	

LZ Black Flight Profile ABKT05-1L - LZ Black - Left Handed Pattern
AH-1/UH-1
on Flight Track ABKT05-1L - 050 Heading

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000

Scale in Feet 1:45,000 (1 inch = 3,750 feet)

N

D-2.3.3 KLOA ALTERNATIVE C (NO ACTION)

D-2.3.3.1 Modeled Events

Table 2.3-5 Modeled Daily Events for Helicopters at LZ Black for Busiest Month for Alternative C (No Action)

Heading	Op Type	Turn Direction	Track Type	Track ID	CH-53 Profile ID	Day	Night	Army Helos Profile ID	Day	Night
50	Ingress	Straight In	Straight In	ABK08-5	CBK05-5_2	0.106126	0.003099	HBK05-5_2	0.402076	0.006824
		Left	180 deg	ABK08-1L	CBK05-1L3	0.026531	0.000775	HBK05-1L3	0.100519	0.001706
			90 deg	ABK08-2L	CBK05-2L2	0.026531	0.000775	HBK05-2L2	0.100519	0.001706
			270 deg	ABK08-3L	CBK05-3L2	0.026531	0.000775	HBK05-3L2	0.100519	0.001706
			Hasty	ABK08-4L	CBK05-4L3	0.026531	0.000775	HBK05-4L3	0.100519	0.001706
		Right	180 deg	ABK08-1R	CBK05-1R3	0.027335	0.000798	HBK05-1R3	0.103565	0.001758
			90 deg	ABK08-2R	CBK05-2R2	0.027335	0.000798	HBK05-2R2	0.103565	0.001758
			270 deg	ABK08-3R	CBK05-3R2	0.027335	0.000798	HBK05-3R2	0.103565	0.001758
			Hasty	ABK08-4R	CBK05-4R3	0.027335	0.000798	HBK05-4R3	0.103565	0.001758
	Pattern	Left	Left Pattern	ABKT08-1L	CBKT05-1L	0.643187	0.018779	HBKT05-1L	2.436822	0.041359
		Right	Right Pattern	ABKT08-1R	CBKT05-1R	0.643187	0.018779	HBKT05-1R	2.436822	0.041359
	Egress	Left	Departure	ABKD08-1L	CBKD05-1L3	0.053063	0.001549	HBKD05-1L3	0.201038	0.003412
			Departure	ABKD08-2L	CBKD05-2L3	0.053063	0.001549	HBKD05-2L3	0.201038	0.003412
		Right	Departure	ABKD08-1R	CBKD05-1R3	0.053063	0.001549	HBKD05-1R3	0.201038	0.003412
			Departure	ABKD08-2R	CBKD05-2R3	0.053063	0.001549	HBKD05-2R3	0.201038	0.003412
		Straight Out	Straight Out	ABKD08-5	CBKD05-5_3	0.109342	0.003192	HBKD05-5_3	0.414260	0.007031
230	Ingress	Straight In	Straight In	ABK26-5	CBK23-5_2	0.019296	0.000563	HBK23-5_2	0.073105	0.001241
		Left	180 deg	ABK26-1L	CBK23-1L3	0.004682	0.000137	HBK23-1L3	0.017739	0.000301
			90 deg	ABK26-2L	CBK23-2L2	0.004682	0.000137	HBK23-2L2	0.017739	0.000301
			270 deg	ABK26-3L	CBK23-3L2	0.004682	0.000137	HBK23-3L2	0.017739	0.000301
			Hasty	ABK26-4L	CBK23-4L3	0.004682	0.000137	HBK23-4L3	0.017739	0.000301
		Right	180 deg	ABK26-1R	CBK23-1R3	0.004682	0.000137	HBK23-1R3	0.017739	0.000301
			90 deg	ABK26-2R	CBK23-2R2	0.004682	0.000137	HBK23-2R2	0.017739	0.000301
			270 deg	ABK26-3R	CBK23-3R2	0.004682	0.000137	HBK23-3R2	0.017739	0.000301
			Hasty	ABK26-4R	CBK23-4R3	0.004682	0.000137	HBK23-4R3	0.017739	0.000301
	Pattern	Left	Left Pattern	ABKT26-1L	CBKT23-1L	0.113504	0.003314	HBKT23-1L	0.430027	0.007299
		Right	Right Pattern	ABKT26-1R	CBKT23-1R	0.113504	0.003314	HBKT23-1R	0.430027	0.007299
	Egress	Left	Departure	ABKD26-1L	CBKD23-1L3	0.009364	0.000273	HBKD23-1L3	0.035477	0.000602
			Departure	ABKD26-2L	CBKD23-2L3	0.009364	0.000273	HBKD23-2L3	0.035477	0.000602
		Right	Departure	ABKD26-1R	CBKD23-1R3	0.009364	0.000273	HBKD23-1R3	0.035477	0.000602
			Departure	ABKD26-2R	CBKD23-2R3	0.009364	0.000273	HBKD23-2R3	0.035477	0.000602
		Straight Out	Straight Out	ABKD26-5	CBKD23-5_3	0.019296	0.000563	HBKD23-5_3	0.073105	0.001241

D-2.4 SCHOFIELD BARRACKS EAST RANGE (SBER)

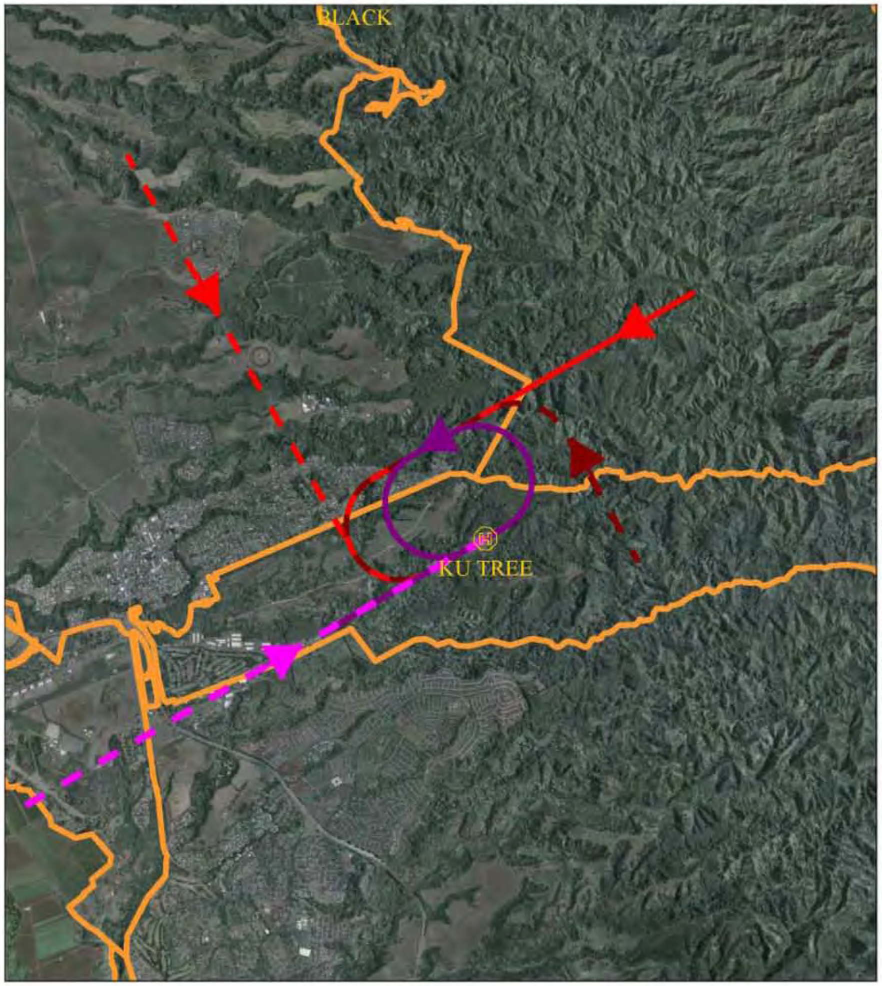
D-2.4.1 SBER BASELINE SCENARIO

D-2.4.1.1 Modeled Events (LZ Ku Tree only)

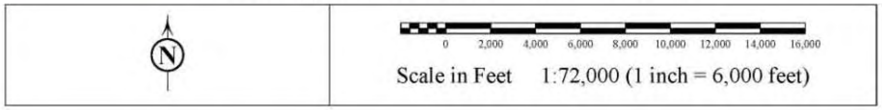
Table 2.4-1 Modeled Daily Events for Helicopters at LZ Ku Tree for Baseline Busiest Month

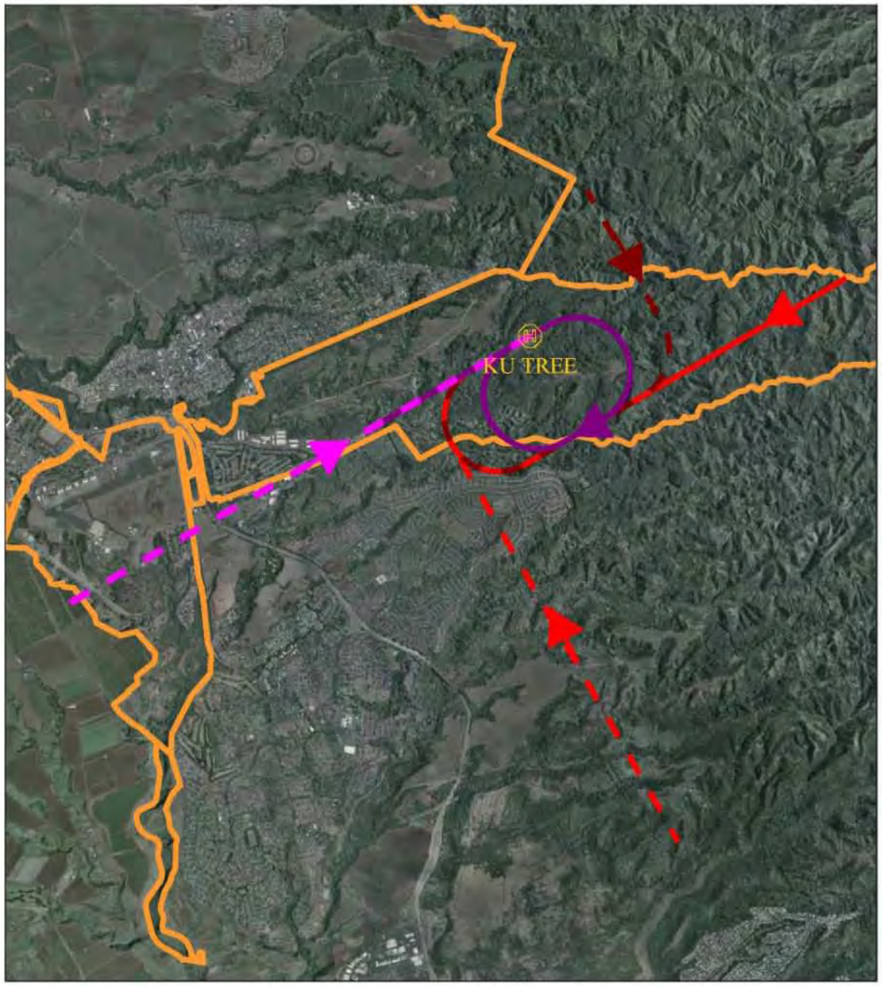
Heading	Op Type	Turn Direction	Track Type	Track ID	CH-53 Profile ID	Day (0700 - 2200)	Night (2200 - 0700)	Army Helos Profile ID	Day (0700 - 2200)	Night (2200 - 0700)
50	Ingress	Straight In	Straight In		CKT05-5_2	0.011435	0.000369	HKT05-5_2	0.013095	-
		Left	180 deg		CKT05-1L3	0.002859	0.000092	HKT05-1L3	0.003274	-
			90 deg		CKT05-2L2	0.002859	0.000092	HKT05-2L2	0.003274	-
			270 deg		CKT05-3L2	0.002859	0.000092	HKT05-3L2	0.003274	-
			Hasty		CKT05-4L3	0.002859	0.000092	HKT05-4L3	0.003274	-
		Right	180 deg		CKT05-1R3	0.002945	0.000095	HKT05-1R3	0.003373	-
			90 deg		CKT05-2R2	0.002945	0.000095	HKT05-2R2	0.003373	-
			270 deg		CKT05-3R2	0.002945	0.000095	HKT05-3R2	0.003373	-
			Hasty		CKT05-4R3	0.002945	0.000095	HKT05-4R3	0.003373	-
	Pattern	Left	Left Pattern		CKTT05-1L	0.069304	0.002236	HKTT05-1L	0.079364	-
		Right	Right Pattern		CKTT05-1R	0.069304	0.002236	HKTT05-1R	0.079364	-
	Egress	Left	Departure		CKTD05-1L3	0.005718	0.000184	HKTD05-1L3	0.006548	-
			Departure		CKTD05-2L3	0.005718	0.000184	HKTD05-2L3	0.006548	-
		Right	Departure		CKTD05-1R3	0.005718	0.000184	HKTD05-1R3	0.006548	-
			Departure		CKTD05-2R3	0.005718	0.000184	HKTD05-2R3	0.006548	-
		Straight Out	Straight Out		CKTD05-5_3	0.011782	0.000380	HKTD05-5_3	0.013492	-
230	Ingress	Straight In	Straight In		CKT23-5_2	0.002079	0.000067	HKT23-5_2	0.002381	-
		Left	180 deg		CKT23-1L3	0.000504	0.000016	HKT23-1L3	0.000578	-
			90 deg		CKT23-2L2	0.000504	0.000016	HKT23-2L2	0.000578	-
			270 deg		CKT23-3L2	0.000504	0.000016	HKT23-3L2	0.000578	-
			Hasty		CKT23-4L3	0.000504	0.000016	HKT23-4L3	0.000578	-
		Right	180 deg		CKT23-1R3	0.000504	0.000016	HKT23-1R3	0.000578	-
			90 deg		CKT23-2R2	0.000504	0.000016	HKT23-2R2	0.000578	-
			270 deg		CKT23-3R2	0.000504	0.000016	HKT23-3R2	0.000578	-
			Hasty		CKT23-4R3	0.000504	0.000016	HKT23-4R3	0.000578	-
	Pattern	Left	Left Pattern		CKTT23-1L	0.012230	0.000395	HKTT23-1L	0.014005	-
		Right	Right Pattern		CKTT23-1R	0.012230	0.000395	HKTT23-1R	0.014005	-
	Egress	Left	Departure		CKTD23-1L3	0.001009	0.000033	HKTD23-1L3	0.001155	-
			Departure		CKTD23-2L3	0.001009	0.000033	HKTD23-2L3	0.001155	-
		Right	Departure		CKTD23-1R3	0.001009	0.000033	HKTD23-1R3	0.001155	-
			Departure		CKTD23-2R3	0.001009	0.000033	HKTD23-2R3	0.001155	-
		Straight Out	Straight Out		CKTD23-5_3	0.002079	0.000067	HKTD23-5_3	0.002381	-

D-2.4.1.2 SBER Modeled Flight Tracks (LZ Ku Tree only)



Modeled Helicopter Flight Tracks to LZ Ku Tree
050 Degree Approach Headings with Left Handed Patterns



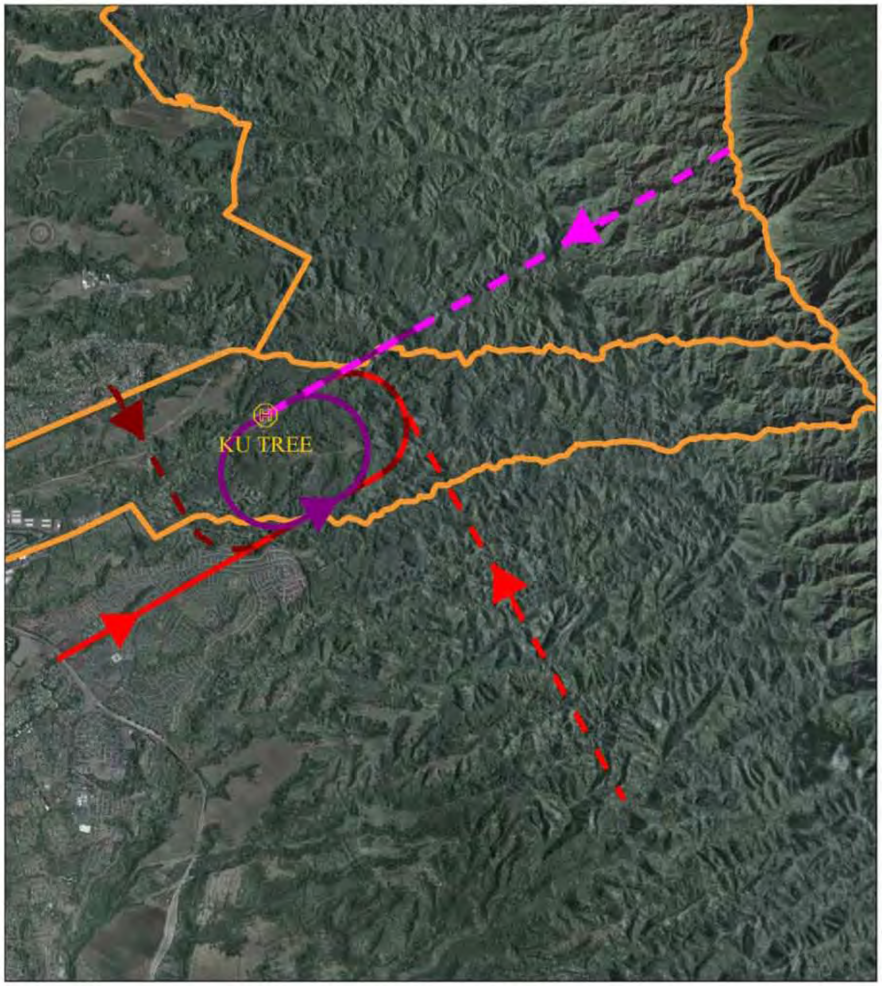


Modeled Helicopter Flight Tracks to LZ Ku Tree
050 Degree Approach Headings with Right Handed Patterns

N

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000

Scale in Feet 1:72,000 (1 inch = 6,000 feet)

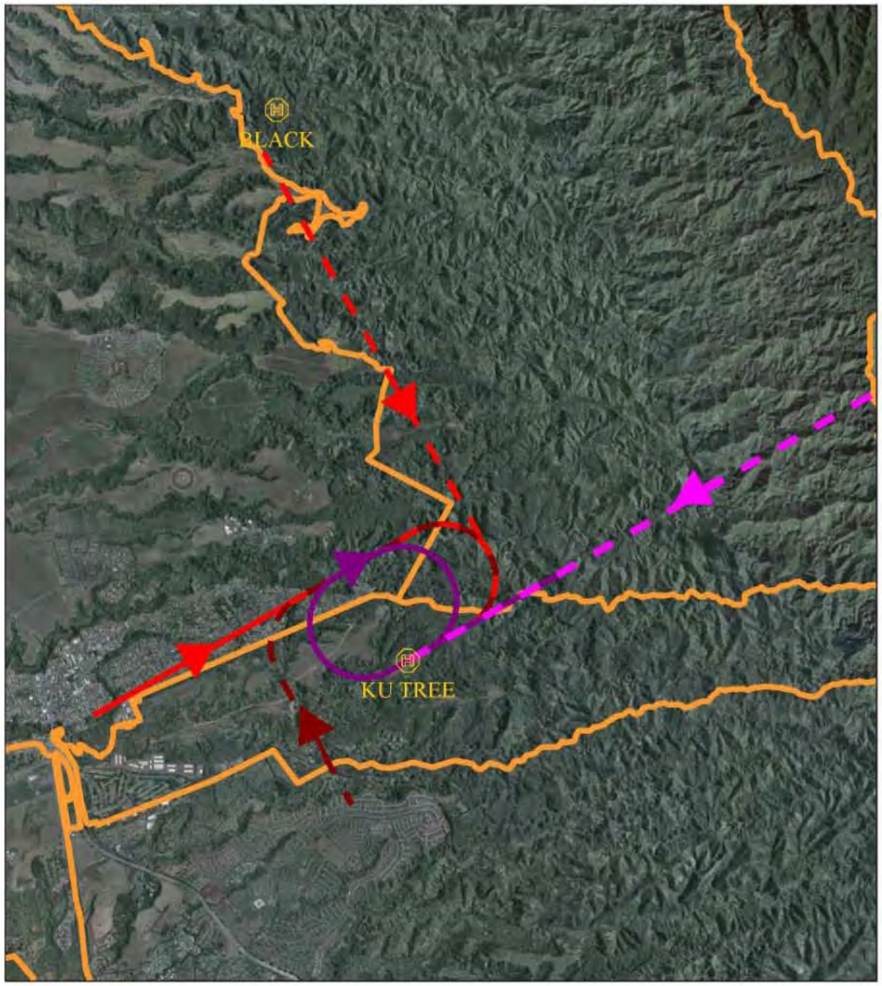


Modeled Helicopter Flight Tracks to LZ Ku Tree
230 Degree Approach Headings with Left Handed Patterns

N

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000

Scale in Feet 1:72,000 (1 inch = 6,000 feet)

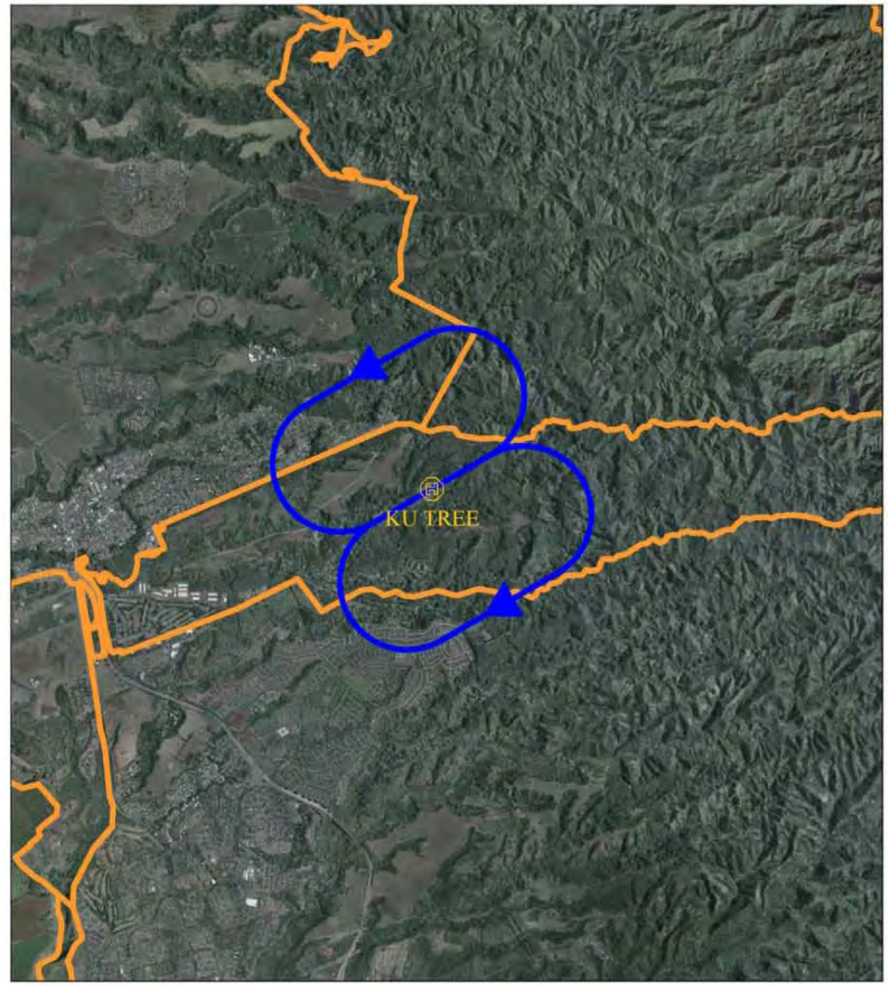


Modeled Helicopter Flight Tracks to LZ Ku Tree
230 Degree Approach Headings with Right Handed Patterns

N

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000

Scale in Feet 1:72,000 (1 inch = 6,000 feet)

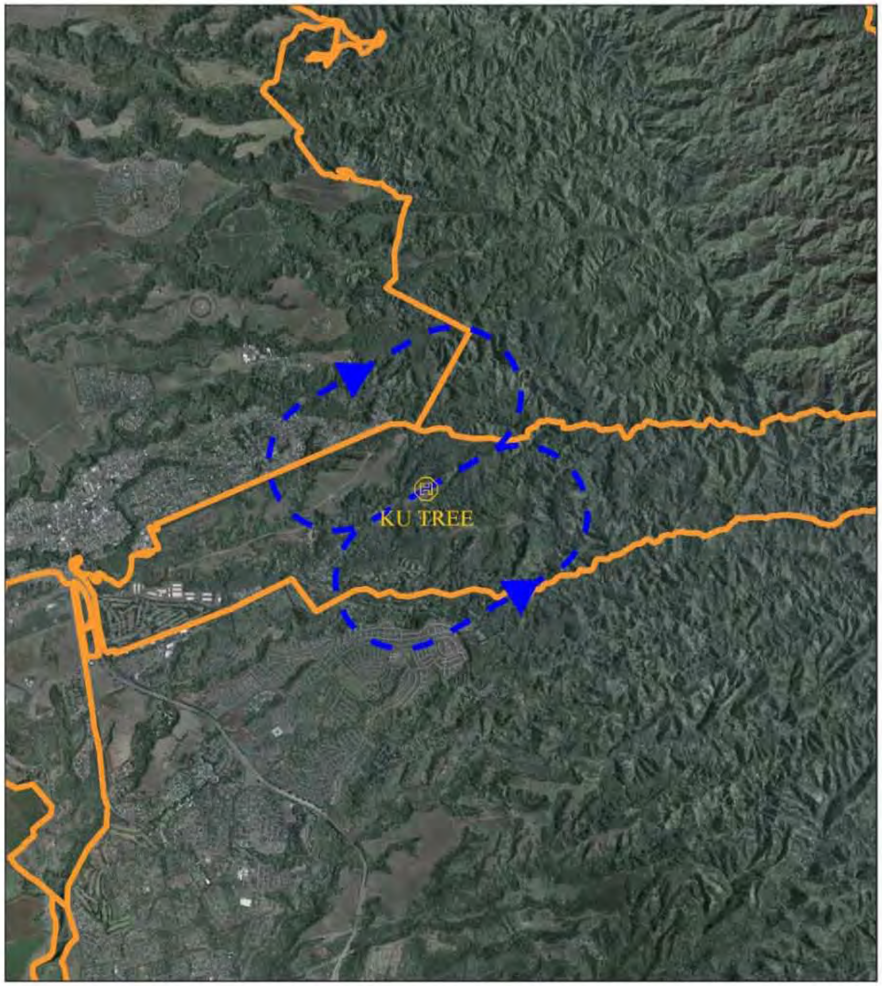


Modeled Helicopter Closed Pattern Flight Tracks at LZ Ku Tree
050 Degree Heading

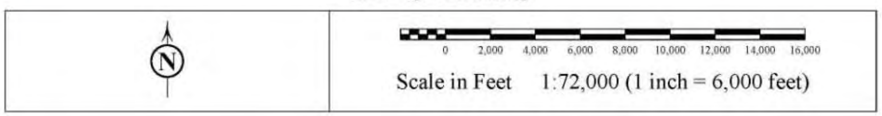
N

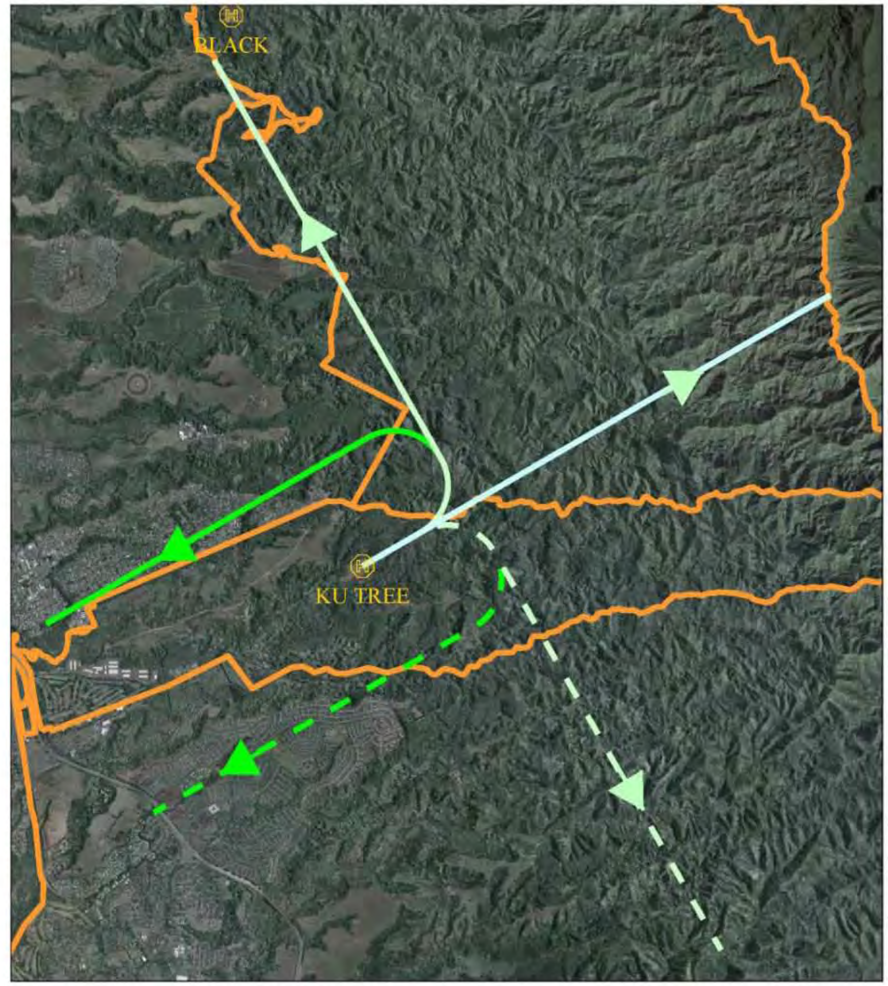
0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000

Scale in Feet 1:72,000 (1 inch = 6,000 feet)

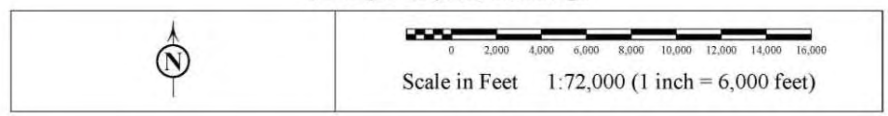


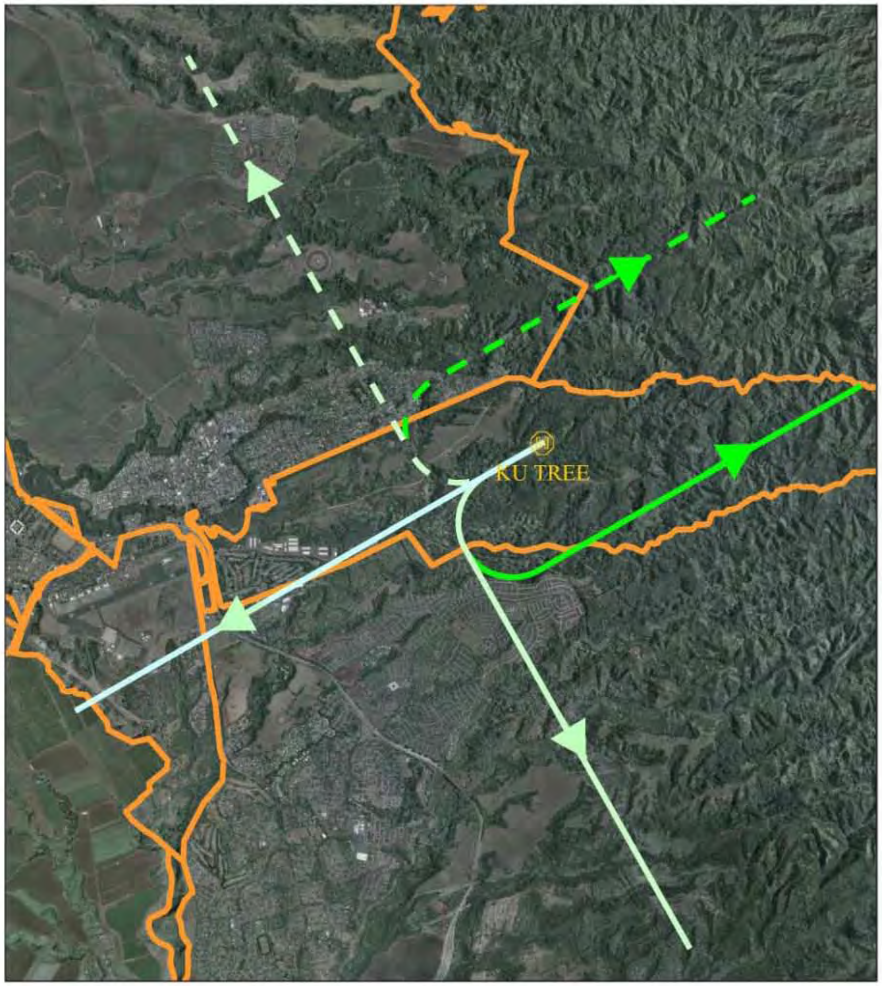
Modeled Helicopter Closed Pattern Flight Tracks at LZ Ku Tree
230 Degree Heading



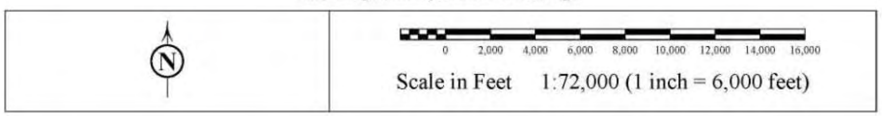


Modeled Helicopter Flight Tracks from LZ Ku Tree
050 Degree Departure Headings





Modeled Helicopter Flight Tracks from LZ Ku Tree
230 Degree Departure Headings



D-2.4.2 SBER ALTERNATIVES A/B

D-2.4.2.1 Modeled Events

Table 2.4-2 Modeled Daily Events for Helicopters at LZ Ku Tree for Busiest Month for Alternative A/B

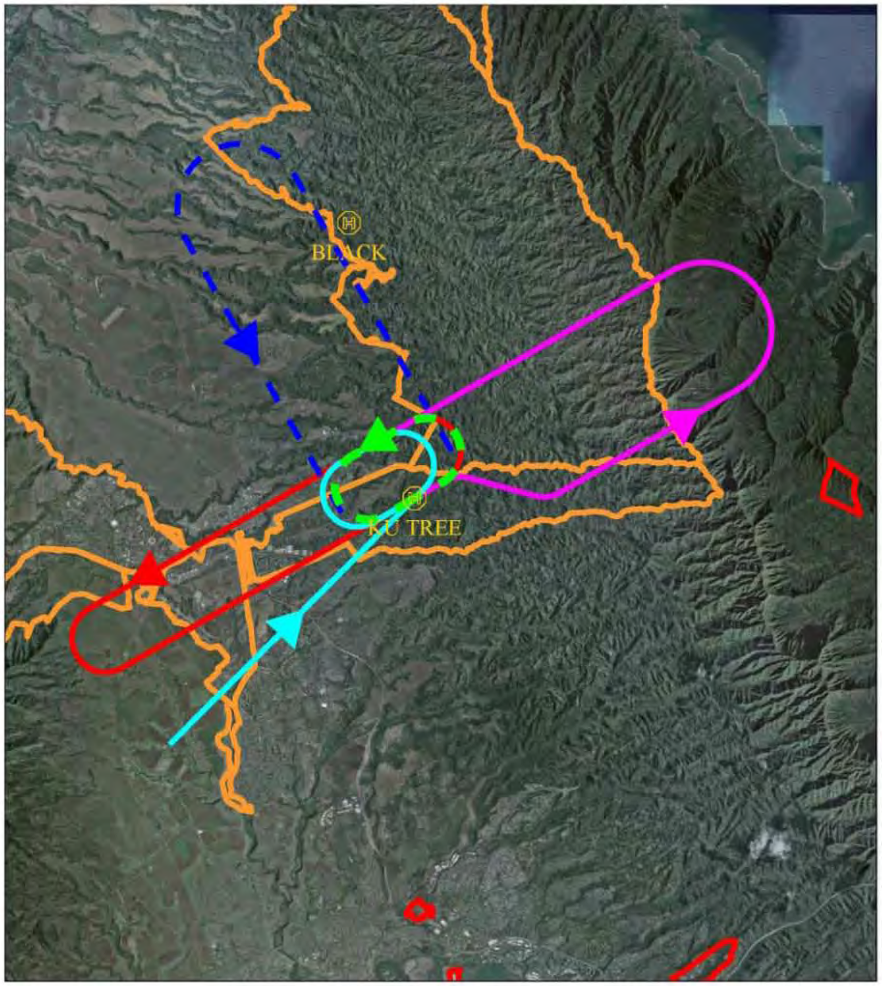
Heading	Op Type	Turn Direction	Track Type	Track ID	CH-53 Profile ID	Day (0700 - 2200)	Night (2200 - 0700)	Army Helos Profile ID	Day (0700 - 2200)	Night (2200 - 0700)
50	Ingress	Straight In	Straight In	AKT08-5	CKT05-5_2	0.005164	-	HKT05-5_2	0.024899	0.000369
		Left	180 deg	AKT08-1L	CKT05-1L3	0.001291	-	HKT05-1L3	0.006225	0.000092
			90 deg	AKT08-2L	CKT05-2L2	0.001291	-	HKT05-2L2	0.006225	0.000092
			270 deg	AKT08-3L	CKT05-3L2	0.001291	-	HKT05-3L2	0.006225	0.000092
			Hasty	AKT08-4L	CKT05-4L3	0.001291	-	HKT05-4L3	0.006225	0.000092
		Right	180 deg	AKT08-1R	CKT05-1R3	0.001330	-	HKT05-1R3	0.006413	0.000095
			90 deg	AKT08-2R	CKT05-2R2	0.001330	-	HKT05-2R2	0.006413	0.000095
			270 deg	AKT08-3R	CKT05-3R2	0.001330	-	HKT05-3R2	0.006413	0.000095
			Hasty	AKT08-4R	CKT05-4R3	0.001330	-	HKT05-4R3	0.006413	0.000095
	Pattern	Left	Left Pattern	AKTT08-1L	CKTT05-1L	0.031299	-	HKTT05-1L	0.150904	0.002236
		Right	Right Pattern	AKTT08-1R	CKTT05-1R	0.031299	-	HKTT05-1R	0.150904	0.002236
	Egress	Left	Departure	AKTD08-1L	CKTD05-1L3	0.002582	-	HKTD05-1L3	0.012450	0.000184
			Departure	AKTD08-2L	CKTD05-2L3	0.002582	-	HKTD05-2L3	0.012450	0.000184
		Right	Departure	AKTD08-1R	CKTD05-1R3	0.002582	-	HKTD05-1R3	0.012450	0.000184
			Departure	AKTD08-2R	CKTD05-2R3	0.002582	-	HKTD05-2R3	0.012450	0.000184
		Straight Out	Straight Out	AKTD08-5	CKTD05-5_3	0.005321	-	HKTD05-5_3	0.025654	0.000380
230	Ingress	Straight In	Straight In	AKT26-5	CKT23-5_2	0.000939	-	HKT23-5_2	0.004527	0.000067
		Left	180 deg	AKT26-1L	CKT23-1L3	0.000228	-	HKT23-1L3	0.001098	0.000016
			90 deg	AKT26-2L	CKT23-2L2	0.000228	-	HKT23-2L2	0.001098	0.000016
			270 deg	AKT26-3L	CKT23-3L2	0.000228	-	HKT23-3L2	0.001098	0.000016
			Hasty	AKT26-4L	CKT23-4L3	0.000228	-	HKT23-4L3	0.001098	0.000016
		Right	180 deg	AKT26-1R	CKT23-1R3	0.000228	-	HKT23-1R3	0.001098	0.000016
			90 deg	AKT26-2R	CKT23-2R2	0.000228	-	HKT23-2R2	0.001098	0.000016
			270 deg	AKT26-3R	CKT23-3R2	0.000228	-	HKT23-3R2	0.001098	0.000016
			Hasty	AKT26-4R	CKT23-4R3	0.000228	-	HKT23-4R3	0.001098	0.000016
	Pattern	Left	Left Pattern	AKTT26-1L	CKTT23-1L	0.005523	-	HKTT23-1L	0.026630	0.000395
		Right	Right Pattern	AKTT26-1R	CKTT23-1R	0.005523	-	HKTT23-1R	0.026630	0.000395
	Egress	Left	Departure	AKTD26-1L	CKTD23-1L3	0.000456	-	HKTD23-1L3	0.002197	0.000033
			Departure	AKTD26-2L	CKTD23-2L3	0.000456	-	HKTD23-2L3	0.002197	0.000033
		Right	Departure	AKTD26-1R	CKTD23-1R3	0.000456	-	HKTD23-1R3	0.002197	0.000033
			Departure	AKTD26-2R	CKTD23-2R3	0.000456	-	HKTD23-2R3	0.002197	0.000033
		Straight Out	Straight Out	AKTD26-5	CKTD23-5_3	0.000939	-	HKTD23-5_3	0.004527	0.000067

Notes: (1) Same track utilization as LZ Black at KTA

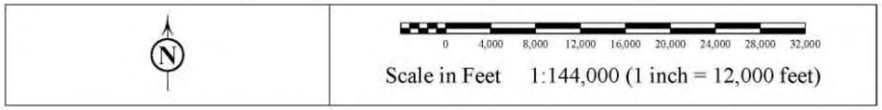
Table 2.4-3 Modeled Daily Events for MV-22 at LZ Ku Tree for Busiest Month for Alternative A/B

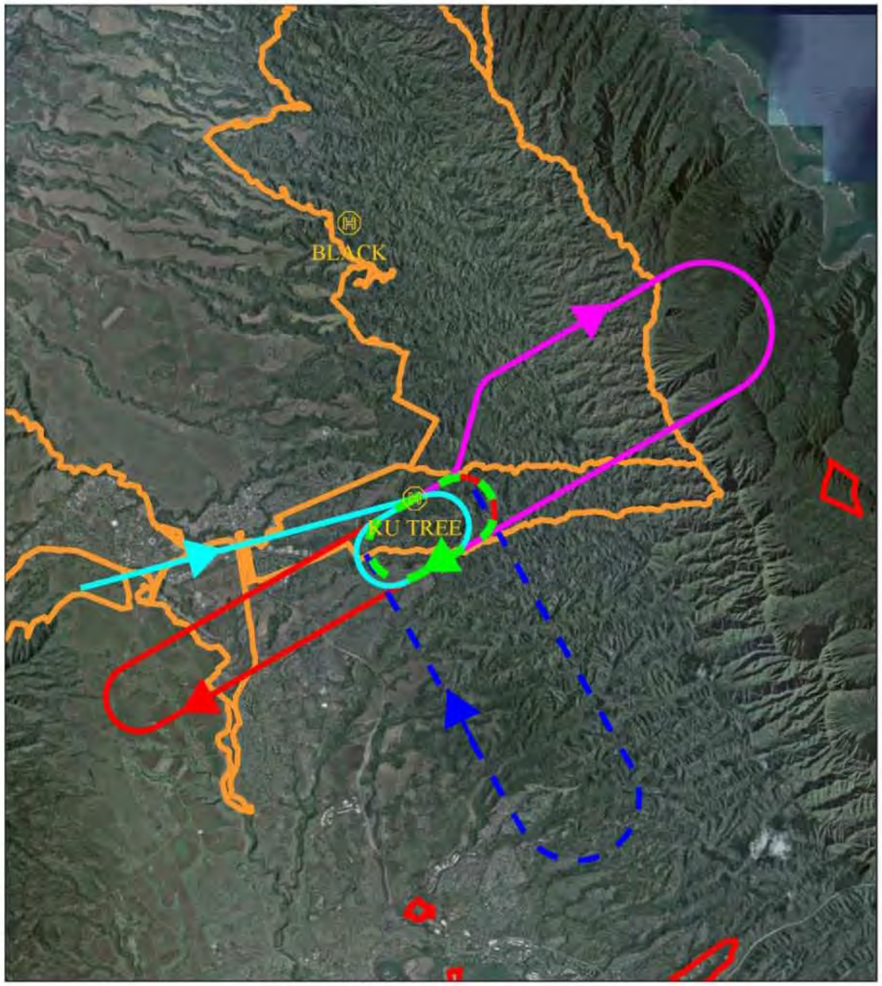
LZ Name	Heading	Heading Utilization	Turn Direction	Direction Utilization	Profile Type	Type Utilization	Track ID	Profile ID	Day (0700 - 2200)	Night (2200 - 0700)
Ku Tree	080	85%	Left	50%	Straight in	28.6%	KT05-1L	KT05-1L	0.0068	0.0032
					90 deg	28.6%	KT05-2L	KT05-2L	0.0068	0.0032
					180 deg	14.3%	KT05-3L	KT05-3L	0.0034	0.0016
					Hasty	14.3%	KT05-4L	KT05-4L	0.0034	0.0016
					Conversion	14.3%	KT05-5L	KT05-5L	0.0034	0.0016
			Right	50%	Straight in	28.6%	KT05-1R	KT05-1R	0.0068	0.0032
					90 deg	28.6%	KT05-2R	KT05-2R	0.0068	0.0032
					180 deg	14.3%	KT05-3R	KT05-3R	0.0034	0.0016
					Hasty	14.3%	KT05-4R	KT05-4R	0.0034	0.0016
					Conversion	14.3%	KT05-5R	KT05-5R	0.0034	0.0016
	260	15%	Left	50%	Straight in	28.6%	KT23-1L	KT23-1L	0.0012	0.0006
					90 deg	28.6%	KT23-2L	KT23-2L	0.0012	0.0006
					180 deg	14.3%	KT23-3L	KT23-3L	0.0006	0.0003
					Hasty	14.3%	KT23-4L	KT23-4L	0.0006	0.0003
					Conversion	14.3%	KT23-5L	KT23-5L	0.0006	0.0003
			Right	50%	Straight in	28.6%	KT23-1R	KT23-1R	0.0012	0.0006
					90 deg	28.6%	KT23-2R	KT23-2R	0.0012	0.0006
					180 deg	14.3%	KT23-3R	KT23-3R	0.0006	0.0003
					Hasty	14.3%	KT23-4R	KT23-4R	0.0006	0.0003
					Conversion	14.3%	KT23-5R	KT23-5R	0.0006	0.0003

D-2.4.2.2 SBER Modeled Flight Tracks (LZ Ku Tree only)



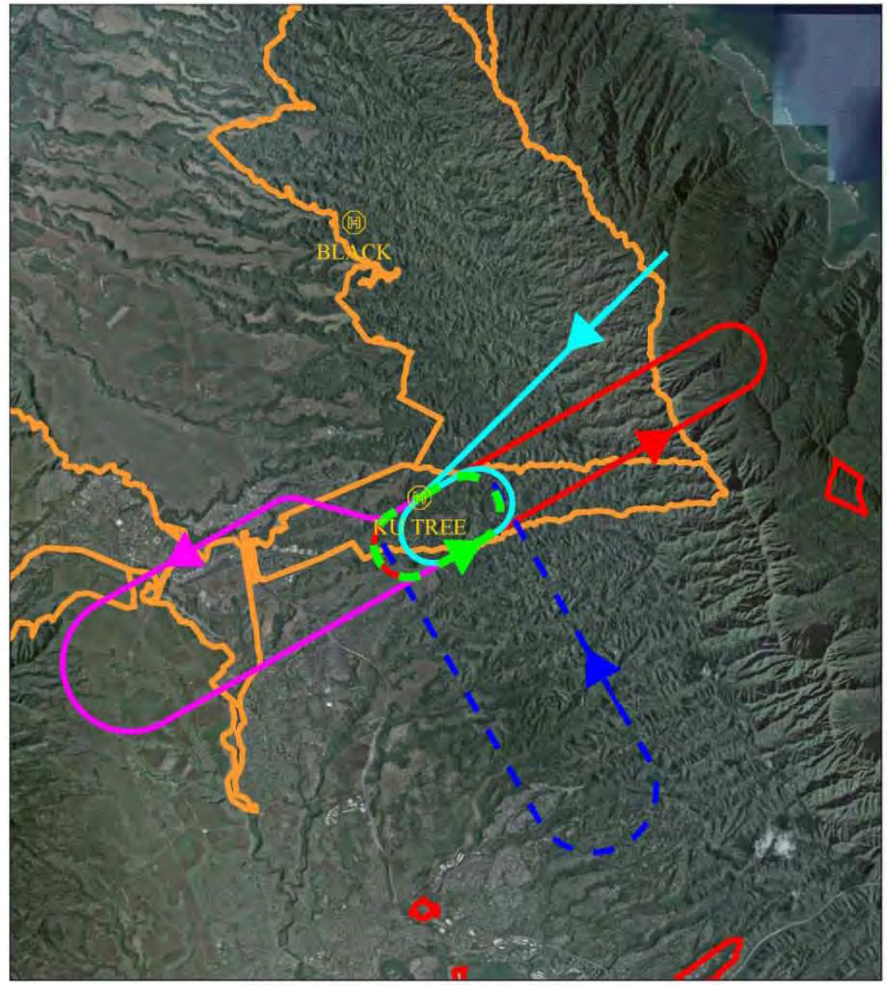
Modeled MV-22 Flight Tracks at LZ Ku Tree
050 Degree Approach Headings with Left Handed Patterns





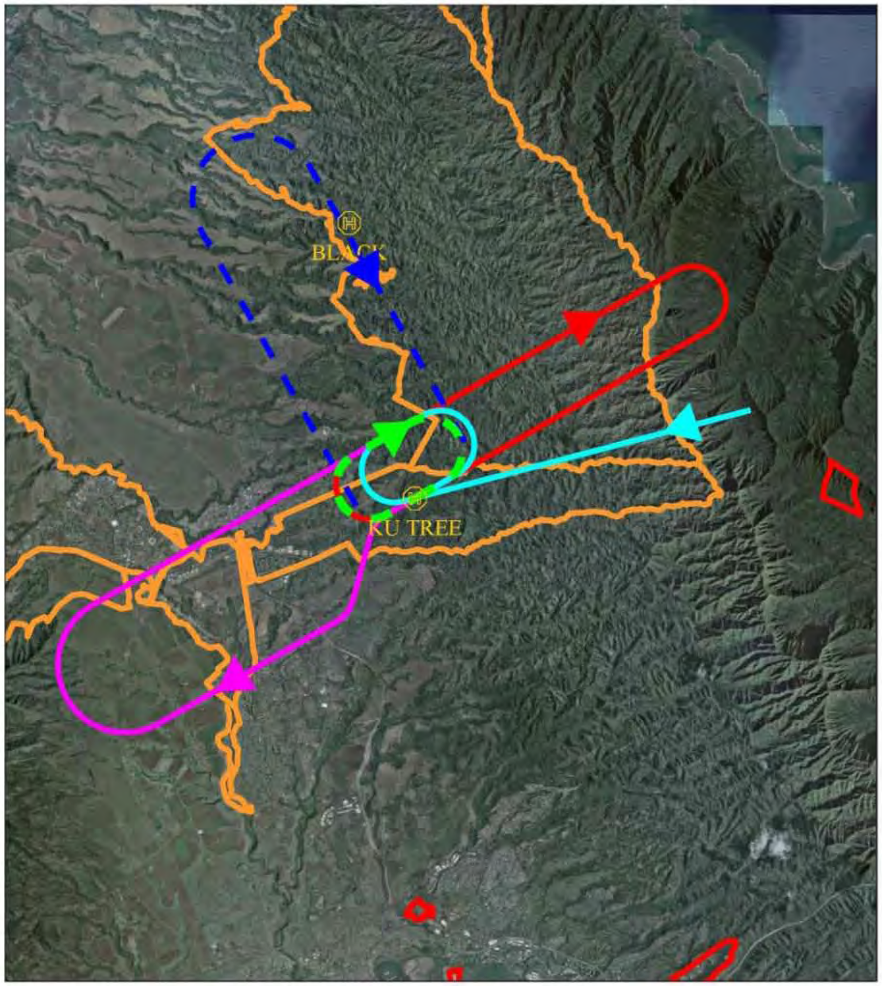
Modeled MV-22 Flight Tracks at LZ Ku Tree
050 Degree Approach Headings with Right Handed Patterns

N	0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 Scale in Feet 1:144,000 (1 inch = 12,000 feet)



Modeled MV-22 Flight Tracks at LZ Ku Tree
230 Degree Approach Headings with Left Handed Patterns

N	0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 Scale in Feet 1:144,000 (1 inch = 12,000 feet)



Modeled MV-22 Flight Tracks at LZ Ku Tree
230 Degree Approach Headings with Right Handed Patterns

N	0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 Scale in Feet 1:144,000 (1 inch = 12,000 feet)

D-2.4.3 SBER ALTERNATIVE C (NO ACTION)

D-2.4.3.1 Modeled Events

Table 2.4-4 Modeled Daily Events for Helicopters at LZ Ku Tree for Busiest Month for Alternative C (No Action)

Heading	Op Type	Turn Direction	Track Type	Track ID	CH-53 Profile ID	Day (0700 - 2200)	Night (2200 - 0700)	Army Helos Profile ID	Day (0700 - 2200)	Night (2200 - 0700)
50	Ingress	Straight In	Straight In	AKT08-5	CKT05-5_2	0.007230	-	HKT05-5_2	0.024899	0.000369
		Left	180 deg	AKT08-1L	CKT05-1L3	0.001807	-	HKT05-1L3	0.006225	0.000092
			90 deg	AKT08-2L	CKT05-2L2	0.001807	-	HKT05-2L2	0.006225	0.000092
			270 deg	AKT08-3L	CKT05-3L2	0.001807	-	HKT05-3L2	0.006225	0.000092
			Hasty	AKT08-4L	CKT05-4L3	0.001807	-	HKT05-4L3	0.006225	0.000092
		Right	180 deg	AKT08-1R	CKT05-1R3	0.001862	-	HKT05-1R3	0.006413	0.000095
			90 deg	AKT08-2R	CKT05-2R2	0.001862	-	HKT05-2R2	0.006413	0.000095
			270 deg	AKT08-3R	CKT05-3R2	0.001862	-	HKT05-3R2	0.006413	0.000095
			Hasty	AKT08-4R	CKT05-4R3	0.001862	-	HKT05-4R3	0.006413	0.000095
	Pattern	Left	Left Pattern	AKTT08-1L	CKTT05-1L	0.043818	-	HKTT05-1L	0.150904	0.002236
		Right	Right Pattern	AKTT08-1R	CKTT05-1R	0.043818	-	HKTT05-1R	0.150904	0.002236
	Egress	Left	Departure	AKTD08-1L	CKTD05-1L3	0.003615	-	HKTD05-1L3	0.012450	0.000184
			Departure	AKTD08-2L	CKTD05-2L3	0.003615	-	HKTD05-2L3	0.012450	0.000184
		Right	Departure	AKTD08-1R	CKTD05-1R3	0.003615	-	HKTD05-1R3	0.012450	0.000184
			Departure	AKTD08-2R	CKTD05-2R3	0.003615	-	HKTD05-2R3	0.012450	0.000184
		Straight Out	Straight Out	AKTD08-5	CKTD05-5_3	0.007449	-	HKTD05-5_3	0.025654	0.000380
230	Ingress	Straight In	Straight In	AKT26-5	CKT23-5_2	0.001315	-	HKT23-5_2	0.004527	0.000067
		Left	180 deg	AKT26-1L	CKT23-1L3	0.000319	-	HKT23-1L3	0.001098	0.000016
			90 deg	AKT26-2L	CKT23-2L2	0.000319	-	HKT23-2L2	0.001098	0.000016
			270 deg	AKT26-3L	CKT23-3L2	0.000319	-	HKT23-3L2	0.001098	0.000016
			Hasty	AKT26-4L	CKT23-4L3	0.000319	-	HKT23-4L3	0.001098	0.000016
		Right	180 deg	AKT26-1R	CKT23-1R3	0.000319	-	HKT23-1R3	0.001098	0.000016
			90 deg	AKT26-2R	CKT23-2R2	0.000319	-	HKT23-2R2	0.001098	0.000016
			270 deg	AKT26-3R	CKT23-3R2	0.000319	-	HKT23-3R2	0.001098	0.000016
			Hasty	AKT26-4R	CKT23-4R3	0.000319	-	HKT23-4R3	0.001098	0.000016
	Pattern	Left	Left Pattern	AKTT26-1L	CKTT23-1L	0.007733	-	HKTT23-1L	0.026630	0.000395
		Right	Right Pattern	AKTT26-1R	CKTT23-1R	0.007733	-	HKTT23-1R	0.026630	0.000395
	Egress	Left	Departure	AKTD26-1L	CKTD23-1L3	0.000638	-	HKTD23-1L3	0.002197	0.000033
			Departure	AKTD26-2L	CKTD23-2L3	0.000638	-	HKTD23-2L3	0.002197	0.000033
		Right	Departure	AKTD26-1R	CKTD23-1R3	0.000638	-	HKTD23-1R3	0.002197	0.000033
			Departure	AKTD26-2R	CKTD23-2R3	0.000638	-	HKTD23-2R3	0.002197	0.000033
		Straight Out	Straight Out	AKTD26-5	CKTD23-5_3	0.001315	-	HKTD23-5_3	0.004527	0.000067

Notes: (1) Same track utilization as LZ Black at KTA

D-2.5 DILLINGHAM MILITARY RESERVATION (DMR)

D-2.5.1 DMR BASELINE SCENARIO

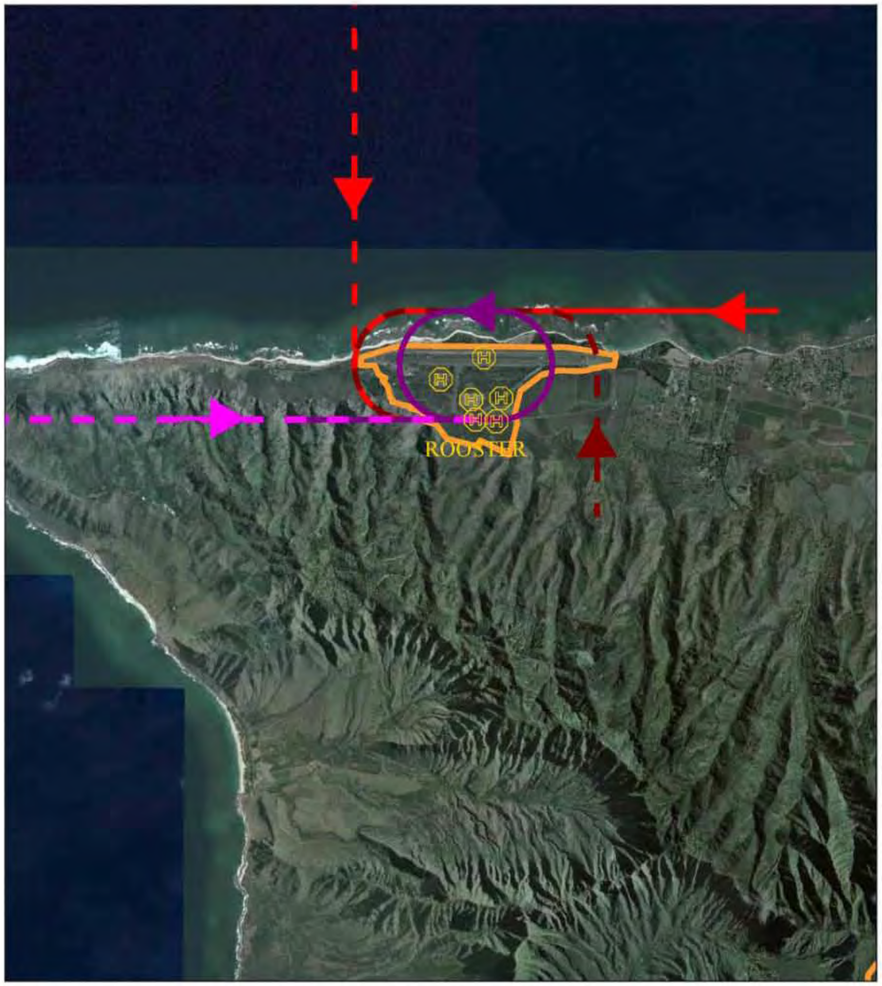
D-2.5.1.1 Modeled Events

Table 2.5-1 Modeled Daily Events for Helicopters at any of the 6 LZs at DMR for Baseline Busiest Month

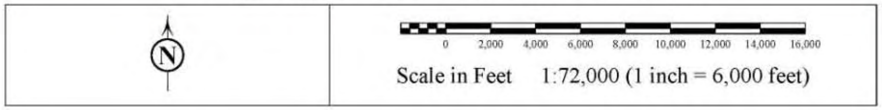
Heading	Op Type	Turn Direction	Track Type	Track ID	CH-53 Profile ID	Day (0700 - 2200)	Night (2200 - 0700)	Army Helos Profile ID	Day (0700 - 2200)	Night (2200 - 0700)
50	Ingress	Straight In	Straight In	ARO08-5	CRO08-5_2	0.009960	0.000369	HRO08-5_2	0.027666	0.000553
		Left	180 deg	ARO08-1L	CRO08-1L3	0.002490	0.000092	HRO08-1L3	0.006916	0.000138
			90 deg	ARO08-2L	CRO08-2L2	0.002490	0.000092	HRO08-2L2	0.006916	0.000138
			270 deg	ARO08-3L	CRO08-3L2	0.002490	0.000092	HRO08-3L2	0.006916	0.000138
			Hasty	ARO08-4L	CRO08-4L3	0.002490	0.000092	HRO08-4L3	0.006916	0.000138
		Right	180 deg	ARO08-1R	CRO08-1R3	0.002565	0.000095	HRO08-1R3	0.007126	0.000143
			90 deg	ARO08-2R	CRO08-2R2	0.002565	0.000095	HRO08-2R2	0.007126	0.000143
			270 deg	ARO08-3R	CRO08-3R2	0.002565	0.000095	HRO08-3R2	0.007126	0.000143
			Hasty	ARO08-4R	CRO08-4R3	0.002565	0.000095	HRO08-4R3	0.007126	0.000143
	Pattern	Left	Left Pattern	AROT08-1L	CROT08-1L	0.060362	0.002236	HROT08-1L	0.167671	0.003353
		Right	Right Pattern	AROT08-1R	CROT08-1R	0.060362	0.002236	HROT08-1R	0.167671	0.003353
	Egress	Left	Departure	AROD08-1L	CROD08-1L3	0.004980	0.000184	HROD08-1L3	0.013833	0.000277
			Departure	AROD08-2L	CROD08-2L3	0.004980	0.000184	HROD08-2L3	0.013833	0.000277
		Right	Departure	AROD08-1R	CROD08-1R3	0.004980	0.000184	HROD08-1R3	0.013833	0.000277
			Departure	AROD08-2R	CROD08-2R3	0.004980	0.000184	HROD08-2R3	0.013833	0.000277
		Straight Out	Straight Out	AROD08-5	CROD08-5_3	0.010261	0.000380	HROD08-5_3	0.028504	0.000570
230	Ingress	Straight In	Straight In	ARO26-5	CRO26-5_2	0.001811	0.000067	HRO26-5_2	0.005030	0.000101
		Left	180 deg	ARO26-1L	CRO26-1L3	0.000439	0.000016	HRO26-1L3	0.001221	0.000024
			90 deg	ARO26-2L	CRO26-2L2	0.000439	0.000016	HRO26-2L2	0.001221	0.000024
			270 deg	ARO26-3L	CRO26-3L2	0.000439	0.000016	HRO26-3L2	0.001221	0.000024
			Hasty	ARO26-4L	CRO26-4L3	0.000439	0.000016	HRO26-4L3	0.001221	0.000024
		Right	180 deg	ARO26-1R	CRO26-1R3	0.000439	0.000016	HRO26-1R3	0.001221	0.000024
			90 deg	ARO26-2R	CRO26-2R2	0.000439	0.000016	HRO26-2R2	0.001221	0.000024
			270 deg	ARO26-3R	CRO26-3R2	0.000439	0.000016	HRO26-3R2	0.001221	0.000024
			Hasty	ARO26-4R	CRO26-4R3	0.000439	0.000016	HRO26-4R3	0.001221	0.000024
	Pattern	Left	Left Pattern	AROT26-1L	CROT26-1L	0.010652	0.000395	HROT26-1L	0.029589	0.000592
		Right	Right Pattern	AROT26-1R	CROT26-1R	0.010652	0.000395	HROT26-1R	0.029589	0.000592
	Egress	Left	Departure	AROD26-1L	CROD26-1L3	0.000879	0.000033	HROD26-1L3	0.002441	0.000049
			Departure	AROD26-2L	CROD26-2L3	0.000879	0.000033	HROD26-2L3	0.002441	0.000049
		Right	Departure	AROD26-1R	CROD26-1R3	0.000879	0.000033	HROD26-1R3	0.002441	0.000049
			Departure	AROD26-2R	CROD26-2R3	0.000879	0.000033	HROD26-2R3	0.002441	0.000049
		Straight Out	Straight Out	AROD26-5	CROD26-5_3	0.001811	0.000067	HROD26-5_3	0.005030	0.000101

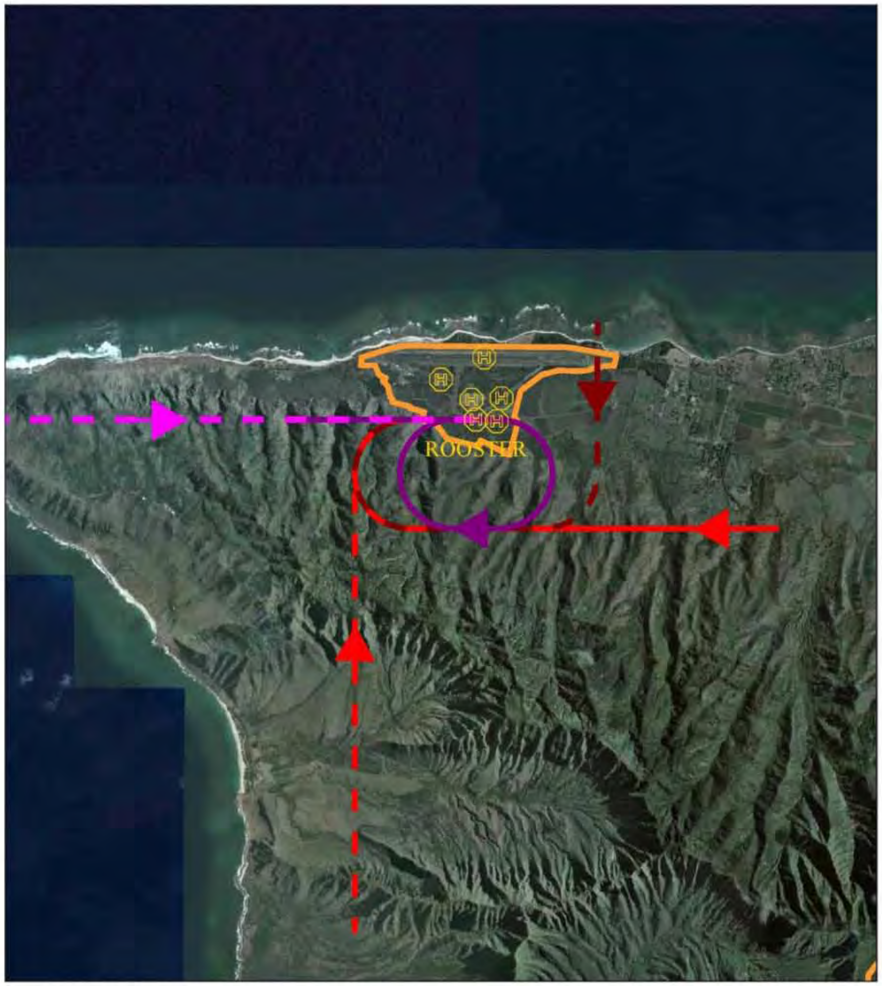
Notes: (1) LZ Rooster Tracks, Profiles, and modeled events shown above
(2) Remaining 5 LZs (Dillingham Rwy, Dillingham DZ, Finch, Blue Jay, and Albatros) modeled with the same track type distribution and same numbers of events as LZ Rooster

D-2.5.1.2 DMR Modeled Flight Tracks (LZ Rooster as Representative)



Modeled Helicopter Flight Tracks to Dillingham Landing Zones - Rooster LZ Tracks Shown
080 Degree Approach Headings with Left Handed Patterns





Modeled Helicopter Flight Tracks to Dillingham Landing Zones - Rooster LZ Tracks Shown
080 Degree Approach Headings with Right Handed Patterns

N

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000

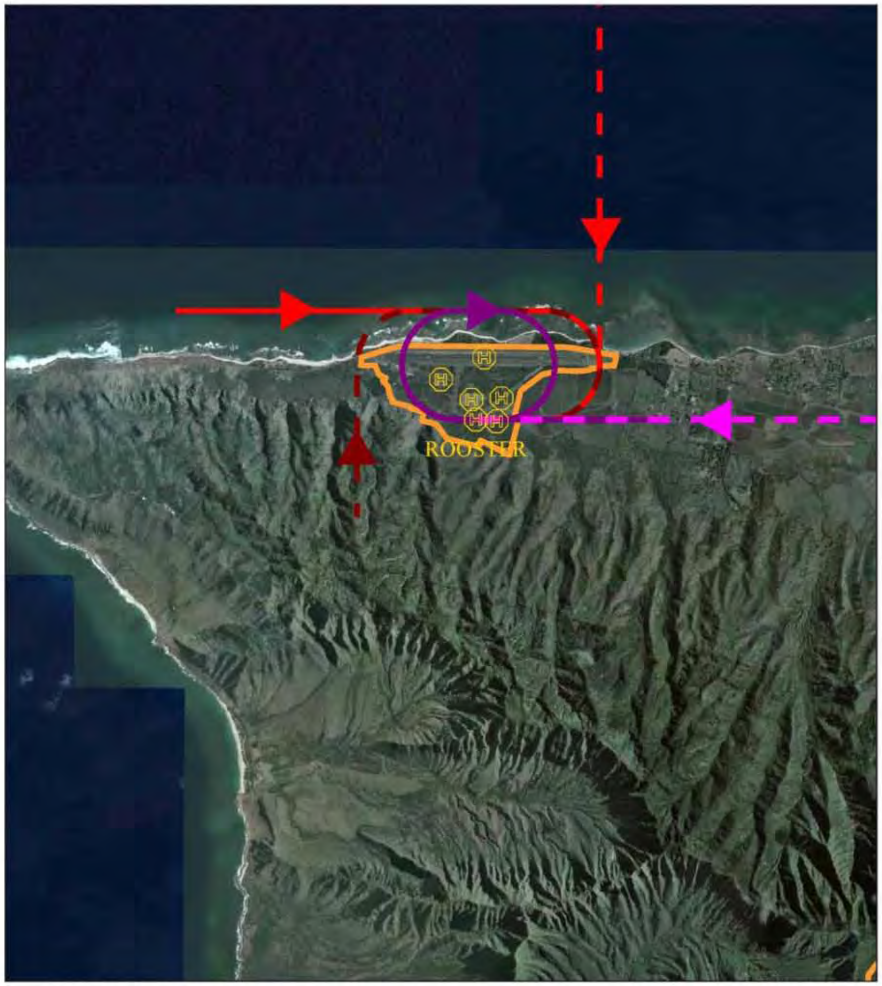
Scale in Feet 1:72,000 (1 inch = 6,000 feet)

Modeled Helicopter Flight Tracks to Dillingham Landing Zones - Rooster LZ Tracks Shown
260 Degree Approach Headings with Left Handed Patterns

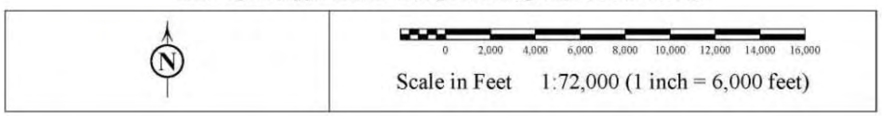
N

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000

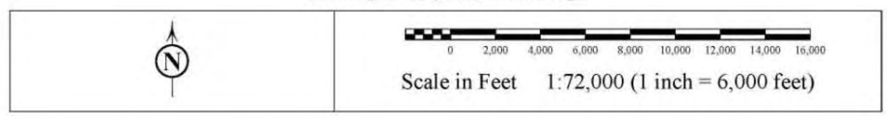
Scale in Feet 1:72,000 (1 inch = 6,000 feet)



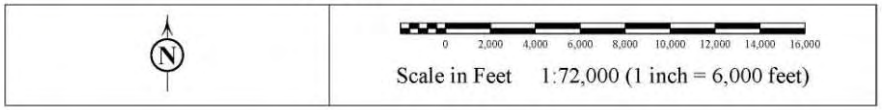
Modeled Helicopter Flight Tracks to Dillingham Landing Zones - Rooster LZ Tracks Shown
260 Degree Approach Headings with Right Handed Patterns

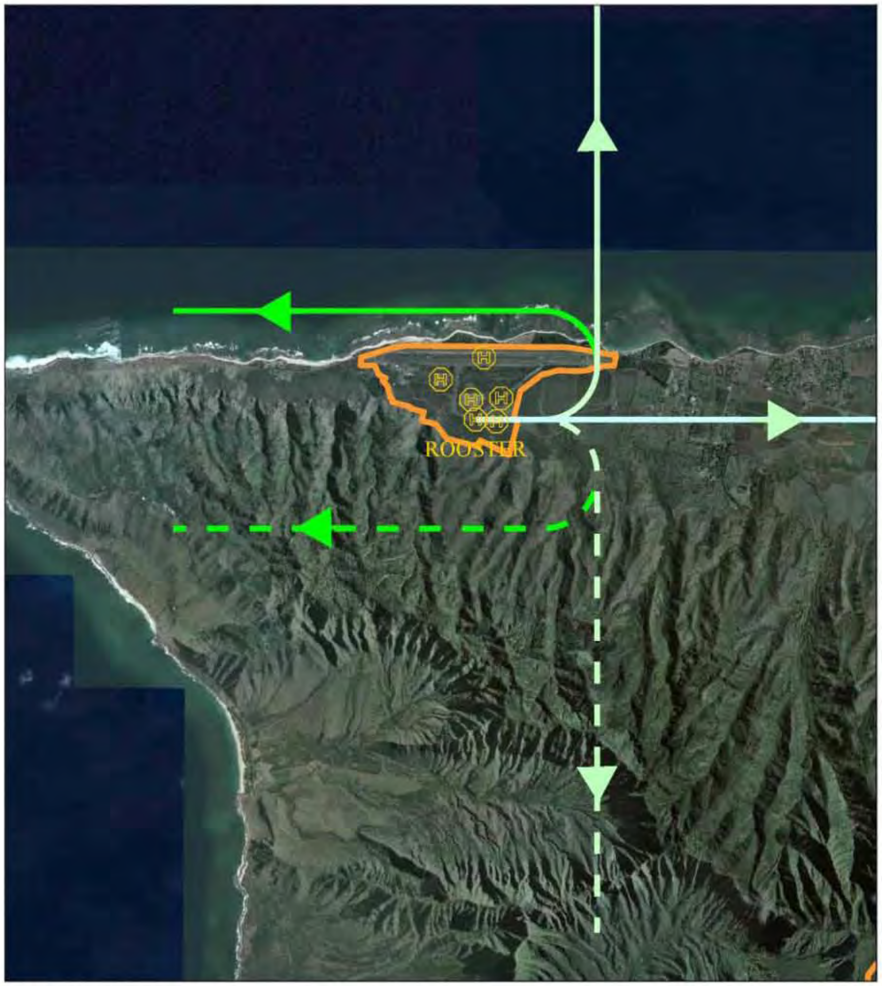


Modeled Helicopter Closed Pattern Flight Tracks at Dillingham - Rooster LZ Tracks Shown
080 Degree Departure Headings

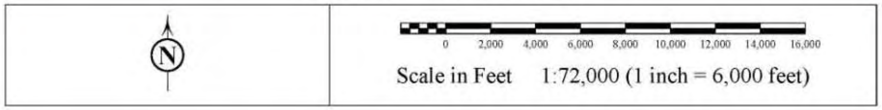


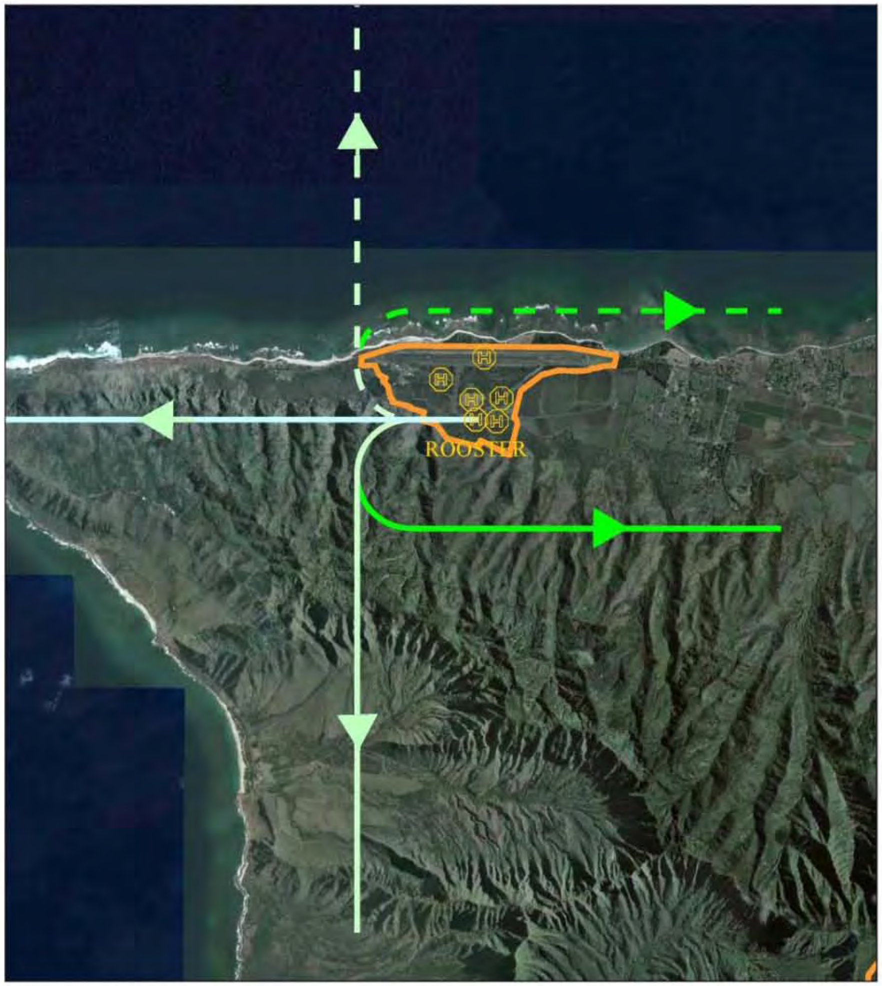
Modeled Helicopter Closed Pattern Flight Tracks at Dillingham - Rooster LZ Tracks Shown
260 Degree Departure Headings





Modeled Helicopter Flight Tracks from Dillingham Landing Zones - Rooster LZ Tracks Shown
080 Degree Departure Headings





Modeled Helicopter Flight Tracks from Dillingham Landing Zones - Rooster LZ Tracks Shown
260 Degree Departure Headings

N	0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000 Scale in Feet 1:72,000 (1 inch = 6,000 feet)

D-2.5.2 DMR ALTERNATIVES A/B

D-2.5.2.1 Modeled Events

Table 2.5-2 Modeled Daily Events for MV-22 at any of the 6 LZs at DMR for Busiest Month for Alternatives A/B

LZ Name	Heading	Heading Utilization	Turn Direction	Direction Utilization	Profile Type	Type Utilization	Track ID	Profile ID	Day (0700 - 2200)	Night (2200 - 0700)
Rooster	080	85%	Left	50%	Straight in	28.6%	RO08-1L	RO08-1L	0.0431	0.0024
					90 deg	28.6%	RO08-2L	RO08-2L	0.0431	0.0024
					180 deg	14.3%	RO08-3L	RO08-3L	0.0216	0.0012
					Hasty	14.3%	RO08-4L	RO08-4L	0.0216	0.0012
					Conversion	14.3%	RO08-5L	RO08-5L	0.0216	0.0012
			Right	50%	Straight in	28.6%	RO08-1R	RO08-1R	0.0431	0.0024
					90 deg	28.6%	RO08-2R	RO08-2R	0.0431	0.0024
					180 deg	14.3%	RO08-3R	RO08-3R	0.0216	0.0012
					Hasty	14.3%	RO08-4R	RO08-4R	0.0216	0.0012
					Conversion	14.3%	RO08-5R	RO08-5R	0.0216	0.0012
	260	15%	Left	50%	Straight in	28.6%	RO26-1L	RO26-1L	0.0076	0.0004
					90 deg	28.6%	RO26-2L	RO26-2L	0.0076	0.0004
					180 deg	14.3%	RO26-3L	RO26-3L	0.0038	0.0002
					Hasty	14.3%	RO26-4L	RO26-4L	0.0038	0.0002
					Conversion	14.3%	RO26-5L	RO26-5L	0.0038	0.0002
			Right	50%	Straight in	28.6%	RO26-1R	RO26-1R	0.0076	0.0004
					90 deg	28.6%	RO26-2R	RO26-2R	0.0076	0.0004
					180 deg	14.3%	RO26-3R	RO26-3R	0.0038	0.0002
					Hasty	14.3%	RO26-4R	RO26-4R	0.0038	0.0002
					Conversion	14.3%	RO26-5R	RO26-5R	0.0038	0.0002

Notes: (1) LZ Rooster Tracks, Profiles, and modeled events shown above
(2) Remaining 5 LZs (Dillingham Rwy, Dillingham DZ, Finch, Blue Jay, and Albatros) modeled with the same track type distribution and same numbers of events as LZ Rooster

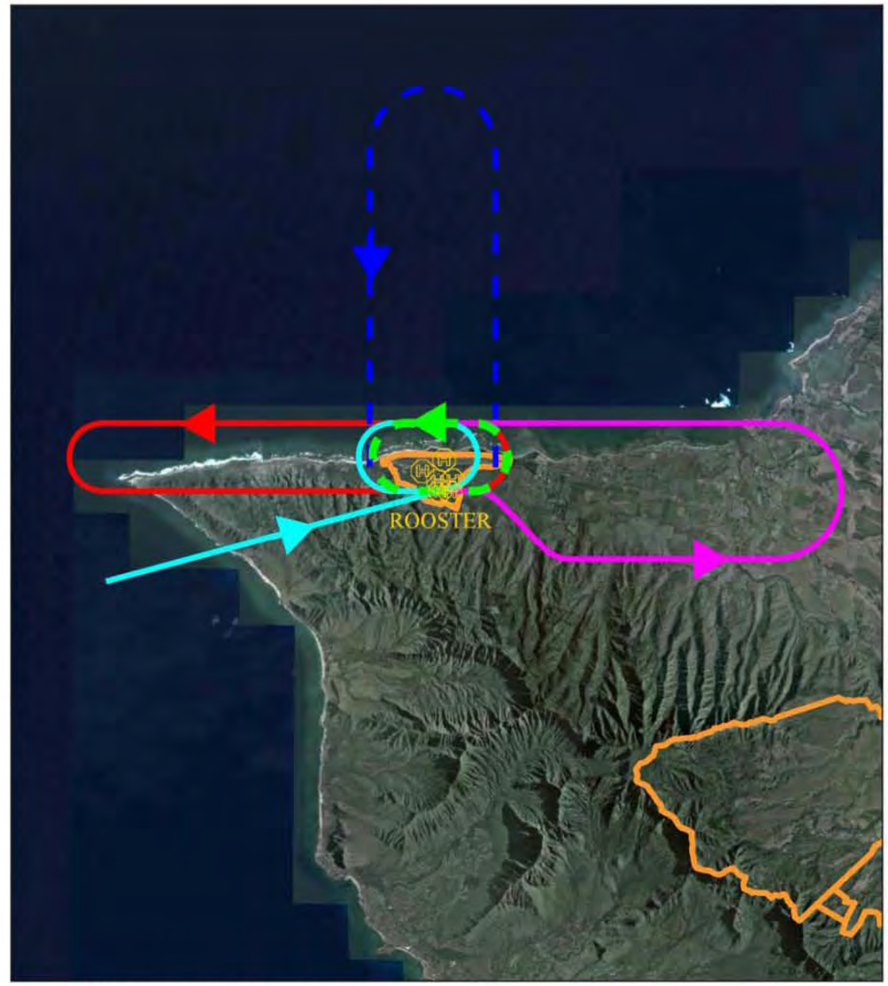
Table 2.5-3 Modeled Daily Events for Helicopters at any of the 6 LZs at DMR for Busiest Month for Alternatives A/B

Heading	Op Type	Turn Direction	Track Type	Track ID	CH-53 Profile ID	Day (0700 - 2200)	Night (2200 - 0700)	AH-1/ UH-1 Profile ID	Day (0700 - 2200)	Night (2200 - 0700)	Army Helos Profile ID	Day (0700 - 2200)	Night (2200 - 0700)
50	Ingress	Straight In	Straight In	ARO08-5	CRO08-5_2	0.004427	0.000184	ARO08-5_2	0.012911	0.000553	HRO08-5_2	0.085579	0.001660
		Left	180 deg	ARO08-1L	CRO08-1L3	0.001107	0.000046	ARO08-1L3	0.003228	0.000138	HRO08-1L3	0.021395	0.000415
			90 deg	ARO08-2L	CRO08-2L2	0.001107	0.000046	ARO08-2L2	0.003228	0.000138	HRO08-2L2	0.021395	0.000415
			270 deg	ARO08-3L	CRO08-3L2	0.001107	0.000046	ARO08-3L2	0.003228	0.000138	HRO08-3L2	0.021395	0.000415
			Hasty	ARO08-4L	CRO08-4L3	0.001107	0.000046	ARO08-4L3	0.003228	0.000138	HRO08-4L3	0.021395	0.000415
		Right	180 deg	ARO08-1R	CRO08-1R3	0.001140	0.000048	ARO08-1R3	0.003325	0.000143	HRO08-1R3	0.022043	0.000428
			90 deg	ARO08-2R	CRO08-2R2	0.001140	0.000048	ARO08-2R2	0.003325	0.000143	HRO08-2R2	0.022043	0.000428
			270 deg	ARO08-3R	CRO08-3R2	0.001140	0.000048	ARO08-3R2	0.003325	0.000143	HRO08-3R2	0.022043	0.000428
			Hasty	ARO08-4R	CRO08-4R3	0.001140	0.000048	ARO08-4R3	0.003325	0.000143	HRO08-4R3	0.022043	0.000428
	Pattern	Left	Left Pattern	AROT08-1L	CROT08-1L	0.026827	0.001118	AROT08-1L	0.078247	0.003353	HROT08-1L	0.518663	0.010060
		Right	Right Pattern	AROT08-1R	CROT08-1R	0.026827	0.001118	AROT08-1R	0.078247	0.003353	HROT08-1R	0.518663	0.010060
	Egress	Left	Departure	AROD08-1L	CROD08-1L3	0.002213	0.000092	AROD08-1L3	0.006455	0.000277	HROD08-1L3	0.042790	0.000830
			Departure	AROD08-2L	CROD08-2L3	0.002213	0.000092	AROD08-2L3	0.006455	0.000277	HROD08-2L3	0.042790	0.000830
		Right	Departure	AROD08-1R	CROD08-1R3	0.002213	0.000092	AROD08-1R3	0.006455	0.000277	HROD08-1R3	0.042790	0.000830
			Departure	AROD08-2R	CROD08-2R3	0.002213	0.000092	AROD08-2R3	0.006455	0.000277	HROD08-2R3	0.042790	0.000830
		Straight Out	Straight Out	AROD08-5	CROD08-5_3	0.004561	0.000190	AROD08-5_3	0.013302	0.000570	HROD08-5_3	0.088173	0.001710
230	Ingress	Straight In	Straight In	ARO26-5	CRO26-5_2	0.000805	0.000034	ARO26-5_2	0.002347	0.000101	HRO26-5_2	0.015560	0.000302
		Left	180 deg	ARO26-1L	CRO26-1L3	0.000195	0.000008	ARO26-1L3	0.000570	0.000024	HRO26-1L3	0.003776	0.000073
			90 deg	ARO26-2L	CRO26-2L2	0.000195	0.000008	ARO26-2L2	0.000570	0.000024	HRO26-2L2	0.003776	0.000073
			270 deg	ARO26-3L	CRO26-3L2	0.000195	0.000008	ARO26-3L2	0.000570	0.000024	HRO26-3L2	0.003776	0.000073
			Hasty	ARO26-4L	CRO26-4L3	0.000195	0.000008	ARO26-4L3	0.000570	0.000024	HRO26-4L3	0.003776	0.000073
		Right	180 deg	ARO26-1R	CRO26-1R3	0.000195	0.000008	ARO26-1R3	0.000570	0.000024	HRO26-1R3	0.003776	0.000073
			90 deg	ARO26-2R	CRO26-2R2	0.000195	0.000008	ARO26-2R2	0.000570	0.000024	HRO26-2R2	0.003776	0.000073
			270 deg	ARO26-3R	CRO26-3R2	0.000195	0.000008	ARO26-3R2	0.000570	0.000024	HRO26-3R2	0.003776	0.000073
			Hasty	ARO26-4R	CRO26-4R3	0.000195	0.000008	ARO26-4R3	0.000570	0.000024	HRO26-4R3	0.003776	0.000073
	Pattern	Left	Left Pattern	AROT26-1L	CROT26-1L	0.004734	0.000197	AROT26-1L	0.013808	0.000592	HROT26-1L	0.091529	0.001775
		Right	Right Pattern	AROT26-1R	CROT26-1R	0.004734	0.000197	AROT26-1R	0.013808	0.000592	HROT26-1R	0.091529	0.001775
	Egress	Left	Departure	AROD26-1L	CROD26-1L3	0.000391	0.000016	AROD26-1L3	0.001139	0.000049	HROD26-1L3	0.007551	0.000146
			Departure	AROD26-2L	CROD26-2L3	0.000391	0.000016	AROD26-2L3	0.001139	0.000049	HROD26-2L3	0.007551	0.000146
		Right	Departure	AROD26-1R	CROD26-1R3	0.000391	0.000016	AROD26-1R3	0.001139	0.000049	HROD26-1R3	0.007551	0.000146
			Departure	AROD26-2R	CROD26-2R3	0.000391	0.000016	AROD26-2R3	0.001139	0.000049	HROD26-2R3	0.007551	0.000146
		Straight Out	Straight Out	AROD26-5	CROD26-5_3	0.000805	0.000034	AROD26-5_3	0.002347	0.000101	HROD26-5_3	0.015560	0.000302

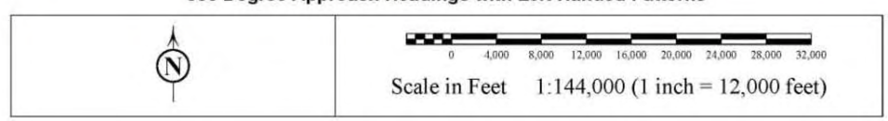
Notes: (1) LZ Rooster Tracks, Profiles, and modeled events shown above

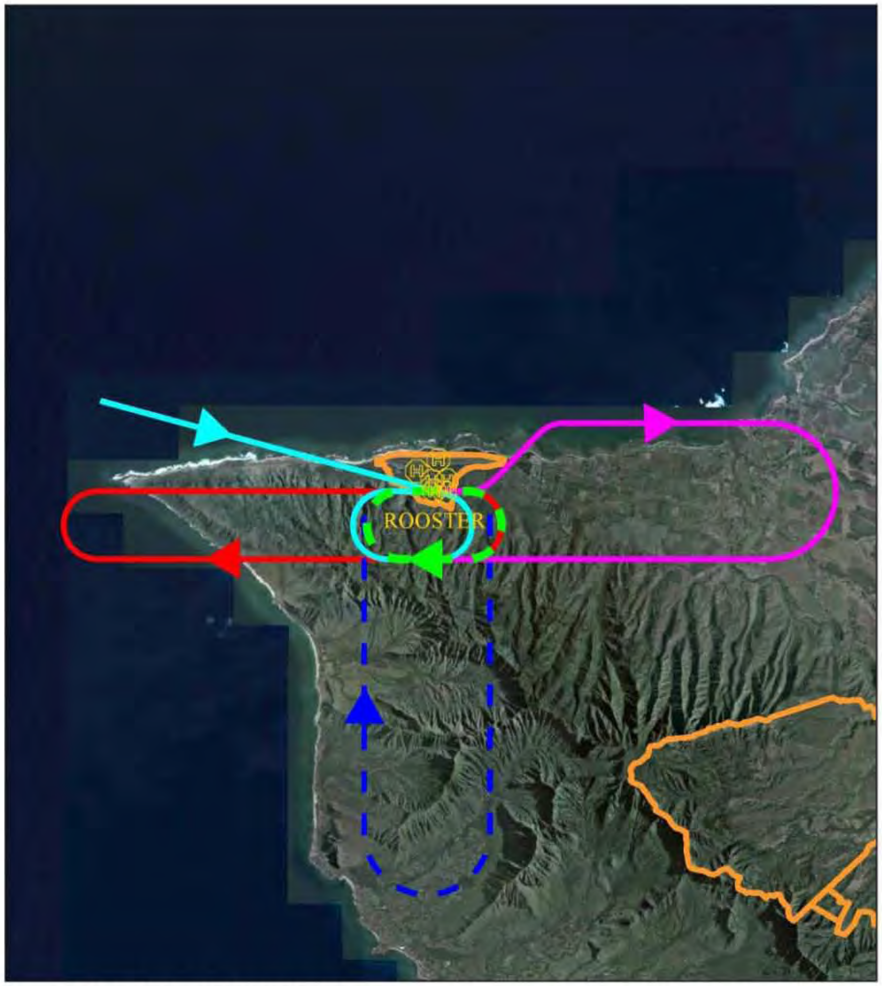
(2) Remaining 5 LZs (Dillingham Rwy, Dillingham DZ, Finch, Blue Jay, and Albatros) modeled with the same track type distribution and same numbers of events as LZ Rooster

D-2.5.2.2 DMR Modeled Flight Tracks (MV-22 only; LZ Rooster as Representative)

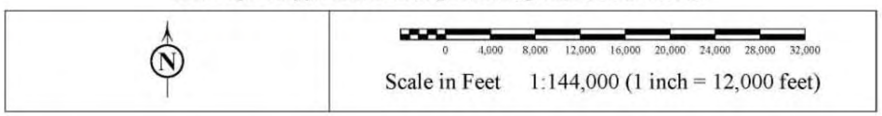


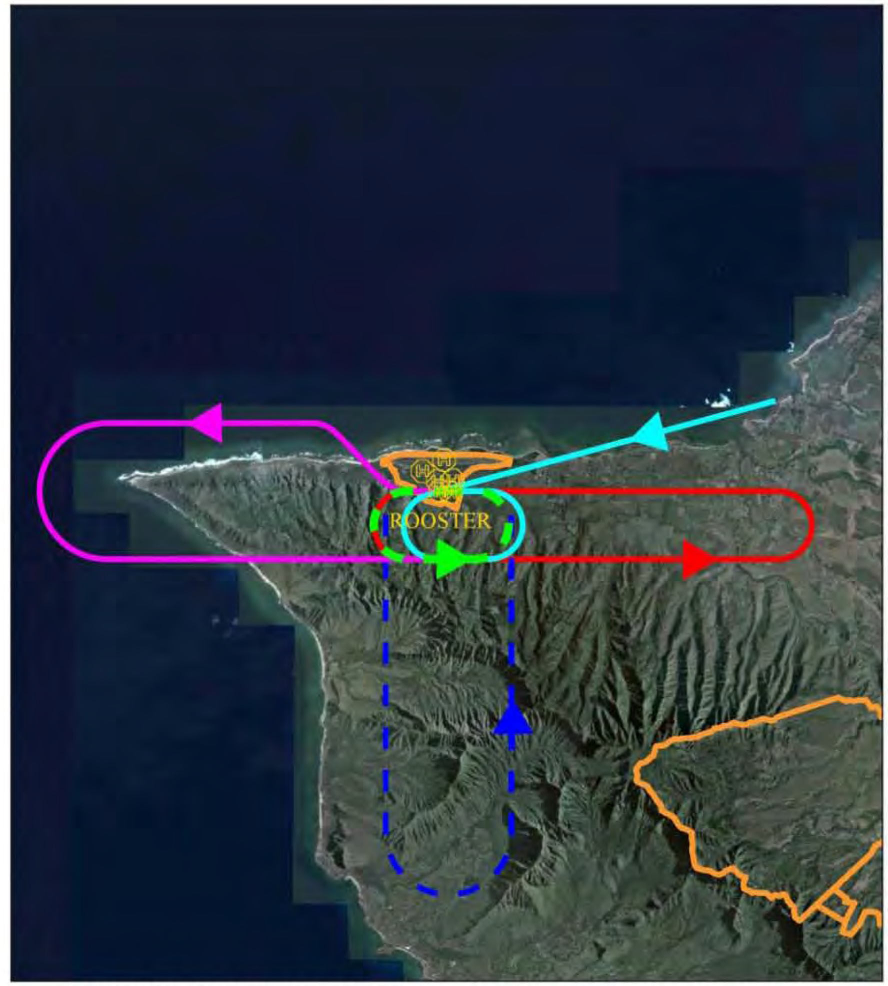
Modeled MV-22 Flight Tracks at Dillingham Landing Zones - Rooster LZ Tracks Shown
080 Degree Approach Headings with Left Handed Patterns



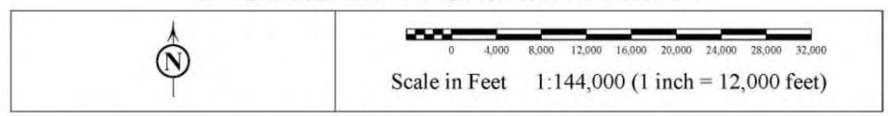


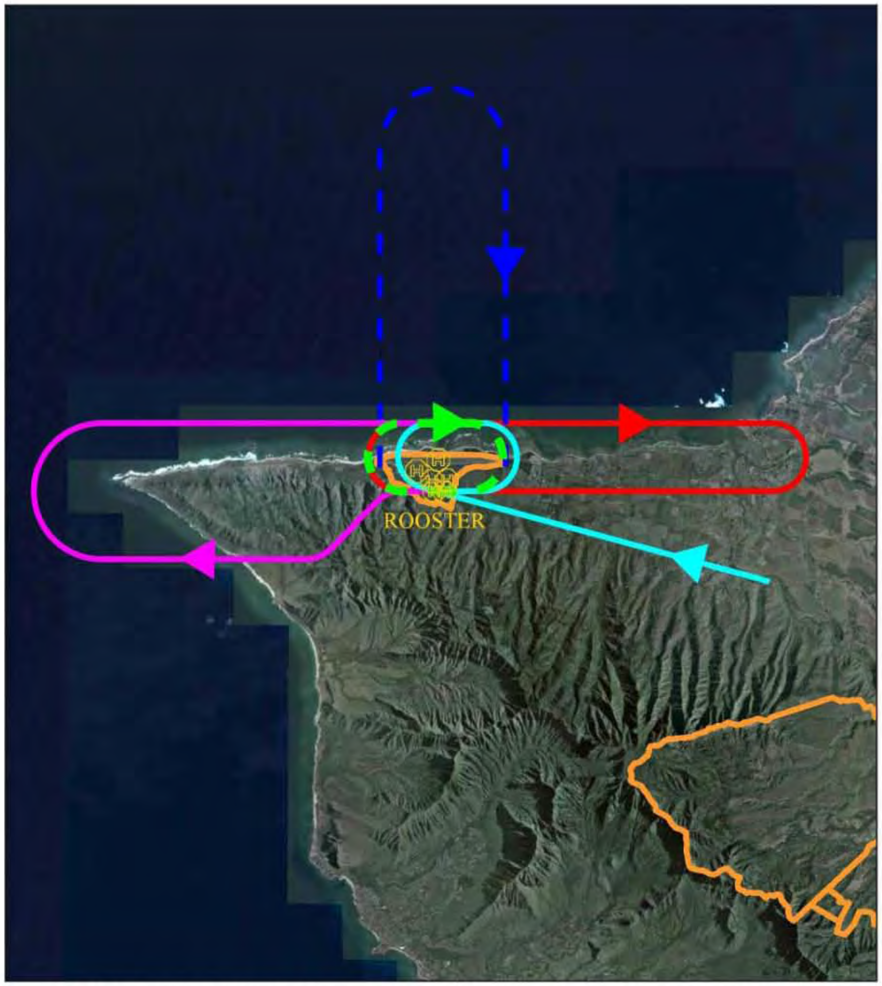
Modeled MV-22 Flight Tracks at Dillingham Landing Zones - Rooster LZ Tracks Shown
080 Degree Approach Headings with Right Handed Patterns





Modeled MV-22 Flight Tracks at Dillingham Landing Zones - Rooster LZ Tracks Shown
260 Degree Approach Headings with Left Handed Patterns





Modeled MV-22 Flight Tracks at Dillingham Landing Zones - Rooster LZ Tracks Shown
260 Degree Approach Headings with Right Handed Patterns

N

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000

Scale in Feet 1:144,000 (1 inch = 12,000 feet)

D-2.5.3 DMR ALTERNATIVE C (NO ACTION)

D-2.5.3.1 Modeled Events

Table 2.5-4 Modeled Daily Events for Helicopters at any of 6 LZs at DMR for Busiest Month for Alternative C (No Action)

Heading	Op Type	Turn Direction	Track Type	Track ID	CH-53 Profile ID	Day (0700 - 2200)	Night (2200 - 0700)	Army Helos Profile ID	Day (0700 - 2200)	Night (2200 - 0700)
50	Ingress	Straight In	Straight In	ARO08-5	CRO08-5_2	0.006197	0.000258	HRO08-5_2	0.085579	0.001660
		Left	180 deg	ARO08-1L	CRO08-1L3	0.001549	0.000065	HRO08-1L3	0.021395	0.000415
			90 deg	ARO08-2L	CRO08-2L2	0.001549	0.000065	HRO08-2L2	0.021395	0.000415
			270 deg	ARO08-3L	CRO08-3L2	0.001549	0.000065	HRO08-3L2	0.021395	0.000415
			Hasty	ARO08-4L	CRO08-4L3	0.001549	0.000065	HRO08-4L3	0.021395	0.000415
		Right	180 deg	ARO08-1R	CRO08-1R3	0.001596	0.000067	HRO08-1R3	0.022043	0.000428
			90 deg	ARO08-2R	CRO08-2R2	0.001596	0.000067	HRO08-2R2	0.022043	0.000428
			270 deg	ARO08-3R	CRO08-3R2	0.001596	0.000067	HRO08-3R2	0.022043	0.000428
			Hasty	ARO08-4R	CRO08-4R3	0.001596	0.000067	HRO08-4R3	0.022043	0.000428
	Pattern	Left	Left Pattern	AROT08-1L	CROT08-1L	0.037558	0.001565	HROT08-1L	0.518663	0.010060
		Right	Right Pattern	AROT08-1R	CROT08-1R	0.037558	0.001565	HROT08-1R	0.518663	0.010060
	Egress	Left	Departure	AROD08-1L	CROD08-1L3	0.003099	0.000129	HROD08-1L3	0.042790	0.000830
			Departure	AROD08-2L	CROD08-2L3	0.003099	0.000129	HROD08-2L3	0.042790	0.000830
		Right	Departure	AROD08-1R	CROD08-1R3	0.003099	0.000129	HROD08-1R3	0.042790	0.000830
			Departure	AROD08-2R	CROD08-2R3	0.003099	0.000129	HROD08-2R3	0.042790	0.000830
		Straight Out	Straight Out	AROD08-5	CROD08-5_3	0.006385	0.000266	HROD08-5_3	0.088173	0.001710
230	Ingress	Straight In	Straight In	ARO26-5	CRO26-5_2	0.001127	0.000047	HRO26-5_2	0.015560	0.000302
		Left	180 deg	ARO26-1L	CRO26-1L3	0.000273	0.000011	HRO26-1L3	0.003776	0.000073
			90 deg	ARO26-2L	CRO26-2L2	0.000273	0.000011	HRO26-2L2	0.003776	0.000073
			270 deg	ARO26-3L	CRO26-3L2	0.000273	0.000011	HRO26-3L2	0.003776	0.000073
			Hasty	ARO26-4L	CRO26-4L3	0.000273	0.000011	HRO26-4L3	0.003776	0.000073
		Right	180 deg	ARO26-1R	CRO26-1R3	0.000273	0.000011	HRO26-1R3	0.003776	0.000073
			90 deg	ARO26-2R	CRO26-2R2	0.000273	0.000011	HRO26-2R2	0.003776	0.000073
			270 deg	ARO26-3R	CRO26-3R2	0.000273	0.000011	HRO26-3R2	0.003776	0.000073
			Hasty	ARO26-4R	CRO26-4R3	0.000273	0.000011	HRO26-4R3	0.003776	0.000073
	Pattern	Left	Left Pattern	AROT26-1L	CROT26-1L	0.006628	0.000276	HROT26-1L	0.091529	0.001775
		Right	Right Pattern	AROT26-1R	CROT26-1R	0.006628	0.000276	HROT26-1R	0.091529	0.001775
	Egress	Left	Departure	AROD26-1L	CROD26-1L3	0.000547	0.000023	HROD26-1L3	0.007551	0.000146
			Departure	AROD26-2L	CROD26-2L3	0.000547	0.000023	HROD26-2L3	0.007551	0.000146
		Right	Departure	AROD26-1R	CROD26-1R3	0.000547	0.000023	HROD26-1R3	0.007551	0.000146
			Departure	AROD26-2R	CROD26-2R3	0.000547	0.000023	HROD26-2R3	0.007551	0.000146
		Straight Out	Straight Out	AROD26-5	CROD26-5_3	0.001127	0.000047	HROD26-5_3	0.015560	0.000302

Notes: (1) LZ Rooster Tracks, Profiles, and modeled events shown above

(2) Remaining 5 LZs (Dillingham Rwy, Dillingham DZ, Finch, Blue Jay, and Albatros) modeled with the same track type distribution and same numbers of events as LZ Rooster

D-2.6 KALAUPAPA AIRPORT

D-2.6.1 KALAUPAPA BASELINE SCENARIO

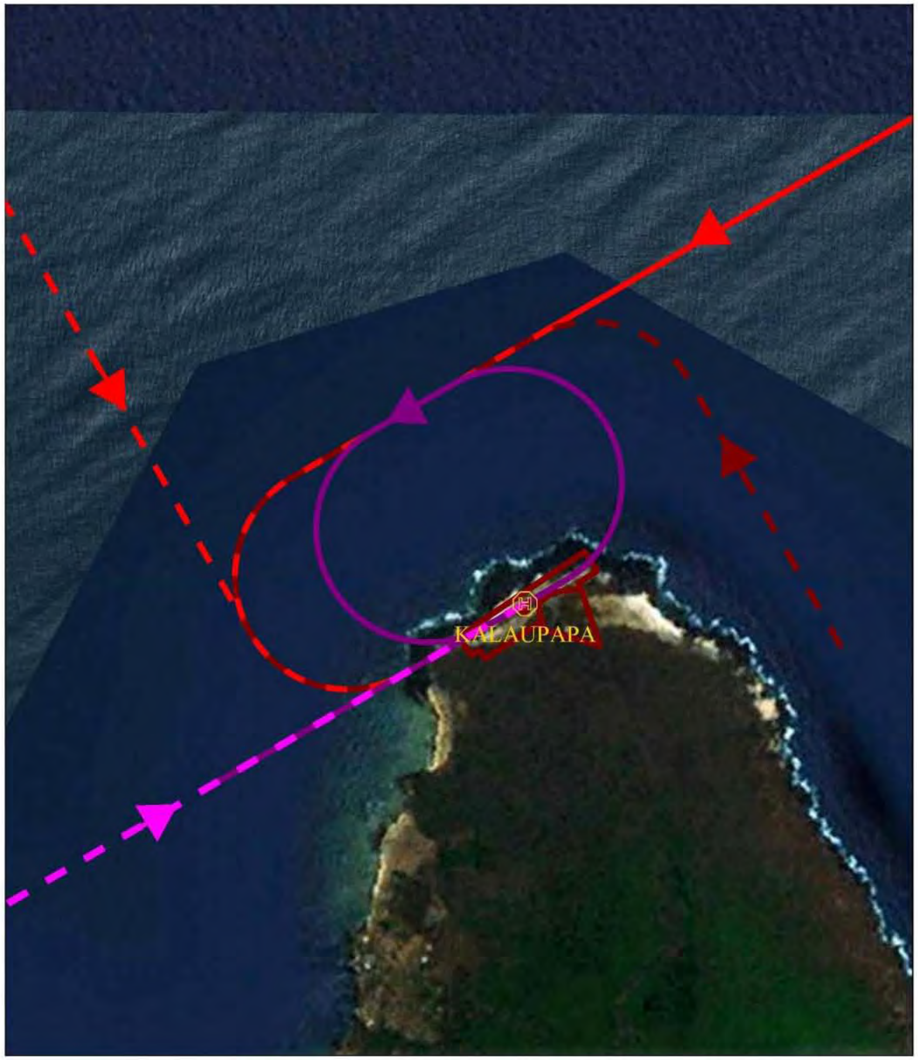
D-2.6.1.1 Modeled Events

Table 2.6-1 Modeled Daily Events for Helicopters at Kalaupapa Airport for Baseline Busiest Month

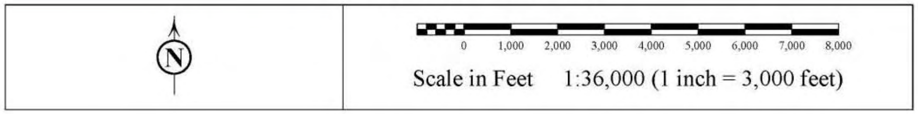
Heading	Heading Utilization	Op Type	Op Type Utilization	Turn Direction	Turn Direction %	Track Type	Track ID	Track Type Utilization	CH-53 Profile ID	Day (0700 - 2200)	Night (2200 - 0700)
50	85%	Ingress	20%	Straight In	50%	Straight In	AKA05-5	100%	CKA05-5_2	0.069679	0.003256
				Left	50%	180 deg	AKA05-1L	25%	CKA05-1L3	0.017420	0.000814
						90 deg	AKA05-2L	25%	CKA05-2L2	0.017420	0.000814
						270 deg	AKA05-3L	25%	CKA05-3L2	0.017420	0.000814
						Hasty	AKA05-4L	25%	CKA05-4L3	0.017420	0.000814
		Pattern	80%	Left	100%	Left Pattern	AKAT05-1L	100%	CKAT05-1L	0.557433	0.026048
		Egress	20%	Left	33%	Departure	AKAD05-1L	50%	CKAD05-1L3	0.022994	0.001074
						Departure	AKAD05-2L	50%	CKAD05-2L3	0.022994	0.001074
				Right	33%	Departure	AKAD05-2R	100%	CKAD05-2R3	0.045988	0.002149
				Straight Out	34%	Straight Out	AKAD05-5	100%	CKAD05-5_3	0.047382	0.002214
230	15%	Ingress	20%	Straight In	34%	Straight In	AKA23-5	100%	CKA23-5_2	0.008361	0.000391
				Left	33%	90 deg	AKA23-2L	100%	CKA23-2L2	0.008116	0.000379
				Right	33%	180 deg	AKA23-1R	33%	CKA23-1R3	0.002678	0.000125
						90 deg	AKA23-2R	33%	CKA23-2R2	0.002678	0.000125
						Hasty	AKA23-4R	34%	CKA23-4R3	0.002759	0.000129
		Pattern	80%	Right	100%	Right Pattern	AKAT23-1R	100%	CKAT23-1R	0.098371	0.004597
				Right	50%	Departure	AKAD23-1R	50%	CKAD23-1R3	0.006148	0.000287

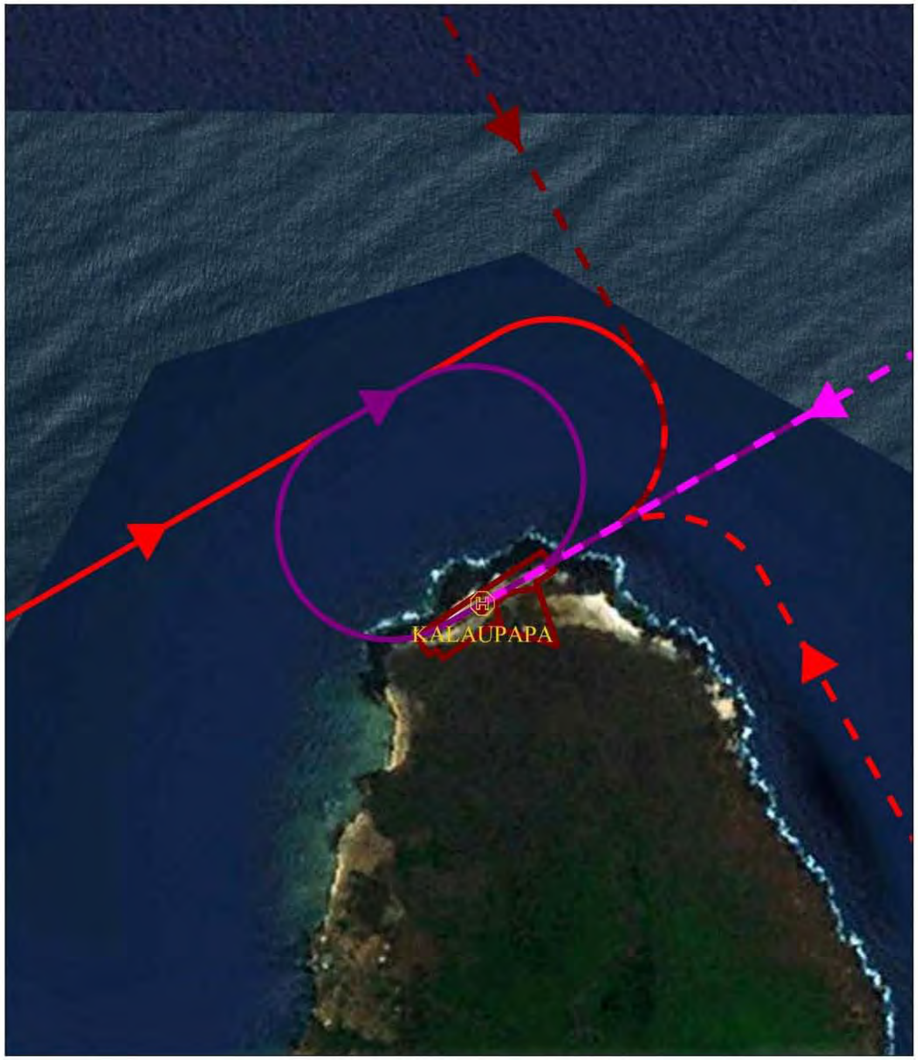
Notes: (1) Flight Track Utilization is the same as LZ Black at KTA

D-2.6.1.2 Modeled Flight Tracks



Modeled Helicopter Flight Tracks to Kalaupapa
050 Degree Approach Heading





Modeled Helicopter Flight Tracks to Kalaupapa
230 Degree Approach Heading

N

0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000

Scale in Feet 1:36,000 (1 inch = 3,000 feet)

Modeled Helicopter Closed Pattern Flight Tracks to Kalaupapa

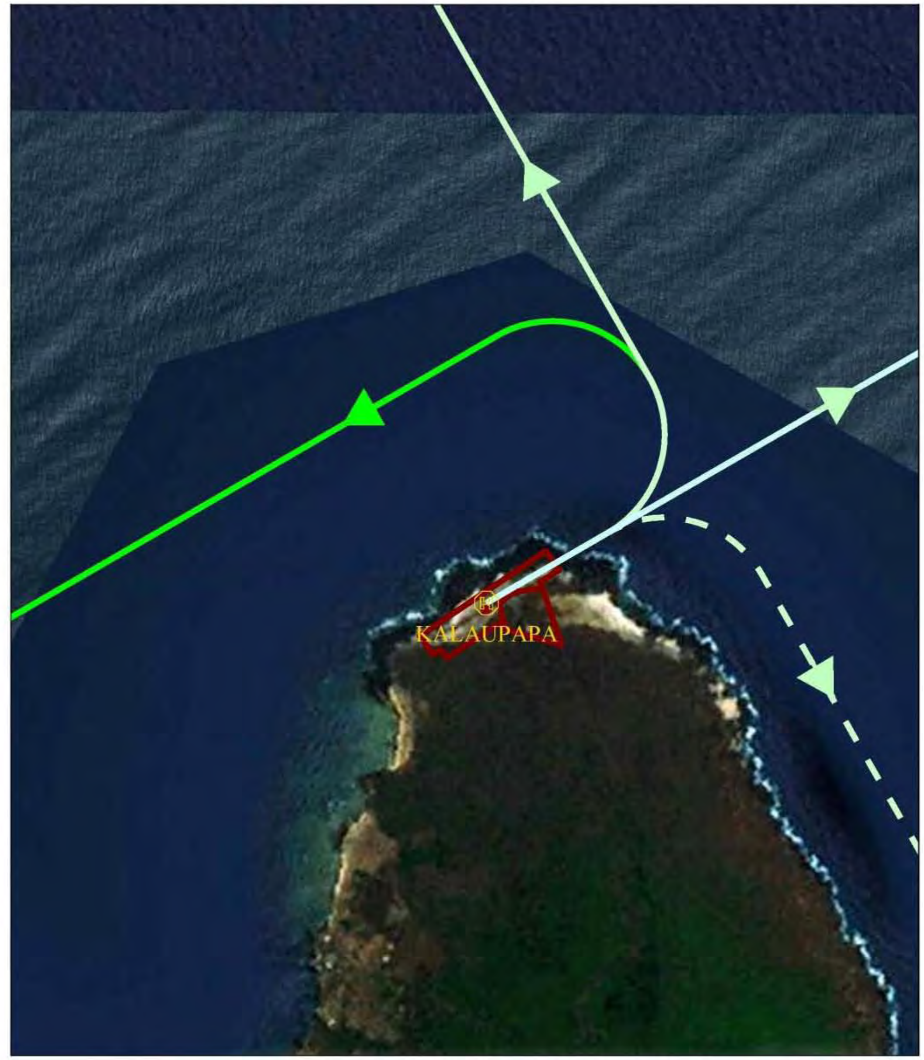
N

0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000

Scale in Feet 1:36,000 (1 inch = 3,000 feet)

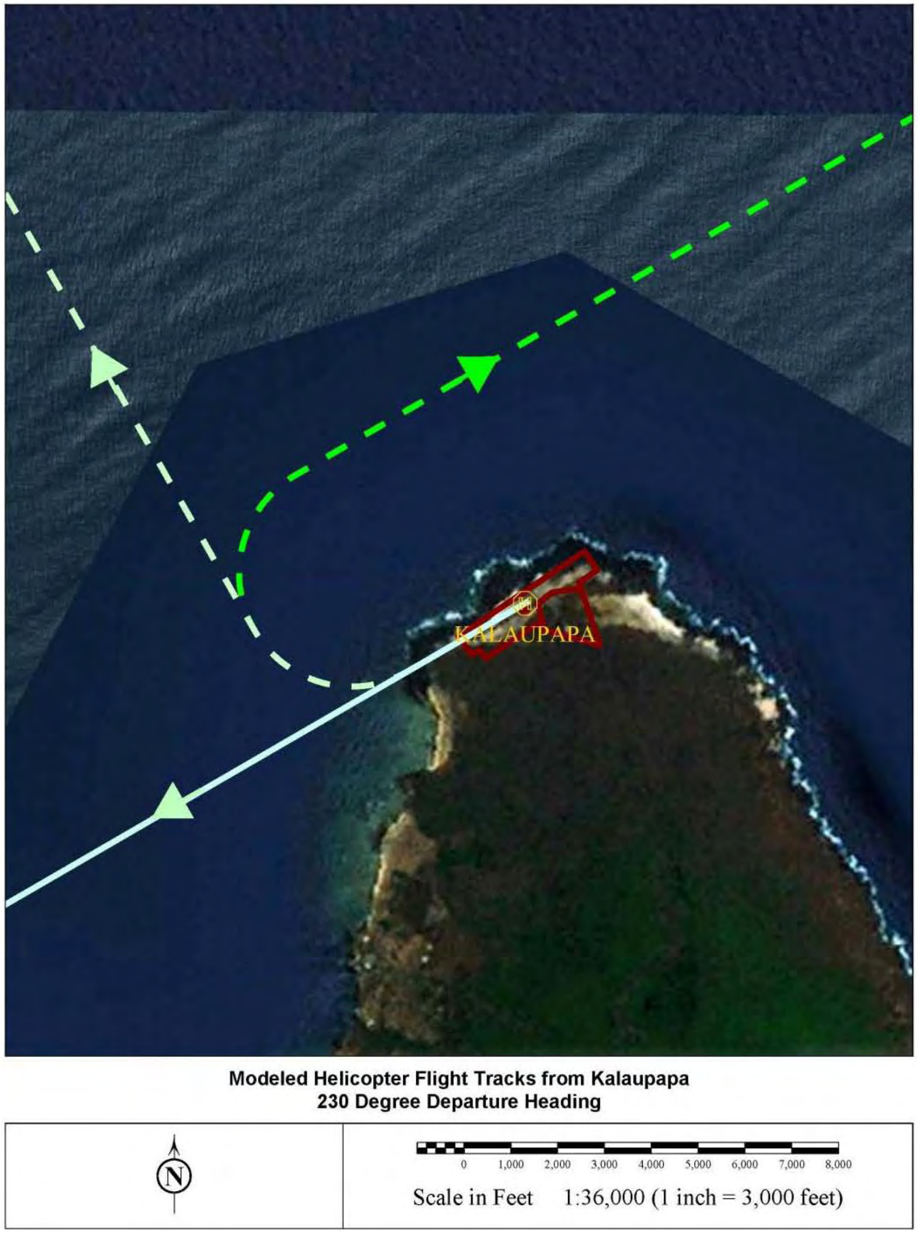
Modeled Helicopter Closed Pattern Flight Tracks to Kalaupapa

N	0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000 Scale in Feet 1:36,000 (1 inch = 3,000 feet)



Modeled Helicopter Flight Tracks from Kalaupapa
050 Degree Departure Heading

N	0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000 Scale in Feet 1:36,000 (1 inch = 3,000 feet)



Modeled Helicopter Flight Tracks from Kalaupapa
230 Degree Departure Heading

D-2.6.2 KALAUPAPA ALTERNATIVE A/B

D-2.6.2.1 Modeled Events

Table 2.6-2 Modeled Daily Events for Helicopters at Kalaupapa Airport for Busiest Month for Alternatives A/B

Heading	Heading Utilization	Op Type	Op Type Utilization	Turn Direction	Turn Direction %	Track Type	Track ID	Track Type Utilization	CH-53 Profile ID	Day (0700 - 2200)	Night (2200 - 0700)	AH-1/ UH-1 Profile ID	Day (0700 - 2200)	Night (2200 - 0700)
50	85%	Ingress	20%	Straight In	50%	Straight In	AKA05-5	100%	CKA05-5_2	0.029901	0.001397	AKA05-5_2	0.289792	0.098088
				Left	50%	180 deg	AKA05-1L	25%	CKA05-1L3	0.007475	0.000349	AKA05-1L3	0.072448	0.024522
						90 deg	AKA05-2L	25%	CKA05-2L2	0.007475	0.000349	AKA05-2L2	0.072448	0.024522
						270 deg	AKA05-3L	25%	CKA05-3L2	0.007475	0.000349	AKA05-3L2	0.072448	0.024522
						Hasty	AKA05-4L	25%	CKA05-4L3	0.007475	0.000349	AKA05-4L3	0.072448	0.024522
		Pattern	80%	Left	100%	Left Pattern	AKAT05-1L	100%	CKAT05-1L	0.239211	0.011178	AKAT05-1L	2.318334	0.784701
		Egress	20%	Left	33%	Departure	AKAD05-1L	50%	CKAD05-1L3	0.009867	0.000461	AKAD05-1L3	0.095631	0.032369
						Departure	AKAD05-2L	50%	CKAD05-2L3	0.009867	0.000461	AKAD05-2L3	0.095631	0.032369
				Right	33%	Departure	AKAD05-2R	100%	CKAD05-2R3	0.019735	0.000922	AKAD05-2R3	0.191263	0.064738
				Straight Out	34%	Straight Out	AKAD05-5	100%	CKAD05-5_3	0.020333	0.000950	AKAD05-5_3	0.197058	0.066700
230	15%	Ingress	20%	Straight In	34%	Straight In	AKA23-5	100%	CKA23-5_2	0.003588	0.000168	AKA23-5_2	0.034775	0.011771
				Left	33%	90 deg	AKA23-2L	100%	CKA23-2L2	0.003483	0.000163	AKA23-2L2	0.033752	0.011424
				Right	33%	180 deg	AKA23-1R	33%	CKA23-1R3	0.001149	0.000054	AKA23-1R3	0.011138	0.003770
						90 deg	AKA23-2R	33%	CKA23-2R2	0.001149	0.000054	AKA23-2R2	0.011138	0.003770
						Hasty	AKA23-4R	34%	CKA23-4R3	0.001184	0.000055	AKA23-4R3	0.011476	0.003884
		Pattern	80%	Right	100%	Right Pattern	AKAT23-1R	100%	CKAT23-1R	0.042214	0.001973	AKAT23-1R	0.409118	0.138477
		Egress	20%	Right	50%	Departure	AKAD23-1R	50%	CKAD23-1R3	0.002638	0.000123	AKAD23-1R3	0.025570	0.008655
						Departure	AKAD23-2R	50%	CKAD23-2R3	0.002638	0.000123	AKAD23-2R3	0.025570	0.008655
				Straight Out	50%	Straight Out	AKAD23-5	100%	CKAD23-5_3	0.005277	0.000247	AKAD23-5_3	0.051140	0.017310

Notes: (1) Flight Track Utilization is the same as LZ Black at KTA

D-2.6.3 KALAUPAPA ALTERNATIVE C (NO ACTION)

D-2.6.3.1 Modeled Events

Table 2.6-3 Modeled Daily Events for Helicopters at Kalaupapa Airport for Busiest Month for Alternative C (No Action)

Heading	Heading Utilization	Op Type	Op Type Utilization	Turn Direction	Turn Direction %	Track Type	Track ID	Track Type Utilization	CH-53 Profile ID	Day (0700 - 2200)	Night (2200 - 0700)
50	85%	Ingress	20%	Straight In	50%	Straight In	AKA05-5	100%	CKA05-5_2	0.041862	0.001956
				Left	50%	180 deg	AKA05-1L	25%	CKA05-1L3	0.010465	0.000489
						90 deg	AKA05-2L	25%	CKA05-2L2	0.010465	0.000489
						270 deg	AKA05-3L	25%	CKA05-3L2	0.010465	0.000489
						Hasty	AKA05-4L	25%	CKA05-4L3	0.010465	0.000489
		Pattern	80%	Left	100%	Left Pattern	AKAT05-1L	100%	CKAT05-1L	0.334895	0.015649
		Egress	20%	Left	33%	Departure	AKAD05-1L	50%	CKAD05-1L3	0.013814	0.000646
						Departure	AKAD05-2L	50%	CKAD05-2L3	0.013814	0.000646
				Right	33%	Departure	AKAD05-2R	100%	CKAD05-2R3	0.027629	0.001291
				Straight Out	34%	Straight Out	AKAD05-5	100%	CKAD05-5_3	0.028466	0.001330
230	15%	Ingress	20%	Straight In	34%	Straight In	AKA23-5	100%	CKA23-5_2	0.005023	0.000235
				Left	33%	90 deg	AKA23-2L	100%	CKA23-2L2	0.004876	0.000228
				Right	33%	180 deg	AKA23-1R	33%	CKA23-1R3	0.001609	0.000075
						90 deg	AKA23-2R	33%	CKA23-2R2	0.001609	0.000075
						Hasty	AKA23-4R	34%	CKA23-4R3	0.001658	0.000077
		Pattern	80%	Right	100%	Right Pattern	AKAT23-1R	100%	CKAT23-1R	0.059099	0.002762
		Egress	20%	Right	50%	Departure	AKAD23-1R	50%	CKAD23-1R3	0.003694	0.000173
						Departure	AKAD23-2R	50%	CKAD23-2R3	0.003694	0.000173
				Straight Out	50%	Straight Out	AKAD23-5	100%	CKAD23-5_3	0.007387	0.000345

Notes: (1) Flight Track Utilization is the same as LZ Black at KTA

D-3 NOISE EFFECTS

D.1 Basics of Sound

Noise is unwanted sound. Sound is all around us; sound becomes noise when it interferes with normal activities, such as sleep or conversation.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Whether that sound is interpreted as pleasant (e.g., music) or unpleasant (e.g., jackhammers) depends largely on the listener's current activity, past experience, and attitude toward the source of that sound.

The measurement and human perception of sound involves three basic physical characteristics: intensity, frequency, and duration. First, intensity is a measure of the acoustic energy of the sound vibrations and is expressed in terms of sound pressure. The greater the sound pressure, the more energy carried by the sound and the louder the perception of that sound. The second important physical characteristic of sound is frequency, which is the number of times per second the air vibrates or oscillates. Low-frequency sounds are characterized as rumbles or roars, while high-frequency sounds are typified by sirens or screeches. The third important characteristic of sound is duration or the length of time the sound can be detected.

The loudest sounds that can be detected comfortably by the human ear have intensities that are a trillion times higher than those of sounds that can barely be detected. Because of this vast range, using a linear scale to represent the intensity of sound becomes very unwieldy. As a result, a logarithmic unit known as the decibel (abbreviated dB) is used to represent the intensity of a sound. Such a representation is called a sound level. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB; sound levels above 120 dB begin to be felt inside the human ear as discomfort. Sound levels between 130 to 140 dB are felt as pain (Berglund and Lindvall 1995).

Because of the logarithmic nature of the decibel unit, sound levels cannot be arithmetically added or subtracted and are somewhat cumbersome to handle mathematically. However, some simple rules are useful in dealing with sound levels. First, if a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. For example:

60 dB + 60 dB = 63 dB, and

80 dB + 80 dB = 83 dB.

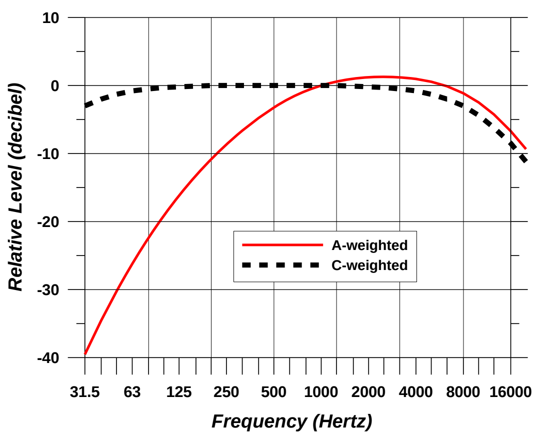
Second, the total sound level produced by two sounds of different levels is usually only slightly more than the higher of the two. For example:

60.0 dB + 70.0 dB = 70.4 dB.

Because the addition of sound levels is different than that of ordinary numbers, such addition is often referred to as "decibel addition" or "energy addition." The latter term arises from the fact that what we are really doing when we add decibel values is first converting each decibel value to its corresponding acoustic energy, then adding the energies using the normal rules of addition, and finally converting the total energy back to its decibel equivalent.

The minimum change in the sound level of individual events that an average human ear can detect is about 3 dB. On average, a person perceives a change in sound level of about 10 dB as a doubling (or halving) of the sound's loudness, and this relation holds true for loud and quiet sounds. A decrease in sound level of 10 dB actually represents a 90 percent decrease in sound intensity but only a 50 percent decrease in perceived loudness because of the nonlinear response of the human ear (similar to most human senses).

Sound frequency is measured in terms of cycles per second (cps), or hertz (Hz), which is the standard unit for cps. The normal human ear can detect sounds that range in frequency from about 20 Hz to about 15,000 Hz. All sounds in this wide range of frequencies, however, are not heard equally by the human ear, which is most sensitive to frequencies in the 1,000 to 4,000 Hz range. Weighting curves have been developed to correspond to the sensitivity and perception of different types of sound. A-weighting and C-weighting are the two most common weightings. A-weighting accounts for frequency dependence by adjusting the very high and very low frequencies (below approximately 500 Hz and above approximately 10,000 Hz) to approximate the human ear's lower sensitivities to those frequencies. C-weighting is nearly flat throughout the range of audible frequencies, hardly de-emphasizing the low frequency sound while approximating the human ear's sensitivity to higher intensity sounds. The two curves shown in Figure C-1 are also the most adequate to quantify environmental noises.



Source: ANSI S1.4A -1985 "Specification of Sound Level Meters"

Figure C-1. Frequency Response Characteristics of A- and C-Weighting Networks

C.1.1 A-weighted Sound Level

Sound levels that are measured using A-weighting, called A-weighted sound levels, are often denoted by the unit dBA or dB(A) rather than dB. When the use of A-weighting is understood, the adjective "A-weighted" is often omitted and the measurements are expressed as dB. In this report (as in most environmental impact documents), dB units refer to A-weighted sound levels.

Noise potentially becomes an issue when its intensity exceeds the ambient or background sound pressures. Ambient background noise in metropolitan, urbanized areas typically varies from 60 to 70 dB and can be as high as 80 dB or greater; quiet suburban neighborhoods experience ambient noise levels of approximately 45-50 dB (U.S. Environmental Protection Agency (EPA) 1978).

Figure C-2 is a chart of A-weighted sound levels from typical sounds. Some noise sources (air conditioner, vacuum cleaner) are continuous sounds which levels are constant for some time. Some (automobile, heavy truck) are the maximum sound during a vehicle pass-by. Some (urban daytime, urban nighttime) are averages over extended periods. A variety of noise metrics have been developed to describe noise over different time periods, as discussed below.

Aircraft noise consists of two major types of sound events: aircraft takeoffs and landings, and engine maintenance operations. The former can be described as intermittent sounds and the latter as continuous. Noise levels from flight operations exceeding background noise typically occur beneath main approach and departure corridors, in local air traffic patterns around the airfield, and in areas immediately adjacent to parking ramps and aircraft staging areas. As aircraft in flight gain altitude, their noise contribution drops to lower levels, often becoming indistinguishable from the background.

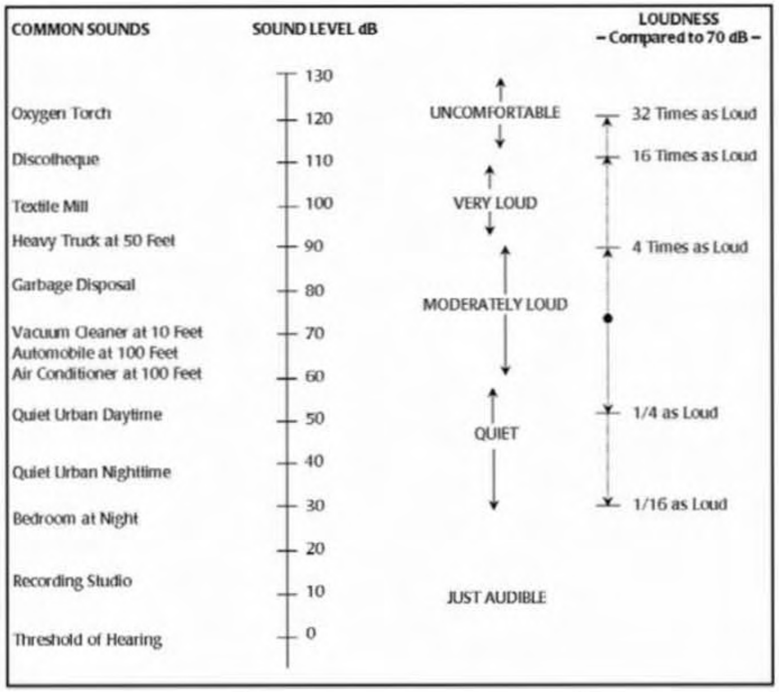
C-weighted Sound Level

Sound levels measured using a C-weighting are most appropriately called C-weighted sound levels (and denoted dBC). C-weighting is nearly flat throughout the audible frequency range, hardly de-emphasizing the low frequency. This weighting scale is generally used to describe impulsive sounds. Sounds that are characterized as impulsive generally contain low frequencies. Impulsive sounds may induce secondary effects, such as shaking of a structure, rattling of windows, inducing vibrations. These secondary effects can cause additional annoyance and complaints.

The following definitions in the American National Standard Institute (ANSI) Report S12.9, Part 4 provide general concepts helpful in understanding impulsive sounds (ANSI 1996).

Impulsive Sound: Sound characterized by brief excursions of sound pressure (acoustic impulses) that significantly exceeds the ambient environmental sound pressure. The duration of a single impulsive sound is usually less than one second (ANSI 1996).

Highly Impulsive Sound: Sound from one of the following enumerated categories of sound sources: small-arms gunfire, metal hammering, wood hammering, drop hammering, pile driving, drop forging, pneumatic hammering, pavement breaking, metal impacts during rail-yard shunting operation, and riveting.



SOURCE: Handbook of Noise Control, *C.M. Harris, Editor McGraw-Hill Book Co., 1979, and FICAN 1997*

Figure C-2. Typical A-weighted Sound Levels of Common Sounds

High-energy Impulsive Sound: Sound from one of the following enumerated categories of sound sources: quarry and mining explosions, sonic booms, demolition and industrial processes that use high explosives, military ordnance (e.g., armor, artillery and mortar fire, and bombs), explosive ignition of rockets and missiles, explosive industrial circuit breakers, and any other explosive source where the equivalent mass of dynamite exceeds 25 grams.

D.2 Noise Metrics

In general, a metric is a statistic for measuring or quantifying. A noise metric quantifies the noise environment. There are three families of noise metrics described herein – one for single noise events such as an aircraft flyby, one for cumulative noise events such as a day's worth of aircraft activity and one which quantifies the events or time relative to single noise events.

Within the single noise event family, metrics described below include Peak Sound Pressure Level, Maximum Sound Level and Sound Exposure Level. Within the cumulative noise events family, metrics described below include Equivalent Sound Level, Day-Night Average Sound Level and several others. Within the events/time family, metrics described below include Number of Events Above a Threshold Level and Time Above a Specified Level.

D.2.1 Maximum Sound Level (L_{max})

The highest A-weighted integrated sound level measured during a single event in which the sound level changes value with time (e.g., an aircraft overflight) is called the maximum A-weighted sound level or Maximum Sound Level.

During an aircraft overflight, the noise level starts at the ambient or background noise level, rises to the maximum level as the aircraft flies closest to the observer, and returns to the background level as the aircraft recedes into the distance. The L_{max} indicates the maximum sound level occurring for a fraction of a second. For aircraft noise, the "fraction of a second" over which the maximum level is defined is generally one-eighth of a second, and is denoted as "fast" response (ANSI 1988). Slowly varying or steady sounds are generally measured over a period of one second, denoted "slow" response. The L_{max} is important in judging the interference caused by a noise event with conversation, TV or radio listening, sleep, or other common activities. Although it provides some measure of the intrusiveness of the event, it does not completely describe the total event, because it does not include the period of time that the sound is heard.

D.2.2 Peak Sound Pressure Level (L_{pk})

The Peak Sound Pressure Level, is the highest instantaneous level obtained by a sound level measurement device. The L_{pk} is typically measured using a 20 microseconds or faster sampling rate, and is typically based on unweighted or linear response of the meter.

D.2.3 Sound Exposure Level (SEL)

Sound Exposure Level is a composite metric that represents both the intensity of a sound and its duration. Individual time-varying noise events (e.g., aircraft overflights) have two main characteristics: a sound level that changes throughout the event and a period of time during which the event is heard. SEL provides a measure of the net impact of the entire acoustic event, but it does not directly represent the sound level heard at any given time. During an aircraft flyover, SEL would include both the L_{max} and the lower noise levels produced during onset and recess periods of the overflight.

SEL is a logarithmic measure of the total acoustic energy transmitted to the listener during the event. Mathematically, it represents the sound level of a constant sound that would, in one second, generate the same acoustic energy as the actual time-varying noise event. For sound from aircraft overflights, which typically lasts more than one second, the SEL is usually greater than the L_{max} because an individual overflight takes seconds and the L_{max} occurs instantaneously. SEL represents the best metric to compare noise levels from overflights.

D.2.4 Equivalent Sound Level (L_{eq})

A cumulative noise metric useful in describing noise is the Equivalent Sound Level. L_{eq} is the continuous sound level that would be present if all of the variations in sound level occurring over a specified time period were smoothed out as to contain the samed total sound energy.

Just as SEL has proven to be a good measure of the noise impact of a single event, L_{eq} has been established to be a good measure of the impact of a series of events during a given time period. Also, while L_{eq} is defined as an average, it is effectively a sum over that time period and is, thus, a measure of the cumulative impact of noise. For example, the sum of all noise-generating events during the period of 7 a.m. to 4 p.m. could provide the relative impact of noise generating events for a school day.

D.2.5 Day-Night Average Sound Level (DNL or L_{dn}) and Community Noise Equivalent Level (CNEL)

Day-Night Average Sound Level and Community Noise Equivalent Level are composite metrics that account for all noise events in a 24-hour period. In order to account for increased human sensitivity to noise at night, a 10 dB penalty is applied to nighttime events (10:00 p.m. to 7:00 a.m. time period). A variant of the DNL, the CNEL includes a 5 dB penalty on noise during the 7:00 a.m. to 10:00 p.m. time period, and a 10 dB penalty on noise during the 10:00 p.m. to 7:00 a.m. time period. The notations DNL and L_{dn} are both used for Day-Night Average Sound Level and are equivalent.

Like L_{eq}, DNL and CNEL without their penalties are average quantities, mathematically representing the continuous A-weighted or C-weighted sound level that would be present if all of the variations in sound level that occur over a 24-hour period were smoothed out so as to contain the same total sound energy. These composite single-measure time-average metrics account for the SELs, L_{max}, the duration of the events (sorties or operations), and the number of events that occur over a 24-hour period but do not provide specific informatation on the number of noise events or the individual sound levels that occur during the 24-hour day. Like SEL, neither DNL nor CNEL represent the sound level heard at any particular time, but quantifies the total sound energy received. While it is normalized as an average, it represents all of the sound energy, and is therefore a cumulative measure.

The nighttime penalties in both DNL and CNEL account for the added intrusiveness of sounds that occur during normal sleeping hours, both because of the increased sensitivity to noise during those hours and because ambient sound levels during nighttime are typically about 10 dB lower than during daytime hours. The evening penalty in CNEL accounts for the added intrusiveness of sounds during that period.

The inclusion of daytime, evening and nighttime periods in the computation of the DNL and CNEL reflects their basic 24-hour definition. They can, however, be applied over periods of multiple days. For application to civil airports, where operations are consistent from day to day, DNL and CNEL are usually applied as an annual average.

The logarithmic nature of the decibel unit causes the noise levels of the loudest events to control the 24-hour average. A DNL of 65 dB could result from a very few noisy events or a large number of quieter events.

As a simple example of this characteristic, consider a case in which only one aircraft overflight occurs during the daytime over a 24-hour period, creating a sound level of 100 dB for 30 seconds. During the remaining 23 hours, 59 minutes, and 30 seconds of the day, the ambient sound level is 50 dB. The DNL for this 24-hour period is 65.9 dB. Assume, as a second example, that 10 such 30-second overflights occur during daytime hours during the next 24-hour period, with the same ambient sound level of 50 dB during the remaining 23 hours and 55 minutes of the day. The DNL for this 24-hour period is 75.5 dB. Clearly, the averaging of noise over a 24-hour period does not ignore the louder single events and tends to emphasize both the sound levels and number of those events.

Daily average sound levels are typically used for the evaluation of community noise effects (i.e., long-term annoyance), and particularly aircraft noise effects. In general, scientific studies and social surveys have found a high correlation between the percentages of groups of people highly annoyed and the level of average noise exposure measured in DNL (EPA 1978 and Schultz 1978).

D.2.6 Onset-Rate Adjusted Monthly Day-Night Average Sound Level (L_{dnmr}) and Onset-Rate Adjusted Monthly Community Noise Equivalent Level ($CNEL_{mr}$)

Military aircraft utilizing Special Use Airspace (SUA) such as Military Training Routes (MTRs), Military Operating Areas (MOAs) and Restricted Areas/Ranges generate a noise environment that is somewhat different from that associated with airfield operations. As opposed to patterned or continuous noise environments associated with airfields, flight activity in SUAs is highly sporadic, and often seasonal ranging from ten per hour to less than one per week. Individual military overflight events also differ from typical community noise events in that noise from a low-altitude, high-airspeed flyover can have a rather sudden onset, exhibiting a rate of increase in sound level (onset rate) of up to 150 dB per second.

To represent these differences, the conventional SEL metric is adjusted to account for the “surprise” effect of the sudden onset of aircraft noise events on humans with an adjustment ranging up to 11 dB above the normal SEL (Stusnick, et al. 1992). Onset rates between 15 to 150 dB per second require an adjustment of 0 to 11 dB, while onset rates below 15 dB per second require no adjustment. The adjusted SEL is designated as the onset-rate adjusted sound exposure level (SEL_r).

Because of the sporadic characteristic of SUA activity and so as not to dilute the resultant noise exposure, the month with the most operations or sorties from a yearly tabulation for the given SUA is examined -- the so-called busiest month. The cumulative exposure to noise in these areas is computed by DNL over the busy month, but using SEL_r instead of SEL. This monthly average is denoted L_{dnmr}. If onset rate adjusted DNL is computed over a period other than a month, it would be designated L_{dnr} and the period must be specified. In the state of California, a variant of the L_{dnmr} includes a penalty for evening operations (7 p.m. to 10 p.m) and is denoted $CNEL_{mr}$.

D.2.7 Number-of-Events Above (NA) a Threshold Level (L)

The Number-of-events Above metric (NA) provides the total number of noise events that exceed the selected noise level threshold during a specified period of time. Combined with the selected threshold level (L), the NA metric is symbolized as NAL. The threshold L can be defined in terms of either the SEL or L_{max} metric, and it is important that this selection is reflected in the nomenclature. When labeling a contour line or point of interest (POI) on a map the NAL will be followed by the number of events in parentheses for that line or POI. For example, the noise environment at a location where 10 events exceed an SEL of 90 dB, over a given period of time, would be represented by the nomenclature NA90SEL(10). Similarly, for L_{max} it would be NA90L_{max}(10). The period of time can be an average 24-hour day, daytime, nighttime, school day, or any other time period appropriate to the nature and application of the analysis.

NA can be portrayed for single or multiple locations, or by means of noise contours on a map similar to the common DNL contours. A threshold level is selected that best meets the need for that situation. An L_{max} threshold is normally selected to analyze speech interference, whereas an SEL threshold is normally selected for analysis of sleep disturbance.

The NA metric is the only supplemental metric that has been developed that combines single-event noise levels with the number of aircraft operations. In essence, it answers the question of how many aircraft (or range of aircraft) fly over a given location or area at or above a selected threshold noise level.

D.2.8 Time Above (TA) a Specified Level (L)

The Time Above (TA) metric is a measure of the total time that the A-weighted aircraft noise level is at or above a defined sound level threshold. Combined with the selected threshold level (L), the TA metric is symbolized as TAL. TA is not a sound level, but rather a time expressed in minutes. TA values can be calculated over a full 24-hour annual average day, the 15-hour daytime and 9-hour nighttime periods, a school day, or any other time period of interest, provided there is operational data to define the time period of interest.

TA has application for describing the noise environment in schools, particularly when comparing the classroom or other noise sensitive environments for different operational scenarios. TA can be portrayed by means of noise contours on a map similar to the common DNL contours.

The TA metric is a useful descriptor of the noise impact of an individual event or for many events occurring over a certain time period. When computed for a full day, the TA can be compared alongside the DNL in order to determine the sound levels and total duration of events that contribute to the DNL. TA analysis is usually conducted along with NA analysis so the results show not only how many events occur above the selected threshold(s), but also the total duration of those events above those levels for the selected time period.

D.3 Noise Effects

This noise effects section includes discussions of annoyance, speech interference and sleep disturbance, and the effects of noise on hearing, health, performance, learning, animals, property values, terrain and archaeological sites.

D.3.1 Annoyance

The primary effect of aircraft noise on exposed communities is one of long-term annoyance, defined by the Environmental Protection Agency (EPA) as any negative subjective reaction on the part of an individual or group. The scientific community has adopted the use of long-term annoyance as a primary indicator of community response because it attempts to account for all negative aspects of effects from noise, e.g., increased annoyance due to being awakened the previous night by aircraft and interference with everyday conversation.

Numerous laboratory studies and field surveys have been conducted to measure annoyance and to account for a number of variables, many of which are dependent on a person's individual circumstances and preferences. Laboratory studies of individual response to noise have helped isolate a number of the factors contributing to annoyance, such as the intensity level and spectral characteristics of the noise, duration, the presence of impulses, pitch, information content, and the degree of interference with activity. Social surveys of community response to noise have allowed the development of general dose-response relationships that can be used to estimate the proportion of people who will be highly annoyed by a given noise level. The results of these studies have formed the basis for criteria established to define areas of compatible land use.

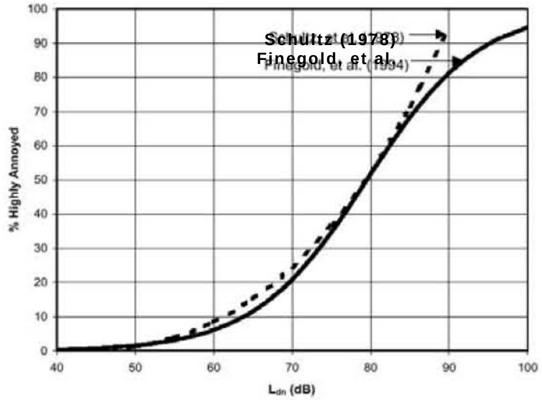
A wide variety of responses have been used to determine intrusiveness of noise and disturbances of speech, sleep, audio/video entertainment, and outdoor living; but the most useful metric for assessing peoples' responses to noise is the percentage of the population expected to be "highly annoyed." The concept of "percent highly annoyed" has provided the most consistent response of a community to a particular noise environment. In his synthesis of several different social surveys that employed different response scales, Schultz (1978) defined "highly annoyed" respondents as those respondents whose self-described annoyance fell within the upper 28 percent of the response scale where the scale was numerical or un-named. For surveys where the response scale was named, Schultz counted those who claimed to be highly annoyed, combining the responses of "very annoyed" and "extremely annoyed." Schultz's definition of "percent highly annoyed" (%HA) became the basis for the Federal policy on environmental noise. Daily average sound levels are typically used for the evaluation of community noise effects, such as long-term annoyance.

In general, scientific studies and social surveys have found a correlation between the percentages of groups of people highly annoyed and the level of average noise exposure. Thus, the results are expressed as the average %HA at various exposure levels measured in DNL. The classic analysis is Schultz's original 1978 study, whose results are shown in Figure C-3. This figure is commonly referred to as the Schultz curve. It represents the synthesis of a large number of social surveys (161 data points in all), that relates the long-term community response to various types of noise sources, measured using the DNL metric.

Figure C-3. Community Surveys of Noise Annoyance

An updated study of the original Schultz data based on the analysis of 400 data points collected through 1989 essentially reaffirmed this relationship. Figure C-4 shows an updated form of the curve fit in comparison with the original Schultz curve (Finegold 1994). The updated fit, which does not differ substantially from the original, is the preferred form in the U.S. The relationship between %HA and DNL is:

$$\%HA = 100/[1+ \exp(11.13 - 0.141L_{dn})]$$



SOURCE:(Schultz, 1978) andCurrent (Finegold, et al. 1994) Curve Fits

Figure C-4. Response of Communities to Noise; Comparison of Original

In general, correlation coefficients of 0.85 to 0.95 are found between the percentages of groups of people highly annoyed and the level of average noise exposure. However, the correlation coefficients for the annoyance of individuals are relatively low, on the order of 0.5 or less. This is not surprising, considering the varying personal factors that influence the manner in which individuals react to noise.

A number of non-acoustic factors have been identified that may influence the annoyance response of an individual. Newman and Beattie (1985) divided these factors into emotional and physical variables.

Emotional Variables:

- Feelings about the necessity or preventability of the noise;
- Judgment of the importance and value of the activity that is producing the noise;
- Activity at the time an individual hears the noise;
- Attitude about the environment;
- General sensitivity to noise;
- Belief about the effect of noise on health; and
- Feeling of fear associated with the noise.

Physical Variables:

- Type of neighborhood;
- Time of day;
- Season;
- Predictability of noise;
- Control over the noise source; and
- Length of time an individual is exposed to a noise.

The low correlation coefficients for individuals' reactions reflect the large amount of scatter among the data drawn from the various surveys and point to the substantial uncertainty associated with the equation representing the relationship between %HA and DNL. Based on the results of surveys it has been observed that noise exposure can explain less than 50 percent of the observed variance in annoyance, indicating that non-acoustical factors play a major role. As a result, it is not possible to accurately predict individual annoyance in any specific community based on the aircraft noise exposure. Nevertheless, changes in %HA can be useful in giving the decision maker more information about the relative effects that different alternatives may have on the community.

The original Schultz curve and the subsequent updates do not separate out the annoyance from aircraft noise and other transportation noise sources. This was an important element, in that it allowed Schultz to obtain some consensus among the various social surveys from the 1960s and 1970s that were synthesized in the analysis. In essence, the Schultz curve assumes that the effects of long-term annoyance on the general population are the same, regardless of whether the noise source is road, rail, or aircraft. In the years after the classical Schultz analysis, additional social surveys have been conducted to better understand the annoyance effects of various transportation sources.

Miedema & Vos (1998) present synthesis curves for the relationship between DNL and percentage "Annoyed" and percentage "Highly Annoyed" for three transportation noise sources. Separate, non-identical curves were found for aircraft, road traffic, and railway noise. Table C-1 illustrates that, for a DNL of 65 dB, the percent of the people forecasted to be Highly Annoyed is 28 percent for air traffic, 18 percent for road traffic, and 11 percent for railroad traffic. For an outdoor DNL of 55 dB, the percent highly annoyed would be close to 12 percent if the noise is generated by aircraft operations, but only 7 percent and 4 percent, respectively, if the noise is generated by road or rail traffic. Comparing the levels on the Miedema & Vos curve to those on the updated Schultz curve indicates that the percentage of people highly annoyed by aircraft noise may be higher than previously thought when the noise is solely generated by aircraft activity.

Table C-1. Percent Highly Annoyed for Different Transportation Noise Sources

DNL (dB)	Percent Hightly Annoyed (% HA)			
	Miedema and Vos			Schultz Combined
	Air	Road	Rail	
55	12	7	4	3
60	19	12	7	6
65	28	18	11	12
70	37	29	16	22
75	48	40	22	36

Source: Miedema & Vos 1998

As noted by the World Health Organization (WHO), even though aircraft noise seems to produce a stronger annoyance response than road traffic, caution should be exercised when interpreting synthesized data from different studies (WHO 2000). The WHO noted that five major parameters should be randomly distributed for the analyses to be valid: personal, demographic, and lifestyle factors, as well as the duration of noise exposure and the population experience with noise.

The FICON found that the updated Schultz curve remains the best available source of empirical dosage effect information to predict community response to transportation noise without any segregation by transportation source (FICON 1992); a position held by the FICAN in 1997 (FICAN 1997). However, FICON also recommended further research to investigate the differences in perceptions of aircraft noise, ground transportation noise (highways and railroads), and general background noise.

D.3.2 Speech Interference

Speech interference associated with aircraft noise is a primary cause of annoyance for communities. The disruption of routine activities such as radio or television listening, telephone use, or family conversation gives rise to frustration and irritation. The quality of speech communication is particularly important in classrooms and offices. In industrial settings it can cause fatigue and vocal strain in those who attempt to communicate over the noise.

The disruption of speech in the classroom is a primary concern, due to the potential for adverse effects on children's learning ability. There are two aspects to speech comprehension:

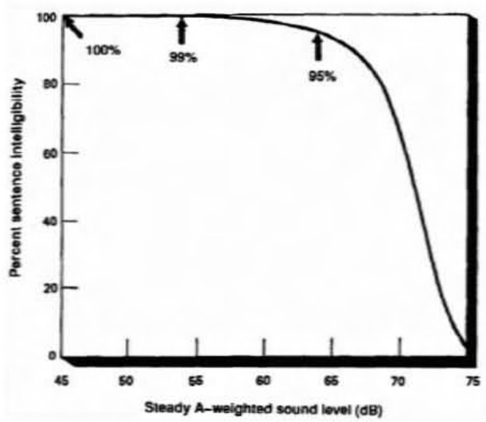
1. *Word Intelligibility* - the percent of words transmitted and received. This might be important for students in the lower grades who are learning the English language, and particularly for students who have English as a Second Language.
2. S*entence Intelligibility* – the percent of sentences transmitted and understood. This might be important for high-school students and adults who are familiar with the language, and who do not necessarily have to understand each word in order to understand sentences.

For teachers to be clearly understood by their students, it is important that regular voice communication is clear and uninterrupted. Not only does the background sound level have to be low enough for the teacher to be clearly heard, but intermittent outdoor noise events also need to be minimized. It is therefore important to evaluate the steady background level, the level of voice communication, and the single-event level due to aircraft overflights that might interfere with speech.

Several research studies have been conducted and guideline documents been developed resulting in a fairly consistent set of noise level criteria for speech interference. This section provides an overview of the results of these studies.

U.S. Federal Criteria for Interior Noise

In 1974, the EPA identified a goal of an indoor 24-hour average sound level $L_{eq(24)}$ of 45 dB to minimize speech interference based on the intelligibility of sentences in the presence of a steady background noise (EPA 1974). Intelligibility pertains to the percentage of speech units correctly understood out of those transmitted, and specifies the type of speech material used, i.e. sentences or words . The curve displayed in Figure C-5 shows the effect of steady indoor background sound levels on sentence intelligibility. For an average adult with normal hearing and fluency in the language, steady background sound levels indoors of less than 45 dB L_{eq} are expected to allow 100 percent intelligibility of sentences.



Source: EPA 1974

Figure C-5. Speech Intelligibility Curve

The curve shows 99 percent sentence intelligibility for background levels at a L_{eq} of 54 dB, and less than 10 percent intelligibility for background levels above a L_{eq} of 73 dB. Note that the curve is especially sensitive to changes in sound level between 65 dB and 75 dB - an increase of 1 dB in background sound level from 70 dB to 71 dB results in a 14 percent decrease in sentence intelligibility, whereas a 1 dB increase in background sound level from 60 dB to 61 dB results in less than 1 percent decrease in sentence intelligibility.

Classroom Criteria

For listeners with normal hearing and fluency in the language, complete sentence intelligibility can be achieved when the signal-to-noise ratio (i.e., the difference between the speech level and the level of the interfering noise) is in the range 15-18 dB (Lazarus 1990).

Both the ANSI and the American Speech-Language-Hearing Association (ASHLA) recommend at least a 15 dB signal-to-noise ratio in classrooms, to ensure that children with hearing impairments and language disabilities are able to enjoy high speech intelligibility (ANSI 2002; ASHLA 1995). As such, provided that the average adult male or female voice registers a minimum of 50 dB L_{max} in the rear of the classroom, the ANSI standard requires that the continuous background noise level indoors must not exceed a L_{eq} of 35 dB (assumed to apply for the duration of school hours).

The WHO reported for a speaker-to-listener distance of about 1 meter, empirical observations have shown that speech in relaxed conversations is 100 percent intelligible in background noise levels of about 35 dB, and speech can be fairly well understood in the presence of background levels of 45 dB. The WHO recommends a guideline value of 35 dB L_{eq} for continuous background levels in classrooms during school hours (WHO 2000).

Bradley suggests that in smaller rooms, where speech levels in the rear of the classroom are approximately 50 dB L_{max}, steady-state noise levels above 35 dB L_{eq} may interfere with the intelligibility of speech (Bradley 1993).

For the purposes of determining eligibility for noise insulation funding, the Federal Aviation Administration (FAA) guidelines state that the design objective for a classroom environment is 45 dB L_{eq} resulting from aircraft operations during normal school hours (FAA 1985).

However, most aircraft noise is not continuous and consists of individual events where the sound level exceeds the background level for a limited time period as the aircraft flies over. Since speech interference in the presence of aircraft noise is essentially determined by the magnitude and frequency of individual aircraft flyover events, a time-averaged metric alone, such as L_{eq}, is not necessarily appropriate when evaluating the overall effects. In addition to the background level criteria described above, single-event criteria, which account for those sporadic intermittent outdoor noisy events, are also essential to specifying speech interference criteria.

In 1984, a report to the Port Authority of New York and New Jersey recommended utilizing the Speech Interference Level (SIL) metric for classroom noise criteria (Sharp and Plotkin 1984). This metric is based on the maximum sound levels in the frequency range (approximately 500 Hz to 2,000 Hz) that directly affects speech communication. The study identified an SIL (the average of the sound levels in the 500, 1000, and 2000 Hz octave-bands) of 45 dB as the desirable goal, which was estimated to provide 90 percent word intelligibility for the short time periods during aircraft over-flights. Although early classroom level criteria were defined in terms of SIL, the use and measurement of L_{max} as the primary metric has since become more popular. Both metrics take into consideration the L_{max} associated with intermittent noise events and can be related to existing background levels when determining speech interference percentages. An SIL of 45 dB is approximately equivalent to an A-weighted L_{max} of 50 dB for aircraft noise (Wesler 1986).

In 1998, a report also concluded that if an aircraft noise event's indoor L_{max} reached the speech level of 50 dB, 90 percent of the words would be understood by students seated throughout the classroom (Lind, Pearsons, and Fidell 1998). Since intermittent aircraft noise does not appreciably disrupt classroom communication at lower levels and other times, the authors also adopted an indoor L_{max} of 50 dB as the maximum single-event level permissible in classrooms. Note that this limit was set based on students with normal hearing and no special needs; at-risk students may be adversely affected at lower sound levels.

Bradley recommends SEL as a better indicator of indoor estimated speech interference in the presence of aircraft overflights (Bradley 1985). For acceptable speech communication using normal vocal efforts, Bradley suggests that the indoor SEL be no greater than 64 dB. He assumes a 26 dB outdoor-to-indoor noise reduction that equates to 90 dB SEL outdoors. Aircraft events producing outdoor SEL values greater than 90 dB would result in disruption to indoor speech communication. Bradley's work indicates that, for speakers talking with a casual vocal effort, 95 percent intelligibility would be achieved when indoor SEL values did not exceed 60 dB, which translates approximately to an L_{max} of 50 dB.

In the presence of intermittent noise events, ANSI states that the criteria for allowable background noise level can be relaxed since speech is impaired only for the short time when the aircraft noise is close to its maximum value. Consequently, they recommend when the background noise level of the noisiest hour is dominated by aircraft noise, the indoor criteria (35 dB L_{eq} for continuous background noise) can be increased by 5 dB to an Leq of 40 dB, as long as the noise level does not exceed 40 dB for more than 10 percent of the noisiest hour. (ANSI 2002).

The WHO does not recommend a specific indoor Lmax criterion for single-event noise, but does place a guideline value at L_{eq} of 35 dB for overall background noise in the classroom. However, WHO does report that "for communication distances beyond a few meters, speech interference starts at sound pressure levels below 50 dB for octave bands centered on the main speech frequencies at 500 Hz, 1kHz, and 2 kHz." (WHO 2000). One can infer this can be approximated by an L_{max} value of 50 dB.

The United Kingdom Department for Education and Skills (UKDFES) established in its classroom acoustics guide a 30-minute time-averaged metric [$L_{eq(30min)}$] for background levels and $L_{A1,30}$ min for intermittent noises, at thresholds of 30-35 dB and 55 dB, respectively. $L_{A1,30}$ min represents the A-weighted sound level that is exceeded one percent of the time (in this case, during a 30 minute teaching session) and is generally equivalent to the L_{max} metric (UKDFES 2003).

Summary

As the previous section demonstrates, research indicates that it is not only important to consider the continuous background levels using time-averaged metrics, but also the intermittent events, using single-event metrics such as L_{max}. Table C-2 provides a summary of the noise level criteria recommended in the scientific literature.

Table C-2. Indoor Noise Level Criteria Based on Speech Intelligibility

Source	Metric/Level (dB)	Effects and Notes
U.S. FAA (1985)	L_{eq}(during school hours) = 45 dB	Federal assistance criteria for school sound insulation; supplemental single-event criteria may be used
Lind et al. (1998), Sharp and Plotkin (1984), Wesler (1986)	L_{max} = 50 dB / SIL 45	Single event level permissible in the classroom
WHO (1999)	L_{eq} = 35 dB L_{max} = 50 dB	Assumes average speech level of 50 dB and recommends signal to noise ratio of 15 dB
U.S. ANSI (2002)	L_{eq} = 40 dB, Based on Room Volume	Acceptable background level for continuous noise/ relaxed criteria for intermittent noise in the classroom
U.K. DFES (2003)	$L_{eq(30min)}$ = 30-35 dB L_{max} = 55 dB	Minimum acceptable in classroom and most other learning environs

When considering intermittent noise caused by aircraft overflights, a review of the relevant scientific literature and international guidelines indicates that an appropriate criteria is a limit on indoor background noise levels of 35 to 40 dB L_{eq} and a limit on single events of 50 dB L_{max}.

D.3.3 Sleep Disturbance

The disturbance of sleep is a major concern for communities exposed to nighttime aircraft noise. There have been numerous research studies that have attempted to quantify the complex effects of noise on sleep. This section provides an overview of the major noise-induced sleep disturbance studies that have been conducted, with particular emphasis placed on those studies that have influenced U.S. federal noise policy. The studies have been separated into two groups:

1. Initial studies performed in the 1960s and 1970s, where the research was focused on laboratory sleep observations.
2. Later studies performed in the 1990s up to the present, where the research was focused on field observations, and correlations to laboratory research were sought.

Initial Studies

The relationship between noise levels and sleep disturbance is complex and not fully understood. The disturbance depends not only on the depth of sleep, but also on the previous exposure to aircraft noise, familiarity with the surroundings, the physiological and psychological condition of the recipient, and a host of other situational factors. The most readily measurable effect of noise on sleep is the number of arousals or awakenings, and so the body of scientific literature has focused on predicting the percentage of the population that will be awakened at various noise levels. Fundamentally, regardless of the tools used to measure the degree of sleep disturbance (awakenings, arousals, etc.), these studies have grouped the data points into bins to predict the percentage of the population likely to be disturbed at various sound level thresholds.

FICON produced a guidance document that provided an overview of the most pertinent sleep disturbance research that had been conducted throughout the 1970s (FICON 1992). Literature reviews and meta-analysis conducted between 1978 and 1989 made use of the existing datasets that indicated the effects of nighttime noise on various sleep-state changes and awakenings (Lukas 1978; Griefahn 1978; Peasons et. al. 1989). FICON noted that various indoor A-weighted sound levels – ranging from

25 to 50 dB were observed to be thresholds below which significant sleep effects were not expected. Due to the large variability in the data, FICON did not endorse the reliability of the results.

However, FICON did recommend the use of an interim dose-response curve—awaiting future research—which predicted the percent of the exposed population expected to be awakened as a function of the exposure to single event noise levels expressed in terms of SEL. This curve was based on the research conducted for the U.S. Air Force (Finegold 1994). The dataset included most of the research performed up to that point, and predicted that ten percent of the population would be awakened when exposed to an interior SEL of approximately 58 dB. The data utilized to derive this relationship were primarily the results of controlled laboratory studies.

Recent Sleep Disturbance Research – Field and Laboratory Studies

It was noted in the early sleep disturbance research that the controlled laboratory studies did not account for many factors that are important to sleep behavior, such as habituation to the environment and previous exposure to noise and awakenings from sources other than aircraft noise. In the early 1990s, field studies were conducted to validate the earlier laboratory work. The most significant finding from these studies was that an estimated 80 to 90 percent of sleep disturbances were not related to individual outdoor noise events, but were instead the result of indoor noise sources and other non-noise-related factors . The results showed that there was less of an effect of noise on sleep in real-life conditions than had been previously reported from laboratory studies .

FICAN

The interim FICON dose-response curve that was recommended for use in 1992 was based on the most pertinent sleep disturbance research that was conducted through the 1970s, primarily in laboratory settings. After that time, considerable field research was conducted to evaluate the sleep effects in peoples' normal, home environment. Laboratory sleep studies tend to show higher values of sleep disturbance than field studies because people who sleep in their own homes are habituated to their environment and, therefore, do not wake up as easily (FICAN 1997).

Based on the new information, FICAN updated its recommended dose-response curve in 1997, depicted as the lower curve in Figure C-6. This figure is based on the results of three field studies (Ollerhead 1992; Fidell et. al. 1994; Fidell et al. 1995a and 1995b), along with the datasets from six previous field studies.

The new relationship represents the higher end, or upper envelope, of the latest field data. It should be interpreted as predicting the "maximum percent of the exposed population expected to be behaviorally awakened" or the "maximum percent awakened" for a given residential population. According to this relationship, a maximum of 3 percent of people would be awakened at an indoor SEL of 58 dB, compared to 10 percent using the 1992 curve. An indoor SEL of 58 dB is equivalent to outdoor SEL's of 73 and 83 dB respectively assuming 15 and 25 dB noise level reduction from outdoor to indoor with windows open and closed, respectively.

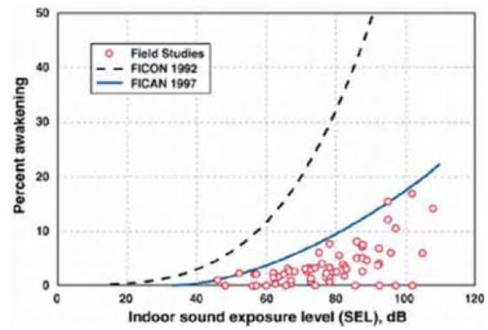


Figure C-6. FICAN's 1997 Recommended Sleep Disturbance Dose-Response Relationship

The FICAN 1997 curve is represented by the following equation:

$$\text{Percent Awakenings} = 0.0087 \times [SEL - 30]^{1.79}$$

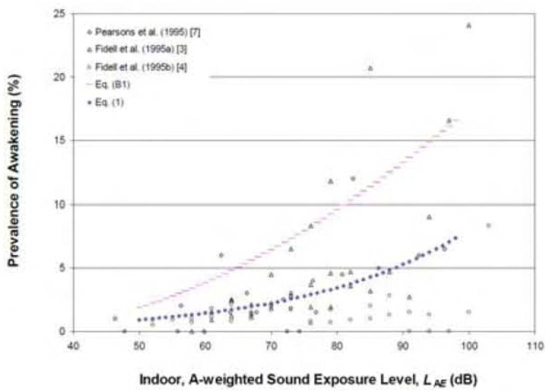
Note the relatively low percentage of awakenings to fairly high noise levels. People think they are awakened by a noise event, but usually the reason for awakening is otherwise. For example, the 1992 UK CAA study found the average person was awakened about 18 times per night for reasons other than exposure to an aircraft noise – some of these awakenings are due to the biological rhythms of sleep and some to other reasons that were not correlated with specific aircraft events.

Number of Events and Awakenings

In recent years, there have been studies and one proposal that attempted to determine the effect of multiple aircraft events on the number of awakenings. The German Aerospace Center (DLR) conducted an extensive study focused on the effects of nighttime aircraft noise on sleep and other related human performance factors (Basner 2004). The DLR study was one of the largest studies to examine the link between aircraft noise and sleep disturbance and involved both laboratory and in-home field research phases. The DLR investigators developed a dose-effect curve that predicts the number of aircraft events at various values of L_{max} expected to produce one additional awakening over the course of a night. The dose-effect curve was based on the relationships found in the field studies.

In July 2008 ANSI and the Acoustical Society of America (ASA) published a method to estimate the percent of the exposed population that might be awakened by multiple aircraft noise events based on statistical assumptions about the probability of awakening (or not awakening) (ANSI 2008). This method relies on probability theory rather than direct field research/experimental data to account for multiple events.

Figure C-7 depicts the awakenings data that form the basis and equations of ANSI S12.9-2008. The curve labeled 'Eq. (B1)' is the relationship between noise and awakening endorsed by FICAN in 1997. The ANSI recommended curve labeled 'Eq. (1)' quantifies the probability of awakening for a population of sleepers who are exposed to an outdoor noise event as a function of the associated indoor SEL in the bedroom. This curve was derived from studies of behavioral awakenings associated with noise events in "steady state" situations where the population has been exposed to the noise long enough to be habituated. The data points in Figure C-7 come from these studies. Unlike the FICAN curve, the ANSI 2008 curve represents the average of the field research data points.



Source: ANSI 2008

Figure C-7. Plot of Sleep Awakening Data versus Indoor SEL

In December 2008, FICAN recommended the use of this new estimation procedure for future analyses of behavioral awakenings from aircraft noise. In that statement, FICAN also recognized that additional sleep disturbance research is underway by various research organizations, and results of that work may result in additional changes to FICAN's position. Until that time, FICAN recommends the use of ANSI S12.9-2008.

D.3.4 Noise-Induced Hearing Impairment

Residents in surrounding communities express concerns regarding the effects of aircraft noise on hearing. This section provides a brief overview of hearing loss caused by noise exposure. The goal is to provide a sense of perspective as to how aircraft noise (as experienced on the ground) compares to other activities that are often linked with hearing loss.

Hearing Threshold Shifts

Hearing loss is generally interpreted as a decrease in the ear's sensitivity or acuity to perceive sound; i.e. a shift in the hearing threshold to a higher level. This change can either be a Temporary Threshold Shift (TTS), or a Permanent Threshold Shift (PTS) (Berger 1995) .

TTS can result from exposure to loud noise over a given amount of time, yet the hearing loss is not necessarily permanent. An example of TTS might be a person attending a loud music concert. After the concert is over, the person may experience a threshold shift that may last several hours, depending upon the level and duration of exposure. While experiencing TTS, the person becomes less sensitive to low-level sounds, particularly at certain frequencies in the speech range (typically near 4,000 Hz) . Normal hearing ability eventually returns, as long as the person has enough time to recover within a relatively quiet environment.

PTS usually results from repeated exposure to high noise levels, where the ears are not given adequate time to recover from the strain and fatigue of exposure. A common example of PTS is the result of working in a loud environment such as a factory. It is important to note that a temporary shift (TTS) can eventually become permanent (PTS) over time with continuous exposure to high noise levels. Thus, even if the ear is given time to recover from TTS, repeated occurrence of TTS may eventually lead to permanent hearing loss. The point at which a Temporary Threshold Shift results in a Permanent Threshold Shift is difficult to identify and varies with a person's sensitivity.

Criteria for Permanent Hearing Loss

Considerable data on hearing loss have been collected and analyzed by the scientific/medical community. It has been well established that continuous exposure to high noise levels will damage human hearing (EPA 1978). The Occupational Safety and Health Administration (OSHA) regulation of 1971 standardizes the limits on workplace noise exposure for protection from hearing loss as an average level of 90 dB over an 8-hour work period or 85 dB over a 16-hour period (the average level is based on a 5 dB decrease per doubling of exposure time) (US Department of Labor 1970). Even the most protective criterion (no measurable hearing loss for the most sensitive portion of the population at the ear's most sensitive frequency, 4,000 Hz, after a 40-year exposure) is an average sound level of 70 dB over a 24-hour period.

The US EPA established 75 dB for an 8-hour exposure and 70 dB for a 24-hour exposure as the average noise level standard requisite to protect 96 percent of the population from greater than a 5 dB PTS (EPA 1978). The National Academy of Sciences Committee on Hearing, Bioacoustics, and Biomechanics identified 75 dB as the minimum level at which hearing loss may occur (CHABA 1977). Finally, the WHO has concluded that environmental and leisure-time noise below an L_{eq24} value of 70 dB "will not cause hearing loss in the large majority of the population, even after a lifetime of exposure" (WHO 2000).

Hearing Loss and Aircraft Noise

The 1982 EPA Guidelines report specifically addresses the criteria and procedures for assessing the noise-induced hearing loss in terms of the Noise-Induced Permanent Threshold Shift (NIPTS), a quantity that defines the permanent change in hearing level, or threshold, caused by exposure to noise (EPA, 1982). Numerically, the NIPTS is the change in threshold averaged over the frequencies 0.5, 1, 2, and 4 kHz that can be expected from daily exposure to noise over a normal working lifetime of 40 years, with the exposure beginning at an age of 20 years. A grand average of the NIPTS over time (40 years) and hearing sensitivity (10 to 90 percentiles of the exposed population) is termed the Average

NIPTS, or Ave NIPTS for short. The Average Noise Induced Permanent Threshold Shift (Ave. NIPTS) that can be expected for noise exposure as measured by the DNL metric is given in Table C-3.

Table C-3. Ave. NIPTS and 10th Percentile NIPTS as a Function of DNL

DNL	Ave. NIPTS dB*	10th Percentile NIPTS dB*
75-76	1.0	4.0
76-77	1.0	4.5
77-78	1.6	5.0
78-79	2.0	5.5
79-80	2.5	6.0
80-81	3.0	7.0
81-82	3.5	8.0
82-83	4.0	9.0
83-84	4.5	10.0
84-85	5.5	11.0

* Rounded to the nearest 0.5 dB

For example, for a noise exposure of 80 dB DNL, the expected lifetime aveerage value of NIPTS is 2.5 dB, or 6.0 dB for the 10th percentile. Characterizing the noise exposure in terms of DNL will usually overestimate the assessment of hearing loss risk as DNL includes a 10 dB weighting factor for aircraft operations occuring between 10 p.m. and 7 a.m. If, however, flight operations between the hours of 10 p.m. and 7 a.m. account for 5 percent or less of the total 24-hour operations, the overestimation is on the order of 1.5 dB.

From a civilian airport perspective, the scientific community has concluded that there is little likelihood that the resulting noise exposure from aircraft noise could result in either a temporary or permanent hearing loss. Studies on community hearing loss from exposure to aircraft flyovers near airports showed that there is no danger, under normal circumstances, of hearing loss due to aircraft noise (Newman and Beattie 1985). The EPA criterion (L_{eq24} = 70 dBA) can be exceeded in some areas located near airports, but that is only the case outdoors. Inside a building, where people are more likely to spend most of their time, the average noise level will be much less than 70 dBA (Eldred and von Gierke 1993). Eldred and von Gierke also report that "several studies in the U.S., Japan, and the U.K. have confirmed the predictions that the possibility for permanent hearing loss in communities, even under the most intense commercial take-off and landing patterns, is remote."

With regard to military airbases, as individual aircraft noise levels are increasing with the introduction of new aircraft, a 2009 DoD policy directive requires that hearing loss risk be estimated for the at risk population, defined as the population exposed to DNL greater than or equal to 80 dB and higher (DoD 2009). Specifically, DoD components are directed to "*use the 80 Day-Night A-Weighted (DNL) noise contour to identify populations at the most risk of potential hearing loss*". This does not preclude populations outside the 80 DNL contour, i.e. at lower exposure levels, from being at some degree of risk of hearing loss. However, the analysis should be restricted to populations within this contour area, including residents of on-base housing. The exposure of workers inside the base boundary area should be considered occupational and evaluated using the appropriate DoD component regulations for occupational noise exposure.

With regard to military airspace activity, studies have shown conflicting results. A 1995 laboratory study measured changes in human hearing from noise representative of low-flying aircraft on MTRs (Nixon, et al. 1993). The potential effects of aircraft flying along MTRs is of particular concern because of maximum overflight noise levels can exceed 115 dB, with rapid increases in noise levels exceeding 30 dB per second. In this study, participants were first subjected to four overflight noise exposures at A-weighted levels of 115 dB to 130 dB. Fifty percent of the subjects showed no change in hearing levels, 25 percent had a temporary 5 dB *increase* in sensitivity (the people could hear a 5 dB wider range of sound than before exposure), and 25 percent had a temporary 5 dB decrease in sensitivity (the people could hear a 5 dB narrower range of sound than before exposure). In the next phase, participants were subjected to a single overflight at a maximum level of 130 dB for eight successive exposures, separated by 90 seconds or until a temporary shift in hearing was observed. The temporary hearing threshold shifts showed an *increase* in sensitivity of up to 10 dB.

In another study of 115 test subjects between 18 and 50 years old in 1999, temporary threshold shifts were measured after laboratory exposure to military low-altitude flight noise (Ising, et al. 1999). According to the authors, the results indicate that repeated exposure to military low-altitude flight noise with L_{max} greater than 114 dB, especially if the noise level increases rapidly, may have the potential to cause noise induced hearing loss in humans.

Summary

Aviation and typical community noise levels near airports are not comparable to the occupational or recreational noise exposures associated with hearing loss. Studies of aircraft noise levels associated with civilian airport activity have not definitively correlated permanent hearing impairment with aircraft activity. It is unlikely that airport neighbors will remain outside their homes 24 hours per day, so there is little likelihood of hearing loss below an average sound level of 75 dB DNL. Near military airbases, average noise levels above 75 dB may occur, and while new DoD policy dictates that NIPTS be evaluated, no research results to date have definitively related permanent hearing impairment to aviation noise.

D.3.5 Nonauditory Health Effects

Studies have been conducted to determine whether correlations exist between noise exposure and cardiovascular problems, birth weight, and mortality rates. The nonauditory effect of noise on humans is not as easily substantiated as the effect on hearing. The results of studies conducted in the United States, primarily concentrating on cardiovascular response to noise, have been contradictory (Cantrell 1974). Cantrell concluded that the results of human and animal experiments show that average or intrusive noise can act as a stress-provoking stimulus. Prolonged stress is known to be a contributor to a number of health disorders. Kryter and Poza (1980) state, "It is more likely that noise-related general ill-health effects are due to the psychological annoyance from the noise interfering with normal everyday behavior, than it is from the noise eliciting, because of its intensity, reflexive response in the autonomic or other physiological systems of the body." Psychological stresses may cause a physiological stress reaction that could result in impaired health.

The National Institute for Occupational Safety and Health and EPA commissioned CHABA in 1981 to study whether established noise standards are adequate to protect against health disorders other than hearing defects. CHABA's conclusion was that:

Evidence from available research reports is suggestive, but it does not provide definitive answers to the question of health effects, other than to the auditory system, of long-term exposure to noise. It seems prudent, therefore, in the absence of adequate knowledge as to whether or not noise can produce effects upon health other than damage to auditory system, either directly or mediated through stress, that insofar as feasible, an attempt should be made to obtain more critical evidence.

Since the CHABA report, there have been more recent studies that suggest that noise exposure may cause hypertension and other stress-related effects in adults. Near an airport in Stockholm, Sweden, the prevalence of hypertension was reportedly greater among nearby residents who were exposed to energy averaged noise levels exceeding 55 dB and maximum noise levels exceeding 72 dB, particularly older subjects and those not reporting impaired hearing ability (Rosenlund, et al. 2001). A study of elderly volunteers who were exposed to simulated military low-altitude flight noise reported that blood pressure was raised by L_{max} of 112 dB and high speed level increase (Michalak, et al. 1990). Yet another study of subjects exposed to varying levels of military aircraft or road noise found no significant relationship between noise level and blood pressure (Pulles, et al. 1990).

The U.S. Department of the Navy prepared a programmatic Environmental Assessment (EA) for the continued use of non-explosive ordnance on the Vieques Inner Range. Following the preparation of the EA, it was learned that research conducted by the University of Puerto Rico, Ponce School of Medicine, suggested that Vieques fishermen and their families were experiencing symptoms associated with vibroacoustic disease (VAD) (U.S. Department of the Navy 2002). The study alleged that exposure to noise and sound waves of large pressure amplitudes within lower frequency bands, associated with Navy training activities—specifically, air-to-ground bombing or naval fire support—was related to a larger prevalence of heart anomalies within the Vieques fishermen and their families. The Ponce School of Medicine study compared the Vieques group with a group from Ponce Playa. A 1999 study conducted on Portuguese aircraft-manufacturing workers from a single factory reported effects of jet aircraft noise exposure that involved a wide range of symptoms and disorders, including the cardiac issues on which the Ponce School of Medicine study focused. The 1999 study identified these effects as VAD.

Johns Hopkins University (JHU) conducted an independent review of the Ponce School of Medicine study, as well as the Portuguese aircraft workers study and other relevant scientific literature. Their findings concluded that VAD should not be accepted as a syndrome, given that exhaustive research across a number of populations has not yet been conducted. JHU also pointed out that the evidence supporting the existence of VAD comes largely from one group of investigators and that similar results would have to be replicated by other investigators. In short, JHU concluded that it had not been established that noise was the causal agent for the symptoms reported and no inference can be made as to the role of noise from naval gunfire in producing echocardiographic abnormalities (U.S. Department of the Navy 2002).

Most studies of nonauditory health effects of long-term noise exposure have found that noise exposure levels established for hearing protection will also protect against any potential nonauditory health effects, at least in workplace conditions. One of the best scientific summaries of these findings is contained in the lead paper at the National Institutes of Health Conference on Noise and Hearing Loss, held on 22 to 24 January 1990 in Washington, D.C.:

> "The nonauditory effects of chronic noise exposure, when noise is suspected to act as one of the risk factors in the development of hypertension, cardiovascular disease, and other nervous disorders, have never been proven to occur as chronic manifestations at levels below these criteria (an average of 75 dBA for complete protection against hearing loss for an 8-hour day). At the recent (1988) International Congress on Noise as a Public Health Problem, most studies attempting to clarify such health effects did not find them at levels below the criteria protective of noise-induced hearing loss, and even above these criteria, results regarding such health effects were ambiguous. Consequently, one comes to the conclusion that establishing and enforcing exposure levels protecting against noise-induced hearing loss would not only solve the noise-induced hearing loss problem, but also any potential nonauditory health effects in the work place" (von Gierke 1990).

Although these findings were specifically directed at noise effects in the workplace, they are equally applicable to aircraft noise effects in the community environment. Research studies regarding the nonauditory health effects of aircraft noise are ambiguous, at best, and often contradictory. Yet, even those studies that purport to find such health effects use time-average noise levels of 75 dB and higher for their research.

For example, two UCLA researchers apparently found a relationship between aircraft noise levels under the approach path to Los Angeles International Airport (LAX) and increased mortality rates among the exposed residents by using an average noise exposure level greater than 75 dB for the "noise-exposed" population (Meacham and Shaw 1979). Nevertheless, three other UCLA professors analyzed those same data and found no relationship between noise exposure and mortality rates (Frerichs, et al. 1980).

As a second example, two other UCLA researchers used this same population near LAX to show a higher rate of birth defects for 1970 to 1972 when compared with a control group residing away from the airport (Jones and Tauscher 1978). Based on this report, a separate group at the Center for Disease Control performed a more thorough study of populations near Atlanta's Hartsfield International Airport (ATL) for 1970 to 1972 and found no relationship in their study of 17 identified categories of birth defects to aircraft noise levels above 65 dB (Edmonds, et al. 1979).

In summary, there is no scientific basis for a claim that potential health effects exist for aircraft time-average sound levels below 75 dB.

The potential for noise to affect physiological health, such as the cardiovascular system, has been speculated; however, no unequivocal evidence exists to support such claims (Harris 1997). Conclusions drawn from a review of health effect studies involving military low-altitude flight noise with its unusually high maximum levels and rapid rise in sound level have shown no increase in cardiovascular disease (Schwartze and Thompson 1993). Additional claims that are unsupported include flyover noise producing increased mortality rates and increases in cardiovascular death, aggravation of post-traumatic stress syndrome, increased stress, increase in admissions to mental hospitals, and adverse affects on pregnant women and the unborn fetus (Harris 1997).

D.3.6 Performance Effects

The effect of noise on the performance of activities or tasks has been the subject of many studies. Some of these studies have established links between continuous high noise levels and performance loss. Noise-induced performance losses are most frequently reported in studies employing noise levels in excess of 85 dB. Little change has been found in low-noise cases. It has been cited that moderate noise levels appear to act as a stressor for more sensitive individuals performing a difficult psychomotor task.

While the results of research on the general effect of periodic aircraft noise on performance have yet to yield definitive criteria, several general trends have been noted including:

- A periodic intermittent noise is more likely to disrupt performance than a steady-state continuous noise of the same level. Flyover noise, due to its intermittent nature, might be more likely to disrupt performance than a steady-state noise of equal level.
- Noise is more inclined to affect the quality than the quantity of work.
- Noise is more likely to impair the performance of tasks that place extreme demands on theworker.

D.3.7 Noise Effects on Children

In response to noise-specific and other environmental studies, Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks (1997), requires federal agencies to ensure that policies, programs, and activities address environmental health and safety risks to identify any disproportionate risks to children.

A review of the scientific literature indicates that there has not been a tremendous amount of research in the area of aircraft noise effects on children. The research reviewed does suggest that environments with sustained high background noise can have variable effects, including noise effects on learning and cognitive abilities, and reports of various noise-related physiological changes.

D.3.7.1 Effects on Learning and Cognitive Abilities

In 2002 ANSI refers to studies that suggest that loud and frequent background noise can affect the learning patterns of young children (ANSI 2002). ANSI provides discussion on the relationships between noise and learning, and stipulates design requirements and acoustical performance criteria for outdoor-to-indoor noise isolation. School design is directed to be cognizant of, and responsive to surrounding land uses and the shielding of outdoor noise from the indoor environment. The ANSI acoustical performance criteria for schools include the requirement that the one-hour-average background noise level shall not exceed 35 dBA in core learning spaces smaller than 20,000 cubic-feet and 40 dBA in core learning spaces with enclosed volumes exceeding 20,000 cubic-feet. This would require schools be constructed such that, in quiet neighborhoods indoor noise levels are lowered by 15 to 20 dBA relative to outdoor levels. In schools near airports, indoor noise levels would have to be lowered by 35 to 45 dBA relative to outdoor levels (ANSI 2002).

The studies referenced by ANSI to support the new standard are not specific to jet aircraft noise and the potential effects on children. However, there are references to studies that have shown that children in noisier classrooms scored lower on a variety of tests. Excessive background noise or reverberation within schools causes interferences of communication and can therefore create an acoustical barrier to learning (ANSI 2002). Studies have been performed that contribute to the body of evidence emphasizing the importance of communication by way of the spoken language to the development of cognitive skills. The ability to read, write, comprehend, and maintain attentiveness, are, in part, based upon whether teacher communication is consistently intelligible (ANSI 2002).

Numerous studies have shown varying degrees of effects of noise on the reading comprehension, attentiveness, puzzle-solving, and memory/recall ability of children. It is generally accepted that young children are more susceptible than adults to the effects of background noise. Because of the developmental status of young children (linguistic, cognitive, and proficiency), barriers to hearing can cause interferences or disruptions in developmental evolution.

Research on the impacts of aircraft noise, and noise in general, on the cognitive abilities of school-aged children has received more attention in recent years. Several studies suggest that aircraft noise can affect the academic performance of schoolchildren. Although many factors could contribute to learning deficits in school-aged children (e.g., socioeconomic level, home environment, diet, sleep patterns), evidence exists that suggests that chronic exposure to high aircraft noise levels can impair learning.

Specifically, elementary school children attending schools near New York City's two airports demonstrated lower reading scores than children living farther away from the flight paths (Green, et al. 1982). Researchers have found that tasks involving central processing and language comprehension (such as reading, attention, problem solving, and memory) appear to be the most affected by noise (Evans and Lepore 1993; Hygge 1994; and Evans, et al. 1998). It has been demonstrated that chronic exposure of first- and second-grade children to aircraft noise can result in reading deficits and impaired speech perception (i.e., the ability to hear common, low-frequency [vowel] sounds but not high frequencies [consonants] in speech) (Evans and Maxwell 1997).

The Evans and Maxwell (1997) study found that chronic exposure to aircraft noise resulted in reading deficits and impaired speech perception for first- and second-grade children. Other studies found that children residing near the Los Angeles International Airport had more difficulty solving cognitive problems and did not perform as well as children from quieter schools in puzzle-solving and attentiveness (Bronzaft 1997; Cohen, et al. 1980). Children attending elementary schools in high aircraft noise areas near London's Heathrow Airport demonstrated poorer reading comprehension and selective cognitive impairments (Haines, et al. 2001a, and 2001b). Similarly, a 1994 study found that students exposed to aircraft noise of approximately 76 dBA scored 20% lower on recall ability tests than students exposed to ambient noise of 42-44 dBA (Hygge 1994). Similar studies involving the testing of attention, memory, and reading comprehension of school children located near airports showed that their tests exhibited reduced performance results compared to those of similar groups of children who were located in quieter environments (Evans, et al. 1998; Haines, et al. 1998). The Haines and Stansfeld study indicated that there may be some long-term effects associated with exposure, as one-year follow-up testing still demonstrated lowered scores for children in higher noise schools (Haines, et al. 2001a, and 2001b). In contrast, a 2002 study found that although children living near the old Munich airport scored lower in standardized reading and long-term memory tests than a control group, their performance on the same tests was equal to that of the control group once the airport was closed. (Hygge, et al. 2002).

Finally, although it is recognized that there are many factors that could contribute to learning deficits in school-aged children, there is increasing awareness that chronic exposure to high aircraft noise levels may impair learning. This awareness has led the World Health Organization and a North Atlantic Treaty Organization working group to conclude that daycare centers and schools should not be located near major sources of noise, such as highways, airports, and industrial sites (World Health Organization 2000; North Atlantic Treaty Organization 2000).

D.3.7.2 Health Effects

Physiological effects in children exposed to aircraft noise and the potential for health effects have also been the focus of limited investigation. Studies in the literature include examination of blood pressure levels, hormonal secretions, and hearing loss.

As a measure of stress response to aircraft noise, authors have looked at blood pressure readings to monitor children's health. Children who were chronically exposed to aircraft noise from a new airport near Munich, Germany, had modest (although significant) increases in blood pressure, significant increases in stress hormones, and a decline in quality of life (Evans, et al. 1998). Children attending noisy schools had statistically significant average systolic and diastolic blood pressure ($p<0.03$). Systolic blood pressure means were 89.68 mm for children attending schools located in noisier environments compared to 86.77 mm for a control group. Similarly, diastolic blood pressure means for the noisier environment group were 47.84 mm and 45.16 for the control group (Cohen, et al. 1980).

Although the literature appears limited, studies focused on the wide range of potential effects of aircraft noise on school children have also investigated hormonal levels between groups of children exposed to aircraft noise compared to those in a control group. Specifically, two studies analyzed cortisol and urinary catecholamine levels in school children as measurements of stress response to aircraft noise (Haines, et al. 2001b and 2001c). In both instances, there were no differences between the aircraft-noise-exposed children and the control groups.

Other studies have reported hearing losses from exposure to aircraft noise. Noise-induced hearing loss was reportedly higher in children who attended a school located under a flight path near a Taiwan airport, as compared to children at another school far away (Chen, et al. 1997). Another study reported that hearing ability was reduced significantly in individuals who lived near an airport and were frequently exposed to aircraft noise (Chen and Chen 1993). In that study, noise exposure near the airport was reportedly uniform, with DNL greater than 75 dB and maximum noise levels of about 87 dB during overflights. Conversely, several other studies that were reviewed reported no difference in hearing ability between children exposed to high levels of airport noise and children located in quieter areas (Fisch 1977; Andrus, et al. 1975; Wu, et al. 1995).

D.3.8 Effects on Domestic Animals and Wildlife

Hearing is critical to an animal's ability to react, compete, reproduce, hunt, forage, and survive in its environment. While the existing literature does include studies on possible effects of jet aircraft noise and sonic booms on wildlife, there appears to have been little concerted effort in developing quantitative comparisons of aircraft noise effects on normal auditory characteristics. Behavioral effects have been relatively well described, but the larger ecological context issues, and the potential for drawing conclusions regarding effects on populations, has not been well developed.

The relationships between potential auditory/physiological effects and species interactions with their environments are not well understood. Manci, et al. (1988), assert that the consequences that physiological effects may have on behavioral patterns is vital to understanding the long-term effects of noise on wildlife. Questions regarding the effects (if any) on predator-prey interactions, reproductive success, and intra-inter specific behavior patterns remain.

The following discussion provides an overview of the existing literature on noise effects (particularly jet aircraft noise) on animal species. The literature reviewed here involves those studies that have focused on the observations of the behavioral effects that jet aircraft and sonic booms have on animals.

A great deal of research was conducted in the 1960's and 1970's on the effects of aircraft noise on the public and the potential for adverse ecological impacts. These studies were largely completed in response to the increase in air travel and as a result of the introduction of supersonic jet aircraft. According to Manci, et al. (1988), the foundation of information created from that focus does not necessarily correlate or provide information specific to the impacts to wildlife in areas overflown by aircraft at supersonic speed or at low altitudes.

The abilities to hear sounds and noise and to communicate assist wildlife in maintaining group cohesiveness and survivorship. Social species communicate by transmitting calls of warning, introduction, and other types that are subsequently related to an individual's or group's responsiveness.

Animal species differ greatly in their responses to noise. Noise effects on domestic animals and wildlife are classified as primary, secondary, and tertiary. Primary effects are direct, physiological changes to the auditory system, and most likely include the masking of auditory signals. Masking is defined as the inability of an individual to hear important environmental signals that may arise from mates, predators, or prey. There is some potential that noise could disrupt a species' ability to communicate or could interfere with behavioral patterns (Manci, et al. 1988). Although the effects are likely temporal, aircraft noise may cause masking of auditory signals within exposed faunal communities. Animals rely on hearing to avoid predators, obtain food, and communicate with, and attract, other members of their species. Aircraft noise may mask or interfere with these functions. Other primary effects, such as ear drum rupture or temporary and permanent hearing threshold shifts, are not as likely given the subsonic noise levels produced by aircraft overflights. Secondary effects may include non-auditory effects such as stress and hypertension; behavioral modifications; interference with mating or reproduction; and impaired ability to obtain adequate food, cover, or water. Tertiary effects are the direct result of primary and secondary effects, and include population decline and habitat loss. Most of the effects of noise are mild enough that they may never be detectable as variables of change in population size or population growth against the background of normal variation (Bowles 1995). Other environmental variables (e.g., predators, weather, changing prey base, ground-based disturbance) also influence secondary and tertiary effects, and confound the ability to identify the ultimate factor in limiting productivity of a certain nest, area, or region (Smith, et al. 1988). Overall, the literature suggests that species differ in their response to various types, durations, and sources of noise (Manci, et al. 1988).

Many scientific studies have investigated the effects of aircraft noise on wildlife, and some have focused on wildlife "flight" due to noise. Apparently, animal responses to aircraft are influenced by many variables, including size, speed, proximity (both height above the ground and lateral distance), engine noise, color, flight profile, and radiated noise. The type of aircraft (e.g., fixed wing versus rotor-wing [helicopter]) and type of flight mission may also produce different levels of disturbance, with varying animal responses (Smith, et al. 1988). Consequently, it is difficult to generalize animal responses to noise disturbances across species.

One result of the 1988 Manci, et al., literature review was the conclusion that, while behavioral observation studies were relatively limited, a general behavioral reaction in animals from exposure to aircraft noise is the startle response. The intensity and duration of the startle response appears to be dependent on which species is exposed, whether there is a group or an individual, and whether there have been some previous exposures. Responses range from flight, trampling, stampeding, jumping, or running, to movement of the head in the apparent direction of the noise source. Manci, et al. (1988), reported that the literature indicated that avian species may be more sensitive to aircraft noise than mammals.

D.3.8.1 Domestic Animals

Although some studies report that the effects of aircraft noise on domestic animals is inconclusive, a majority of the literature reviewed indicates that domestic animals exhibit some behavioral responses to military overflights but generally seem to habituate to the disturbances over a period of time. Mammals in particular appear to react to noise at sound levels higher than 90 dB, with responses including the startle response, freezing (i.e., becoming temporarily stationary), and fleeing from the sound source. Many studies on domestic animals suggest that some species appear to acclimate to some forms of sound disturbance (Manci, et al. 1988). Some studies have reported such primary and secondary effects as reduced milk production and rate of milk release, increased glucose concentrations, decreased levels of hemoglobin, increased heart rate, and a reduction in thyroid activity. These latter effects appear to represent a small percentage of the findings occurring in the existing literature.

Some reviewers have indicated that earlier studies, and claims by farmers linking adverse effects of aircraft noise on livestock, did not necessarily provide clear-cut evidence of cause and effect (Cottereau 1978). In contrast, many studies conclude that there is no evidence that aircraft overflights affect feed intake, growth, or production rates in domestic animals.

Cattle

In response to concerns about overflight effects on pregnant cattle, milk production, and cattle safety, the U.S. Air Force prepared a handbook for environmental protection that summarizes the literature on the impacts of low-altitude flights on livestock (and poultry) and includes specific case studies conducted in numerous airspaces across the country. Adverse effects have been found in a few studies but have not been reproduced in other similar studies. One such study, conducted in 1983, suggested that 2 of 10 cows in late pregnancy aborted after showing rising estrogen and falling progesterone levels. These increased hormonal levels were reported as being linked to 59 aircraft overflights. The remaining eight cows showed no changes in their blood concentrations and calved normally (U.S. Air Force 1994b). A similar study reported abortions occurred in three out of five pregnant cattle after exposing them to flyovers by six different aircraft (U.S.Air Force 1994b). Another study suggested that feedlot cattle could stampede and injure themselves when exposed to low-level overflights (U.S. Air Force 1994b).

A majority of the studies reviewed suggests that there is little or no effect of aircraft noise on cattle. Studies presenting adverse effects to domestic animals have been limited. A number of studies (Parker and Bayley 1960; Casady and Lehmann 1967; Kovalcik and Sottnik 1971) investigated the effects of jet aircraft noise and sonic booms on the milk production of dairy cows. Through the compilation and examination of milk production data from areas exposed to jet aircraft noise and sonic boom events, it was determined that milk yields were not affected. This was particularly evident in those cows that had been previously exposed to jet aircraft noise.

A study examined the causes of 1,763 abortions in Wisconsin dairy cattle over a one-year time period and none were associated with aircraft disturbances (U.S.Air Force 1993). In 1987, Anderson contacted seven livestock operators for production data, and no effects of low-altitude and supersonic flights were noted. Three out of 43 cattle previously exposed to low-altitude flights showed a startle response to an F/A-18 aircraft flying overhead at 500 feet above ground level and 400 knots by running less than 10 meters. They resumed normal activity within one minute (U.S.Air Force 1994b). Beyer (1983) found that helicopters caused more reaction than other low-aircraft overflights, and that the helicopters at 30 to 60 feet overhead did not affect milk production and pregnancies of 44 cows and heifers in a 1964 study (U.S. Air Force 1994b).

Additionally, Beyer reported that five pregnant dairy cows in a pasture did not exhibit fright-flight tendencies or disturb their pregnancies after being overflown by 79 low-altitude helicopter flights and 4 low-altitude, subsonic jet aircraft flights (U.S. Air Force 1994b). A 1956 study found that the reactions of dairy and beef cattle to noise from low-altitude, subsonic aircraft were similar to those caused by paper blowing about, strange persons, or other moving objects (U.S. Air Force 1994b).

In a report to Congress, the U. S. Forest Service concluded that "evidence both from field studies of wild ungulates and laboratory studies of domestic stock indicate that the risks of damage are small (from aircraft approaches of 50 to 100 meters), as animals take care not to damage themselves (U.S. Forest Service 1992). If animals are overflown by aircraft at altitudes of 50 to 100 meters, there is no evidence that mothers and young are separated, that animals collide with obstructions (unless confined) or that they traverse dangerous ground at too high a rate." These varied study results suggest that, although the confining of cattle could magnify animal response to aircraft overflight, there is no proven cause-and-effect link between startling cattle from aircraft overflights and abortion rates or lower milk production.

Horses

Horses have also been observed to react to overflights of jet aircraft. Several of the studies reviewed reported a varied response of horses to low-altitude aircraft overflights. Observations made in 1966 and 1968 noted that horses galloped in response to jet flyovers (U.S. Air Force 1993). Bowles (1995) cites Kruger and Erath as observing horses exhibiting intensive flight reactions, random movements, and biting/kicking behavior. However, no injuries or abortions occurred, and there was evidence that the mares adapted somewhat to the flyovers over the course of a month (U.S. Air Force 1994b). Although horses were observed noticing the overflights, it did not appear to affect either survivability or reproductive success. There was also some indication that habituation to these types of disturbances was occurring.

LeBlanc, et al. (1991), studied the effects of F-14 jet aircraft noise on pregnant mares. They specifically focused on any changes in pregnancy success, behavior, cardiac function, hormonal production, and rate of habituation. Their findings reported observations of "flight-fright" reactions, which caused increases in heart rates and serum cortisol concentrations. The mares, however, did habituate to the noise. Levels of anxiety and mass body movements were the highest after initial exposure, with intensities of responses decreasing thereafter. There were no differences in pregnancy success when compared to a control group.

Swine

Generally, the literature findings for swine appear to be similar to those reported for cows and horses. While there are some effects from aircraft noise reported in the literature, these effects are minor. Studies of continuous noise exposure (i.e., 6 hours, 72 hours of constant exposure) reported influences on short-term hormonal production and release. Additional constant exposure studies indicated the observation of stress reactions, hypertension, and electrolyte imbalances (Dufour 1980). A study by Bond, et al. (1963), demonstrated no adverse effects on the feeding efficiency, weight gain, ear physiology, or thyroid and adrenal gland condition of pigs subjected to observed aircraft noise. Observations of heart rate increase were recorded, noting that cessation of the noise resulted in the return to normal heart rates. Conception rates and offspring survivorship did not appear to be influenced by exposure to aircraft noise.

Similarly, simulated aircraft noise at levels of 100 dB to 135 dB had only minor effects on the rate of feed utilization, weight gain, food intake, or reproduction rates of boars and sows exposed, and there were no injuries or inner ear changes observed (Manci, et al. 1988; Gladwin, et al. 1988).

Domestic Fowl

According to a 1994 position paper by the U.S. Air Force on effects of low-altitude overflights (below 1,000 ft) on domestic fowl, overflight activity has negligible effects (U.S. Air Force 1994a). The paper did recognize that given certain circumstances, adverse effects can be serious. Some of the effects can be panic reactions, reduced productivity, and effects on marketability (e.g., bruising of the meat caused during "pile-up" situations).

The typical reaction of domestic fowl after exposure to sudden, intense noise is a short-term startle response. The reaction ceases as soon as the stimulus is ended, and within a few minutes all activity returns to normal. More severe responses are possible depending on the number of birds, the frequency of exposure, and environmental conditions. Large crowds of birds, and birds not previously exposed, are more likely to pile up in response to a noise stimulus (U.S. Air Force 1994a). According to studies and interviews with growers, it is typically the previously unexposed birds that incite panic crowding, and the tendency to do so is markedly reduced within five exposures to the stimulus (U.S. Air Force 1994a). This suggests that the birds habituate relatively quickly. Egg productivity was not adversely affected by infrequent noise bursts, even at exposure levels as high as 120 to 130 dBA.

Between 1956 and 1988, there were 100 recorded claims against the Navy for alleged damage to domestic fowl. The number of claims averaged three per year, with peak numbers of claims following publications of studies on the topic in the early 1960s (U.S. Air Force 1994a). Many of the claims were disproved or did not have sufficient supporting evidence. The claims were filed for the following alleged damages: 55% for panic reactions, 31% for decreased production, 6% for reduced hatchability, 6% for weight loss, and less than 1% for reduced fertility (U.S. Air Force 1994a).

Turkeys

The review of the existing literature suggests that there has not been a concerted or widespread effort to study the effects of aircraft noise on commercial turkeys. One study involving turkeys examined the differences between simulated versus actual overflight aircraft noise, turkey responses to the noise, weight gain, and evidence of habituation (Bowles, et al. 1990a). Findings from the study suggested that turkeys habituated to jet aircraft noise quickly, that there were no growth rate differences between the experimental and control groups, and that there were some behavioral differences that increased the difficulty in handling individuals within the experimental group.

Low-altitude overflights were shown to cause turkey flocks that were kept inside turkey houses to occasionally pile up and experience high mortality rates due to the aircraft noise and a variety of disturbances unrelated to aircraft (U.S. Air Force 1994a).

D.3.8.2 Wildlife

Studies on the effects of overflights and sonic booms on wildlife have been focused mostly on avian species and ungulates such as caribou and bighorn sheep. Few studies have been conducted on marine mammals, small terrestrial mammals, reptiles, amphibians, and carnivorous mammals. Generally, species that live entirely below the surface of the water have also been ignored due to the fact they do not experience the same level of sound as terrestrial species (National Park Service 1994). Wild ungulates appear to be much more sensitive to noise disturbance than domestic livestock (Manci, et al. 1988). This may be due to previous exposure to disturbances. One common factor appears to be that low-altitude flyovers seem to be more disruptive in terrain where there is little cover (Manci, et al. 1988).

D.3.8.2.1 MAMMALS

Terrestrial Mammals

Studies of terrestrial mammals have shown that noise levels of 120 dBA can damage mammals' ears, and levels at 95 dBA can cause temporary loss of hearing acuity. Noise from aircraft has affected other large carnivores by causing changes in home ranges, foraging patterns, and breeding behavior. One study recommended that aircraft not be allowed to fly at altitudes below 2,000 feet above ground level over important grizzly and polar bear habitat (Dufour 1980). Wolves have been frightened by low-altitude flights that were 25 to 1,000 feet off the ground. However, wolves have been found to adapt to aircraft overflights and noise as long as they were not being hunted from aircraft (Dufour 1980).

Wild ungulates (American bison, caribou, bighorn sheep) appear to be much more sensitive to noise disturbance than domestic livestock (Weisenberger, et al. 1996). Behavioral reactions may be related to the past history of disturbances by such things as humans and aircraft. Common reactions of reindeer kept in an enclosure exposed to aircraft noise disturbance were a slight startle response, raising of the head, pricking ears, and scenting of the air. Panic reactions and extensive changes in behavior of individual animals were not observed. Observations of caribou in Alaska exposed to fixed-wing aircraft and helicopters showed running and panic reactions occurred when overflights were at an altitude of 200 feet or less. The reactions decreased with increased altitude of overflights, and, with more than 500 feet in altitude, the panic reactions stopped. Also, smaller groups reacted less strongly than larger groups. One negative effect of the running and avoidance behavior is increased expenditure of energy. For a 90-kg animal, the calculated expenditure due to aircraft harassment is 64 kilocalories per minute when running and 20 kilocalories per minute when walking. When conditions are favorable, this expenditure can be counteracted with increased feeding; however, during harsh winter conditions, this may not be possible. Incidental observations of wolves and bears exposed to fixed-wing aircraft and helicopters in the northern regions suggested that wolves are less disturbed than wild ungulates, while grizzly bears showed the greatest response of any animal species observed.

It has been proven that low-altitude overflights do induce stress in animals. Increased heart rates, an indicator of excitement or stress, have been found in pronghorn antelope, elk, and bighorn sheep. As such reactions occur naturally as a response to predation, infrequent overflights may not, in and of themselves, be detrimental. However, flights at high frequencies over a long period of time may cause harmful effects. The consequences of this disturbance, while cumulative, is not additive. It may be that aircraft disturbance may not cause obvious and serious health effects, but coupled with a harsh winter, it may have an adverse impact. Research has shown that stress induced by other types of disturbances produces long-term decreases in metabolism and hormone balances in wild ungulates.

Behavioral responses can range from mild to severe. Mild responses include head raising, body shifting, or turning to orient toward the aircraft. Moderate disturbance may be nervous behaviors, such as trotting a short distance. Escape is the typical severe response.

Marine Mammals

The physiological composition of the ear in aquatic and marine mammals exhibits adaptation to the aqueous environment. These differences (relative to terrestrial species) manifest themselves in the auricle and middle ear (Manci, et al. 1988). Some mammals use echolocation to perceive objects in their surroundings and to determine the directions and locations of sound sources (Simmons 1983 in Manci, et al. 1988).

In 1980, the Acoustical Society of America held a workshop to assess the potential hazard of manmade noise associated with proposed Alaska Arctic (North Slope-Outer Continental Shelf) petroleum operations on marine wildlife and to prepare a research plan to secure the knowledge necessary for proper assessment of noise impacts (Acoustical Society of America, 1980). Since 1980 it appears that research on responses of aquatic mammals to aircraft noise and sonic booms has been limited. Research conducted on northern fur seals, sea lions, and ringed seals indicated that there are some differences in how various animal groups receive frequencies of sound. It was observed that these species exhibited varying intensities of a startle response to airborne noise, which was habituated over time. The rates of habituation appeared to vary with species, populations, and demographics (age, sex). Time of day of exposure was also a factor (Muyberg 1978 in Manci, et al. 1988).

Studies accomplished near the Channel Islands were conducted near the area where the space shuttle launches occur. It was found that there were some response differences between species relative to the loudness of sonic booms. Those booms that were between 80 and 89 dBA caused a greater intensity of startle reactions than lower-intensity booms at 72 to 79 dBA. However, the duration of the startle responses to louder sonic booms was shorter (Jehl and Cooper 1980 in Manci, et al. 1988).

Jehl and Cooper (1980) indicated that low-flying helicopters, loud boat noises, and humans were the most disturbing to pinnipeds. According to the research, while the space launch and associated operational activity noises have not had a measurable effect on the pinniped population, it also suggests that there was a greater "disturbance level" exhibited during launch activities. There was a recommendation to continue observations for behavioral effects and to perform long-term population monitoring (Jehl and Cooper 1980).

The continued presence of single or multiple noise sources could cause marine mammals to leave a preferred habitat. However, it does not appear likely that overflights could cause migration from suitable habitats as aircraft noise over water is mobile and would not persist over any particular area. Aircraft noise, including supersonic noise, currently occurs in the overwater airspace of Eglin, Tyndall, and Langley AFBs from sorties predominantly involving jet aircraft. Survey results reported in Davis, et al. (2000), indicate that cetaceans (i.e., dolphins) occur under all of the Eglin and Tyndall marine airspace. The continuing presence of dolphins indicates that aircraft noise does not discourage use of the area and apparently does not harm the locally occurring population.

In a summary by the National Parks Service (1994) on the effects of noise on marine mammals, it was determined that gray whales and harbor porpoises showed no outward behavioral response to aircraft noise or overflights. Bottlenose dolphins showed no obvious reaction in a study involving helicopter overflights at 1,200 to 1,800 feet above the water. Neither did they show any reaction to survey aircraft unless the shadow of the aircraft passed over them, at which point there was some observed tendency to dive (Richardson, et al. 1995). Other anthropogenic noises in the marine environment from ships and pleasure craft may have more of an effect on marine mammals than aircraft noise (U.S. Air Force 2000). The noise effects on cetaceans appear to be somewhat attenuated by the air/water interface. The cetacean fauna along the coast of California have been subjected to sonic booms from military aircraft for many years without apparent adverse effects (Tetra Tech, Inc. 1997).

Manatees appear relatively unresponsive to human-generated noise to the point that they are often suspected of being deaf to oncoming boats [although their hearing is actually similar to that of pinnipeds (Bullock, et al. 1980)]. Little is known about the importance of acoustic communication to manatees, although they are known to produce at least ten different types of sounds and are thought to have sensitive hearing (Richardson, et al. 1995). Manatees continue to occupy canals near Miami International Airport, which suggests that they have become habituated to human disturbance and noise (Metro-Dade County 1995). Since manatees spend most of their time below the surface and do not startle readily, no effect of aircraft overflights on manatees would be expected (Bowles, et al. 1991b).

D.3.8.2.2 BIRDS

Auditory research conducted on birds indicates that they fall between the reptiles and the mammals relative to hearing sensitivity. According to Dooling (1978), within the range of one to five kHz, birds show a level of hearing sensitivity similar to that of the more sensitive mammals. In contrast to mammals, bird sensitivity falls off at a greater rate to increasing and decreasing frequencies. Passive observations and studies examining aircraft bird strikes indicate that birds nest and forage near airports. Aircraft noise in the vicinity of commercial airports apparently does not inhibit bird presence and use.

High-noise events (like a low-altitude aircraft overflight) may cause birds to engage in escape or avoidance behaviors, such as flushing from perches or nests (Ellis, et al. 1991). These activities impose an energy cost on the birds that, over the long term, may affect survival or growth. In addition, the birds may spend less time engaged in necessary activities like feeding, preening, or caring for their young because they spend time in noise-avoidance activity. However, the long-term significance of noise-related impacts is less clear. Several studies on nesting raptors have indicated that birds become habituated to aircraft overflights and that long-term reproductive success is not affected (Grubb and King 1991; Ellis, et al. 1991). Threshold noise levels for significant responses range from 62 dB for Pacific black brant (Branta bernicla nigricans) (Ward and Stehn 1990) to 85 dB for crested tern (Sterna bergii) (Brown 1990).

Songbirds were observed to become silent prior to the onset of a sonic boom event (F-111 jets), followed by "raucous discordant cries." There was a return to normal singing within 10 seconds after the boom (Higgins 1974 in Manci, et al. 1988). Ravens responded by emitting protestation calls, flapping their wings, and soaring.

Manci, et al. (1988), reported a reduction in reproductive success in some small territorial passerines (i.e., perching birds or songbirds) after exposure to low-altitude overflights. However, it has been observed that passerines are not driven any great distance from a favored food source by a nonspecific disturbance, such as aircraft overflights (U.S. Forest Service 1992). Further study may be warranted.

A recent study, conducted cooperatively between the DoD and the USFWS, assessed the response of the red-cockaded woodpecker to a range of military training noise events, including artillery, small arms, helicopter, and maneuver noise (Pater, et al. 1999). The project findings show that the red-cockaded woodpecker successfully acclimates to military noise events. Depending on the noise level that ranged from innocuous to very loud, the birds responded by flushing from their nest cavities. When the noise source was closer and the noise level was higher, the number of flushes increased proportionately. In all cases, however, the birds returned to their nests within a relatively short period of time (usually within 12 minutes). Additionally, the noise exposure did not result in any mortality or statistically detectable changes in reproductive success (Pater, et al. 1999). Red-cockaded woodpeckers did not flush when artillery simulators were more than 122 meters away and SEL noise levels were 70 dBA.

Lynch and Speake (1978) studied the effects of both real and simulated sonic booms on the nesting and brooding eastern wild turkey (Meleagris gallopavo silvestris) in Alabama. Hens at four nest sites were subjected to between 8 and 11 combined real and simulated sonic booms. All tests elicited similar responses, including quick lifting of the head and apparent alertness for between 10 and 20 seconds. No apparent nest failure occurred as a result of the sonic booms.

Twenty-one brood groups were also subjected to simulated sonic booms. Reactions varied slightly between groups, but the largest percentage of groups reacted by standing motionless after the initial blast. Upon the sound of the boom, the hens and poults fled until reaching the edge of the woods (approximately 4 to 8 meters). Afterward, the poults resumed feeding activities while the hens remained alert for a short period of time (approximately 15 to 20 seconds). In no instances were poults abandoned, nor did they scatter and become lost. Every observation group returned to normal activities within a maximum of 30 seconds after a blast.

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In a literature review of raptor responses to aircraft noise, Manci, et al. (1988), found that most raptors did not show a negative response to overflights. When negative responses were observed they were predominantly associated with rotor-winged aircraft or jet aircraft that were repeatedly passing within 0.5 mile of a nest.

Ellis, et al. (1991), performed a study to estimate the effects of low-level military jet aircraft and mid- to high-altitude sonic booms (both actual and simulated) on nesting peregrine falcons and seven other raptors (common black-hawk, Harris' hawk, zone-tailed hawk, red-tailed hawk, golden eagle, prairie falcon, bald eagle). They observed responses to test stimuli, determined nest success for the year of the testing, and evaluated site occupancy the following year. Both long- and short-term effects were noted in the study. The results reported the successful fledging of young in 34 of 38 nest sites (all eight species) subjected to low-level flight and/or simulated sonic booms. Twenty-two of the test sites were revisited in the following year, and observations of pairs or lone birds were made at all but one nest. Nesting attempts were underway at 19 of 20 sites that were observed long enough to be certain of breeding activity. Reoccupancy and productivity rates were within or above expected values for self-sustaining populations.

Short-term behavior responses were also noted. Overflights at a distance of 150 m or less produced few significant responses and no severe responses. Typical responses consisted of crouching or, very rarely, flushing from the perch site. Significant responses were most evident before egg laying and after young were "well grown." Incubating or brooding adults never burst from the nest, thus preventing egg breaking or knocking chicks out of the nest. Jet passes and sonic booms often caused noticeable alarm; however, significant negative responses were rare and did not appear to limit productivity or reoccupancy. Due to the locations of some of the nests, some birds may have been habituated to aircraft noise. There were some test sites located at distances far from zones of frequent military aircraft usage, and the test stimuli were often closer, louder, and more frequent than would be likely for a normal training situation.

Manci, et al. (1988), noted that a female northern harrier was observed hunting on a bombing range in Mississippi during bombing exercises. The harrier was apparently unfazed by the exercises, even when a bomb exploded within 200 feet. In a similar case of habituation/non-disturbance, a study on the Florida snail-kite stated the greatest reaction to overflights (approximately 98 dBA) was "watching the aircraft fly by." No detrimental impacts to distribution, breeding success, or behavior were noted.

Bald Eagle

A study by Grubb and King (1991) on the reactions of the bald eagle to human disturbances showed that terrestrial disturbances elicited the greatest response, followed by aquatic (i.e., boats) and aerial disturbances. The disturbance regime of the area where the study occurred was predominantly characterized by aircraft noise. The study found that pedestrians consistently caused responses that were greater in both frequency and duration. Helicopters elicited the highest level of aircraft-related responses. Aircraft disturbances, although the most common form of disturbance, resulted in the lowest levels of response. This low response level may have been due to habituation; however, flights less than 170 meters away caused reactions similar to other disturbance types. Ellis, et al. (1991), showed that eagles typically respond to the proximity of a disturbance, such as a pedestrian or aircraft within 100 meters, rather than the noise level. Fleischner and Weisberg (1986) stated that reactions of bald eagles to commercial jet flights, although minor (e.g., looking), were twice as likely to occur when the jets passed at a distance of 0.5 mile or less. They also noted that helicopters were four times more likely to cause a reaction than a commercial jet and 20 times more likely to cause a reaction than a propeller plane.

The USFWS advised Cannon AFB that flights at or below 2,000 feet AGL from October 1 through March 1 could result in adverse impacts to wintering bald eagles (U.S. Fish and Wildlife Serice 1998). However, Fraser, et al. (1985), suggested that raptors habituate to overflights rapidly, sometimes tolerating aircraft approaches of 65 feet or less.

Osprey

A study by Trimper, et al. (1998), in Goose Bay, Labrador, Canada, focused on the reactions of nesting osprey to military overflights by CF-18 Hornets. Reactions varied from increased alertness and focused observation of planes to adjustments in incubation posture. No overt reactions (e.g., startle response, rapid nest departure) were observed as a result of an overflight. Young nestlings crouched as a result of any disturbance until they grew to 1 to 2 weeks prior to fledging. Helicopters, human presence, float planes, and other ospreys elicited the strongest reactions from nesting ospreys. These responses included flushing, agitation, and aggressive displays. Adult osprey showed high nest occupancy rates during incubation regardless of external influences.

The osprey observed occasionally stared in the direction of the flight before it was audible to the observers. The birds may have been habituated to the noise of the flights; however, overflights were strictly controlled during the experimental period. Strong reactions to float planes and helicopter may have been due to the slower flight and therefore longer duration of visual stimuli rather than noise-related stimuli.

Red-tailed Hawk

Anderson, et al. (1989), conducted a study that investigated the effects of low-level helicopter overflights on 35 red-tailed hawk nests. Some of the nests had not been flown over prior to the study. The hawks that were naïve (i.e., not previously exposed) to helicopter flights exhibited stronger avoidance behavior (nine of 17 birds flushed from their nests) than those that had experienced prior overflights. The overflights did not appear to affect nesting success in either study group. These findings were consistent with the belief that red-tailed hawks habituate to low-level air traffic, even during the nesting period.

D.3.8.2.2.2 MIGRATORY WATERFOWL

A study of caged American black ducks was conducted by Fleming, et al. in 1996. It was determined that noise had negligible energetic and physiologic effects on adult waterfowl. Measurements included body weight, behavior, heart rate, and enzymatic activity. Experiments also showed that adult ducks exposed to high noise events acclimated rapidly and showed no effects.

The study also investigated the reproductive success of captive ducks, which indicated that duckling growth and survival rates at Piney Island, North Carolina, were lower than those at a background location. In contrast, observations of several other reproductive indices (i.e., pair formation, nesting, egg production, and hatching success) showed no difference between Piney Island and the background location. Potential effects on wild duck populations may vary, as wild ducks at Piney Island have presumably acclimated to aircraft overflights. It was not demonstrated that noise was the cause of adverse impacts. A variety of other factors, such as weather conditions, drinking water and food availability and variability, disease, and natural variability in reproduction, could explain the observed effects. Fleming noted that drinking water conditions (particularly at Piney Island) deteriorated during the study, which could have affected the growth of young ducks. Further research would be necessary to determine the cause of any reproductive effects.

Another study by Conomy, et al. (1998) exposed previously unexposed ducks to 71 noise events per day that equaled or exceeded 80 dBA. It was determined that the proportion of time black ducks reacted to aircraft activity and noise decreased from 38 percent to 6 percent in 17 days and remained stable at 5.8 percent thereafter. In the same study, the wood duck did not appear to habituate to aircraft disturbance. This supports the notion that animal response to aircraft noise is species-specific. Because a startle response to aircraft noise can result in flushing from nests, migrants and animals living in areas with high concentrations of predators would be the most vulnerable to experiencing effects of lowered birth rates and recruitment over time. Species that are subjected to infrequent overflights do not appear to habituate to overflight disturbance as readily.

Black brant studied in the Alaska Peninsula were exposed to jets and propeller aircraft, helicopters, gunshots, people, boats, and various raptors. Jets accounted for 65% of all the disturbances. Humans, eagles, and boats caused a greater percentage of brant to take flight. There was markedly greater reaction to Bell-206-B helicopter flights than fixed wing, single-engine aircraft (Ward, et al. 1986).

The presence of humans and low-flying helicopters in the Mackenzie Valley North Slope area did not appear to affect the population density of Lapland longspurs, but the experimental group was shown to have reduced hatching and fledging success and higher nest abandonment. Human presence appeared to have a greater impact on the incubating behavior of the black brant, common eider, and Arctic tern than fixed-wing aircraft (Gunn and Livingston 1974).

Gunn and Livingston (1974) found that waterfowl and seabirds in the Mackenzie Valley and North Slope of Alaska and Canada became acclimated to float plane disturbance over the course of three days. Additionally, it was observed that potential predators (bald eagle) caused a number of birds to leave their nests. Non-breeding birds were observed to be more reactive than breeding birds. Waterfowl were affected by helicopter flights, while snow geese were disturbed by Cessna 185 flights. The geese flushed when the planes were under 1,000 feet, compared to higher flight elevations. An overall reduction in flock sizes was observed. It was recommended that aircraft flights be reduced in the vicinity of premigratory staging areas.

Manci, et al. 1988 reported that waterfowl were particularly disturbed by aircraft noise. The most sensitive appeared to be snow geese. Canada geese and snow geese were thought to be more sensitive than other animals such as turkey vultures, coyotes, and raptors (Edwards, et al. 1979).

D.3.8.2.2.3 WADING AND SHORE BIRDS

Black, et al. (1984), studied the effects of low-altitude (less than 500 feet AGL) military training flights with sound levels from 55 to 100 dBA on wading bird colonies (i.e., great egret, snowy egret, tricolored heron, and little blue heron). The training flights involved three or four aircraft, which occurred once or twice per day. This study concluded that the reproductive activity--including nest success, nestling survival, and nestling chronology--was independent of F-16 overflights. Dependent variables were more strongly related to ecological factors, including location and physical characteristics of the colony and climatology. Another study on the effects of circling fixed-wing aircraft and helicopter overflights on wading bird colonies found that at altitudes of 195 to 390 feet, there was no reaction in nearly 75 percent of the 220 observations. Ninety percent displayed no reaction or merely looked toward the direction of the noise source. Another 6 percent stood up, 3 percent walked from the nest, and 2 percent flushed (but were without active nests) and returned within 5 minutes (Kushlan 1978). Apparently, non-nesting wading birds had a slightly higher incidence of reacting to overflights than nesting birds. Seagulls observed roosting near a colony of wading birds in another study remained at their roosts when subsonic aircraft flew overhead (Burger 1981). Colony distribution appeared to be most directly correlated to available wetland community types and was found to be distributed randomly with respect to military training routes. These results suggest that wading bird species presence was most closely linked to habitat availability and that they were not affected by low-level military overflights (U.S. Air Force 2000).

Burger (1986) studied the response of migrating shorebirds to human disturbance and found that shorebirds did not fly in response to aircraft overflights, but did flush in response to more localized intrusions (i.e., humans and dogs on the beach). Burger (1981) studied the effects of noise from JFK Airport in New York on herring gulls that nested less than 1 kilometer from the airport. Noise levels over the nesting colony were 85 to 100 dBA on approach and 94 to 105 dBA on takeoff. Generally, there did not appear to be any prominent adverse effects of subsonic aircraft on nesting, although some birds flushed when the concorde flew overhead and, when they returned, engaged in aggressive behavior. Groups of gulls tended to loaf in the area of the nesting colony, and these birds remained at the roost when the Concorde flew overhead. Up to 208 of the loafing gulls flew when supersonic aircraft flew overhead. These birds would circle around and immediately land in the loafing flock (U.S. Air Force 2000).

In 1970, sonic booms were potentially linked to a mass hatch failure of Sooty Terns on the Dry Tortugas (Austin, et al. 1970). The cause of the failure was not certain, but it was conjectured that sonic booms from military aircraft or an overgrowth of vegetation were factors. In the previous season, Sooties were observed to react to sonic booms by rising in a "panic flight," circling over the island, then usually settling down on their eggs again. Hatching that year was normal. Following the 1969 hatch failure, excess vegetation was cleared and measures were taken to reduce supersonic activity. The 1970 hatch appeared to proceed normally. A colony of Noddies on the same island hatched successfully in 1969, the year of the Sooty hatch failure.

Subsequent laboratory tests of exposure of eggs to sonic booms and other impulsive noises (Bowles, et al. 1991a; Bowles, et al. 1994; Cottereau 1972; Cogger and Zegarra 1980) failed to show adverse effects on hatching of eggs. A structural analysis (Ting, et al. 2002) showed that, even under extraordinary circumstances, sonic booms would not damage an avian egg.

Burger (1981) observed no effects of subsonic aircraft on herring gulls in the vicinity of JFK International Airport. The Concorde aircraft did cause more nesting gulls to leave their nests (especially in areas of higher density of nests), causing the breakage of eggs and the scavenging of eggs by intruder prey. Clutch sizes were observed to be smaller in areas of higher-density nesting (presumably due to the greater tendency for panic flight) than in areas where there were fewer nests.

D.3.8.3 Fish, Reptiles, and Amphibians

The effects of overflight noise on fish, reptiles, and amphibians have been poorly studied, but conclusions regarding their expected responses have involved speculation based upon known physiologies and behavioral traits of these taxa (Gladwin, et al. 1988). Although fish do startle in response to low-flying aircraft noise, and probably to the shadows of aircraft, they have been found to habituate to the sound and overflights. Reptiles and amphibians that respond to low frequencies and those that respond to ground vibration, such as spadefoots (genus Scaphiopus), may be affected by noise. Limited information is available on the effects of short-duration noise events on reptiles. Dufour (1980) and Manci, et al. (1988), summarized a few studies of reptile responses to noise. Some reptile species tested under laboratory conditions experienced at least temporary threshold shifts or hearing loss after exposure to 95 dB for several minutes. Crocodilians in general have the most highly developed hearing of all reptiles. Crocodile ears have lids that can be closed when the animal goes under water. These lids can reduce the noise intensity by 10 to 12 dB (Wever and Vernon 1957). On Homestead Air Reserve Station, Florida, two crocodilians (the American Alligator and the Spectacled Caiman) reside in wetlands and canals along the base runway suggesting that they can coexist with existing noise levels of an active runway including DNLs of 85 dB.

D.3.8.4 Summary

Some physiological/behavioral responses such as increased hormonal production, increased heart rate, and reduction in milk production have been described in a small percentage of studies. A majority of the studies focusing on these types of effects have reported short-term or no effects.

The relationships between physiological effects and how species interact with their environments have not been thoroughly studied. Therefore, the larger ecological context issues regarding physiological effects of jet aircraft noise (if any) and resulting behavioral pattern changes are not well understood.

Animal species exhibit a wide variety of responses to noise. It is therefore difficult to generalize animal responses to noise disturbances or to draw inferences across species, as reactions to jet aircraft noise appear to be species-specific. Consequently, some animal species may be more sensitive than other species and/or may exhibit different forms or intensities of behavioral responses. For instance, wood ducks appear to be more sensitive and more resistant to acclimation to jet aircraft noise than Canada geese in one study. Similarly, wild ungulates seem to be more easily disturbed than domestic animals.

The literature does suggest that common responses include the "startle" or "fright" response and, ultimately, habituation. It has been reported that the intensities and durations of the startle response decrease with the numbers and frequencies of exposures, suggesting no long-term adverse effects. The majority of the literature suggests that domestic animal species (cows, horses, chickens) and wildlife species exhibit adaptation, acclimation, and habituation after repeated exposure to jet aircraft noise and sonic booms.

Animal responses to aircraft noise appear to be somewhat dependent on, or influenced by, the size, shape, speed, proximity (vertical and horizontal), engine noise, color, and flight profile of planes. Helicopters also appear to induce greater intensities and durations of disturbance behavior as compared to fixed-wing aircraft. Some studies showed that animals that had been previously exposed to jet aircraft noise exhibited greater degrees of alarm and disturbance to other objects creating noise, such as boats, people, and objects blowing across the landscape. Other factors influencing response to jet aircraft noise may include wind direction, speed, and local air turbulence; landscape structures (i.e., amount and type of vegetative cover); and, in the case of bird species, whether the animals are in the incubation/nesting phase.

D.3.9 Property Values

Property within a noise zone (or Accident Potential Zone) may be affected by the availability of federally guaranteed loans. According to U.S. Department of Housing and Urban Development (HUD), Federal Housing Administration (FHA), and Veterans Administration (VA) guidance, sites are acceptable for program assistance, subsidy, or insurance for housing in noise zones of less than 65 dB DNL, and sites are conditionally acceptable with special approvals and noise attenuation in the 65 to 75 dB DNL noise zone and the greater than 75 dB DNL noise zone. HUD's position is that noise is not the only determining factor for site acceptability, and properties should not be rejected only because of airport influences if there is evidence of acceptability within the market and if use of the dwelling is expected to continue. Similar to the Navy's and Air Force's Air Installation Compatible Use Zone Program, HUD, FHA, and VA recommend sound attenuation for housing in the higher noise zones and written disclosures to all prospective buyers or lessees of property within a noise zone (or Accident Potential Zone).

Newman and Beattie (1985) reviewed the literature to assess the effect of aircraft noise on property values. One paper by Nelson (1978), reviewed by Newman and Beattie, suggested a 1.8 to 2.3 percent decrease in property value per decibel at three separate airports, while at another period of time, they found only a 0.8 percent devaluation per decibel change in DNL. However, Nelson also noted a decline in noise depreciation over time which he theorized could be due to either noise sensitive people being replaced by less sensitive people or the increase in commerical value of the property near airports; both ideas were supported by Crowley (1978). Ultimately, Newman and Beattie summarized that while an effect of noise was observed, noise is only one of the many factors that is part of a decision to move close to, or away from, an airport, but which is sometimes considered an advantage due to increased opportunities for employment or ready access to the airport itself. With all the issues associated with determining property values, their reviews found that decreases in property values usually range from 0.5 to 2 percent per decibel increase of cumulative noise exposure.

More recently Fidell, et al. (1996) studied the influences of aircraft noise on actual sale prices of residential properties in the vicinity of two military facilities and found that equations developed for one area to predict residential sale prices in areas unaffected by aircraft noise worked equally well when applied to predicting sale prices of homes in areas with aircraft noise in excess of 65 dB DNL. Thus, the model worked equally well in predicting sale prices in areas with and without aircraft noise exposure. This indicates that aircraft noise had no meaningful effect on residential property values. In some cases, the average sale prices of noise exposed properties were somewhat higher than those elsewhere in the same area. In the vicinity of Davis-Monthan AFB in Tucson, AZ, Fidell found the homes near the AFB were much older, smaller and in poorer condition than homes elsewhere. These factors caused the equations developed for predicting sale prices in areas further away from the base to be inapplicable with those nearer the AFB. However, again Fidell found that, similar to other researchers, differences in sale prices between homes with and without aircraft noise were frequently due to factors other than noise itself.

D.3.10 Noise Effects on Structures

Normally, the most sensitive components of a structure to airborne noise are the windows and, infrequently, the plastered walls and ceilings. An evaluation of the peak sound pressures impinging on the structure is normally used to determine the possibility of damage. In general, with peak sound levels above 130 dB, there is the possibility of the excitation of structural component resonances. While certain frequencies (such as 30 Hz for window breakage) may be of more concern than other frequencies, conservatively, only sounds lasting more than one second above a sound level of 130 dB are potentially damaging to structural components (Committee on Hearing, Bioacoustics, and Biomechanics 1977).

Noise-induced structural vibration may also cause annoyance to dwelling occupants because of induced secondary vibrations, or rattling of objects within the dwelling such as hanging pictures, dishes, plaques, and bric-a-brac. Window panes may also vibrate noticeably when exposed to high levels of airborne noise. In general, such noise-induced vibrations occur at peak sound levels of 110 dB or greater. Thus, assessments of noise exposure levels for compatible land use should also be protective of noise-induced secondary vibrations.

D.3.11 Noise Effects on Terrain

It has been suggested that noise levels associated with low-flying aircraft may affect the terrain under the flight path by disturbing fragile soil or snow, especially in mountainous areas, causing landslides or avalanches. There are no known instances of such effects, and it is considered improbable that such effects would result from routine, subsonic aircraft operations.

D.3.12 Noise Effects on Historical and Archaeological Sites

Because of the potential for increased fragility of structural components of historical buildings and other historical sites, aircraft noise may affect such sites more severely than newer, modern structures. Particularly in older structures, seemingly insignificant surface cracks initiated by vibrations from aircraft noise may lead to greater damage from natural forces (Hanson, et al. 1991). There are few scientific studies of such effects to provide guidance for their assessment.

One study involved the measurements of sound levels and structural vibration levels in a superbly restored plantation house, originally built in 1795, and now situated approximately 1,500 feet from the centerline at the departure end of Runway 19L at Washington Dulles International Airport. These measurements were made in connection with the proposed scheduled operation of the Concorde airplane at Dulles (Wesler 1977). There was special concern for the building’s windows, since roughly half of the 324 panes were original. No instances of structural damage were found. Interestingly, despite the high levels of noise during Concorde takeoffs, the induced structural vibration levels were actually less than those induced by touring groups and vacuum cleaning.

As noted above for the noise effects of noise-induced vibrations of conventional structures, assessments of noise exposure levels for normally compatible land uses should also be protective of historic and archaeological sites.

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APPENDIX E

Air Quality

E-1: Construction Emissions

Normalized Emissions based on MCAS Miramar 10-Squadron Alternative

		Total Construction Emissions (tons) [1]					
	Area[2]	VOC	CO	NOx	SOx	PM10	PM2.5
DEMOLITION							
Building Facilities (SF)	18,637	0.07	0.44	1.12	0	0.46	0.13
Airfield Facilities (SY)	128,621	0.4	2.4	5.88	0	2.44	0.7
CONSTRUCTION							
Building Facilities (SF)	371,031	0.91	3.19	5.43	0.01	1.44	0.62
Airfield Facilities (SY)	901,818	2.03	7.79	13.61	0.02	4.98	1.79

[1] U.S. Navy. West Coast Basing of the MV-22 Final EIS, October 2009. Table B1-194.
[2] U.S. Navy. West Coast Basing of the MV-22 Final EIS, October 2009. Table 2.3-1.

		Normalized Construction Emissions (lbs/SF or lbs/SY)					
	Area	VOC	CO	NOx	SOx	PM10	PM2.5
DEMOLITION							
Building Facilities (SF)	18,637	0.00751	0.04722	0.12019	0	0.04936	0.01395
Airfield Facilities (SY)	128,621	0.00622	0.03732	0.09143	0	0.03794	0.01088
CONSTRUCTION							
Building Facilities (SF)	371,031	0.00491	0.0172	0.02927	5.39E-05	0.00776	0.00334
Airfield Facilities (SY)	901,818	0.0045	0.01728	0.03018	4.44E-05	0.01104	0.00397

C&D Emissions from MCB Hawaii Kaneohe Bay

		Total Construction Emissions (tons)					
Alternative A	Area	VOC	CO	NOx	SOx	PM10	PM2.5
DEMOLITION							
Building Facilities (SF)	255,300	0.96	6.03	15.34	0.00	6.30	1.78
Airfield Facilities (SY)	13,100	0.04	0.24	0.60	0.00	0.25	0.07
CONSTRUCTION							
Building Facilities (SF)	748,700	1.84	6.44	10.96	0.02	2.91	1.25
Airfield Facilities (SY)	221,781	0.50	1.92	3.35	0.00	1.22	0.44
Alternative A: Total C&D Emissions (tons)		3.34	14.62	30.25	0.03	10.68	3.54

		Total Construction Emissions (tons)					
Alternative B	Area	VOC	CO	NOx	SOx	PM10	PM2.5
DEMOLITION							
Building Facilities (SF)	152,700	0.57	3.61	9.18	0.00	3.77	1.07
Airfield Facilities (SY)	16,890	0.05	0.32	0.77	0.00	0.32	0.09
CONSTRUCTION							
Building Facilities (SF)	593,100	1.45	5.10	8.68	0.02	2.30	0.99
Airfield Facilities (SY)	387,401	0.87	3.35	5.85	0.01	2.14	0.77
Alternative B: Total C&D Emissions (tons)		2.95	12.37	24.48	0.02	8.53	2.92

Summary of C&D Emissions from MCB Hawaii Kaneohe Bay

Alternative	VOC	CO	NOx	SOx	PM10	PM2.5
	Total Construction Emissions (tons)					
A	3.34	14.62	30.25	0.03	10.68	3.54
B	2.95	12.37	24.48	0.02	8.53	2.92

Alternative	VOC	CO	NOx	SOx	PM10	PM2.5
	Estimated Annual Construction Emissions (tons)[a]					
A	1.67	7.31	15.12	0.01	5.34	1.77
B	1.48	6.18	12.24	0.01	4.27	1.46

[a] Estimated Annual Construction Emissions = 50% of Total Construction Emissions

Summary of C&D Emissions from Other Training Areas

		Total Construction Emissions (tons)					
Alternative A/B	Area	VOC	CO	NOx	SOx	PM10	PM2.5
DEMOLITION							
Building Facilities (SF)	0	0.00	0.00	0.00	0.00	0.00	0.00
Airfield Facilities (SY)	0	0.00	0.00	0.00	0.00	0.00	0.00
CONSTRUCTION							
Building Facilities (SF)	0	0.00	0.00	0.00	0.00	0.00	0.00
Airfield Facilities (SY)	21,660	0.05	0.19	0.33	0.00	0.12	0.04
Other Training Areas: Total C&D Emissions (tons)		0.05	0.19	0.33	0.00	0.12	0.04

E-1: Construction Emissions
Alternative A -- Construction Areas at MCB Hawaii Kaneohe Bay

Facility	Location	Improvements (Building Number)	Approximate Scope	Units
VMM hangar and apron	Northeast of runway	Realign Mokapu Road [presume 10y-wide; 10Y x 767 Y=7,670SY]	7,670	SY
		Demolish warehouses and storage facilities (4005, 4075, 4000, 584, 1197, 5068, 6678, 6679, 6680, 6681, 6682, and 6683)	(94,300)	SF
		Renovate warehouses (4088, 250, and 271)	100,400	SF
		Replace/relocate CIF warehouse (4075)	38,500	SF
		Replace MAG-24 warehouse (4005)	10,000	SF
		Replace family housing and operations warehouse (4005 and 4000)	15,000	SF
		Replace MCCS self-storage facilities (6678, 6679, 6680, 6681, 6682, and 6683)	16,000	SF
		Construct hangar and IMF	144,000	SF
		Construct apron, wash rack, and taxiway	110,600	SY
		Relocate aircraft rinse facility	9,300	SY
HMLA hangar and apron	Hangar 101	Renovate Hangar 101	117,800	SF
		Resurface and reseal aprons for HMLA	31,100	SY
MALS-24 maintenance shops, warehouse, and armory	MALS-24 maintenance area	Demolish engine test cell near the corrosion control hangar (1178)	(2,700)	SF
		Expand composite shop at corrosion control hangar (5069)	11,400	SF
		Demolish van pads (5049, 5050, 5053, 5064)	(13,100)	SY
		Construct new van pads	12,700	SY
		Construct MALS-24 warehouse	57,700	SF
		Expand armory (4054)	11,700	SF
MAG-24 HQ	301			

		Demolish MAG-24 HQ (301)	(35,000)	SF
		Construct MAG-24 HQ	44,500	SF
		Construct parking structure	21,100	SY
MCAS helicopter landing pad	West Field	Construct helicopter landing pad for MV-22	1,111	SY
Bachelor housing	3rd Street	Demolish existing BEQs (225, 226, 227, 228, 229, and 230) and associated structures (3000, 1001 to 1006)	(102,300)	SF
		Replace with three four-story BEQs	181,700	SF
		Demolish existing building (1094) for parking structure	(21,000)	SF
		Construct parking structure	17,500	SY
		Improve existing parking lot	10,700	SY
			702,081	

Alternative A	Area
DEMOLITION	
Building Facilities (SF)	-255,300
Airfield Facilities (SY)	-13,100
CONSTRUCTION	
Building Facilities (SF)	748,700
Airfield Facilities (SY)	221,781
	702,081

E-1: Construction Emissions

Alternative B -- Construction Areas at MCB Hawaii Kaneohe Bay

Facility	Location	Improvements (Building Number)	Approximate Scope	
VMM hangar and apron	West Field	Demolish facilities and structures (14, 15, 17, 612, 601, 602, 603, 605, 620, 3076, 3077, 3078, 3079, 3087, 6183, 3099, 995, and 6478)	(25,800)	SF
		Demolish aircraft power check pad (5020)	(3,790)	SY
		Construct hangar and IMF	144,000	SF
		Construct apron, wash rack, and taxiway	140,200	SY
		Replace MCAS storage (601, 602, 620)	6,900	SF
		Replace MALS storage (603)	8,300	SF
		Replace EOD offices and training facility (605)	7,000	SF
		Replace MALS engine test facility (6183)	1,250	SF
		Replace game warden office and kennel (3099)	850	SF
		Replace aircraft power check pad (5020)	3,790	SY
		Realign Sumner Road (2,740 FT)	9,130	SY
HMLA hangar and apron	Hangar 101	Renovate Hangar 101	117,800	SF
		Resurface and reseal aprons for HMLA	31,100	SY
MALS-24 maintenance shops, warehouse, and armory	MALS-24 maintenance area	Demolish engine test cell near the corrosion control hangar (1178)	(2,700)	SF
		Expand composite shop at corrosion control hangar (5069)	11,400	SF
		Demolish van pads (5049, 5050, 5053, 5064)	(13,100)	SY
		Construct new van pads	12,700	SY
		Construct MALS-24 warehouse	57,700	SF
		Expand armory (4054)	11,700	SF
MAG-24 HQ	301			

		Demolish MAG-24 HQ (301)	(35,000)	SF
		Construct MAG-24 HQ	44,500	SF
		Construct parking structure	21,100	SY
MCAS helicopter landing pad	West Field	Construct helicopter landing pad for MV-22	1,111	SY
Runway underpass	Mokapu Road	Construct runway underpass (2,000 FT or 6,670 Y long). Presume 30 FT of 10 Y wide. SY=6,670. Then.	140,070	SY
Bachelor housing	3rd Street and 503	Demolish existing BEQs (227, 228, 229, and 230) and associated structures (3000, 1001 to 1006)	(68,200)	SF
		Demolish existing building (1094) for parking structure	(21,000)	SF
		Replace with two six-story BEQs	181,700	SF
		Construct parking structure	17,500	SY
		Improve existing parking lot	10,700	SY
			810,911	

Alternative B	Area
DEMOLITION	
Building Facilities (SF)	-152,700
Airfield Facilities (SY)	-16,890
CONSTRUCTION	
Building Facilities (SF)	593,100
Airfield Facilities (SY)	387,401
	810,911

Note: Construction estimated to involve excavation&removal of over 140,000 CY of material. As 140,000 CY/6,670SY = 21, SY of underpass is multiplied by 21 in estimating emissions.

E-1: Construction Emissions

Alternatives A/B -- Construction Areas at Other Training Areas

Island/Training Area	Location of Proposed Construction	Description of Construction/Improvement	Approximate Area	
Oahu				
MCTAB	Gull	Reinforce concrete	1,110	SY
"	Hawk	Reinforce concrete	1,110	SY
"	Owl	Reinforce concrete	1,110	SY
"	Noni	Reinforce concrete	1,110	SY
Oahu Training Areas -SBER		(No construction proposed)		
Oahu Training Areas –KTA and KLOA		(No construction proposed)		
Oahu Training Areas –DMR		(No construction proposed)		
Hawaii				
PTA	Bravo	Expand existing helipads	15,000	SY
Kauai				
PMRF		(No construction proposed)		
Molokai				
MTSF	Vacant	Clearing, grubbing, grading, paving, and installation of fencing	2,220	SY
Kalaupapa Airport		(No construction proposed)		
Maui				
HIARNG		(No construction proposed)		
				21,660

SY – square yards
mi – miles
MCTAB – Marine Corps Training Area Bellows
WAAF – Wheeler Army Air Field
SBER – Schofield Barracks East Range
KTA – Kahuku Training Area
KLOA – Kawailoa Training Area
DMR – Dillingham Military Reservation
PTA – Pohakuloa Training Area
MTSF – Molokai Training Support Facility
HIARNG – Hawaii Army National Guard

Proposed 2018 Annual Activity at Other Training Areas For Alternatives A/B

Aircraft	CAL	Insert/ Extract (external Ops)	Simulated Air-to-Ground Gunnery	LAT	External	TERF	Live Fire	Other	Total
MV-22	11,172	0	84	302	1,182	227	56	0	13,023
AH-1[a]	2,256	0	322	0	0	105	1,270	0	3,953
UH-1	694	125	156	0	0	172	376	0	1,523
Total AH/UH-1	2,950	125	478	0	0	277	1,646	0	5,476
TOTAL	14,122	125	562	302	1,182	504	1,702	0	18,499

[a] If location-specific counts group AH-1 and UH-1, group count is included under "AH-1".

Includes simulated air-to-ground gunnery. Numbers not known, so not apportioned accordingly. Errs on overestimating emissions.

Includes CAL and TERF activities. Numbers not known, so not apportioned accordingly.

LAT and TERF activities accounted for under AESO "Cruise".
Activities associated with the following AESO emission factors:

For MV-22

1 Confined Area Landing (CAL) = 1 Vertical Arrival + 1 Vertical Departure. Personal communication (email) from Tuong Nguyen of Aircraft Environmental Support Office (AESO) to mv22h1eis of Belt Collins Hawaii on 12 December 2011.
1 Simulated Air-to-Ground Gunnery = 1 Vertical Arrival + 1 Vertical Departure
1 Live Fire = 1 Vertical Arrival + 1 Vertical Departure
1 External = 1 Vertical Arrival + 1 Vertical Departure

For H-1s

1 CAL = 1 Mountain Pad
1 Insert/Extract (external ops) = 1 Mountain Pad
1 Simulated Air-to-Ground Gunnery = 1 Touch & Go (T&G)
1 Live Fire = 1 T&G

Proposed 2018 Annual Activity by AEOS Emission Factors at Other Training Areas For Alternatives A/B

Aircraft	Vertical Departure	Vertical Arrival	Mountain Pad	T&G	Total
MV-22	12,494	12,494	0	0	24,988
Total AH/UH-1	0	0	3,075	2,124	5,199
TOTAL	12,494	12,494	3,075	2,124	30,187

NA - Not Applicable

E-2: Aircraft Activity Data

Proposed 2018 Annual Activity at MCTAB Under Alternatives A/B

Aircraft	CAL	Insert/ Extract (External Operations)	Simulated Air-to-Ground Gunnery	TOTAL
Proposed Action				
MV-22[1]	114			114
AH-1[1]			122	122
UH-1[1]		125		125

1 U.S. Marine Corps Headquarters

Proposed 2018 Annual Activity for KTA, KLOA, SBER Under Alternatives A/B

Aircraft	CAL	LAT	External	TERF	Other	TOTAL
Proposed Action						
MV-22[1]	798	30	1,008	27		1,863
AH-1[1]	418			105		523
UH-1[1]	689			172		861

Notes

1 U.S. Marine Corps Headquarters

Proposed 2018 Annual Activity at DMR Under

Aircraft	CAL	Other	Total
Proposed Action			
MV-22[1]	684		684
AH-1/UH-1[1]	438		438

1 U.S. Marine Corps Headquarters

Proposed 2018 Annual Marine Corps Activity at PTA For Alternatives A/B

Aircraft	CAL	LAT	External	TERF	Live Fire	Other	Total
Proposed Action							
MV-22[1]	7,752	226	174	200	56		8,408
AH-1[1]					1,270		1,270
UH-1[1]					376		376

1 U.S. Marine Corps Headquarters

E-2: Aircraft Activity Data

Proposed 2018 Annual Activity at Barking Sands Airfield Under Alternatives A/B

Aircraft	CAL	LAT	Simulated/Air-to-Ground Gunnery[1]	Other	Total
Proposed Action					
MV-22[2]	1,710	46			1,756
AH-1[2]			100		100
UH-1[2]			78		78

Notes

1 Air-to-ground gunnery conducted within the ocean training range.

2 Source: U.S. Marine Corps Headquarters

Proposed 2018 Annual Marine Corps Activity at Kaula Island Under Alternatives A/B

Aircraft	Air-to-Ground Gunnery	Total
Proposed Action		
MV-22[1]	84	84
AH-1[1]	100	100
UH-1[1]	78	78

Notes

1 Source: U.S. Marine Corps Headquarters

Proposed 2018 Annual Activity at Kalaupapa Airport Under Alternatives A/B

Aircraft	CAL	Civilian	Total
Proposed Action			
MV-22[1]			
AH-1/UH-1[1]	1,388		1,388

1 Source: U.S. Marine Cops Headquarters.

Proposed 2018 Marine Corps Annual Activity at HIARNG Under Alternatives A/B

Aircraft	CAL	Total
Proposed Action		
MV-22[1]	114	114
AH-1 [1]	12	12
UH-1[1]	5	5

Use of the facility by the Army National Guard aircraft is presumed to be minimal.

1 Source: U.S. Marine Corps Headquarters.

MCAS Emissions

Squadron/ Aircraft		Emissions (tons/yr) CO	NOX	SO2	PM10	PM2.5	ROG	CO2	CH4	N2O
VMM/MV-22 (24 aircraft)	Operations	7.04	16.56	0.80	2.80	2.80	0.12	6,490.32	0.91	0.07
	Maintenance & Testing	3.55	6.31	0.31	1.05	1.05	0.06	0.00	0.00	0.00
	Subtotals	10.59	22.86	1.12	3.84	3.84	0.17	6,490.32	0.91	0.07
HMLA/AH-1 (15 aircraft)	Operations	2.55	1.14	0.08	0.89	0.89	0.13	682.45	NA	NA
	Maintenance & Testing	0.57	0.12	0.01	0.11	0.11	0.03	82.79	NA	NA
	Subtotals	3.12	1.26	0.09	1.00	1.00	0.17	765.25	0.00	0.00
HMLA/UH-1 (12 aircraft)	Operations	1.70	0.76	0.06	0.59	0.59	0.09	454.97	NA	NA
	Maintenance & Testing	0.46	0.10	0.01	0.09	0.09	0.03	66.23	NA	NA
	Subtotals	2.16	0.85	0.06	0.68	0.68	0.11	521.20	0.00	0.00
Totals		**15.88**	**24.97**	**1.28**	**5.52**	**5.52**	**0.45**	**7,776.77**	**0.91**	**0.07**
Emissions totals greater than PSD reference of 250 tons/yr?		No	No	No	No	No	Not applicable	Not applicable	Not applicable	Not applicable

NA - Not available

Presumes 2 VMM (12 aircraft/squadron) and 1 HMLA (15 AH-1 and 12 UH-1)

Non-MCAS Emissions

Squadron/ Aircraft		Emissions (tons/yr) CO	NOX	SO2	PM10	PM2.5	ROG	CO2	CH4	N2O
VMM/MV-22 (24 aircraft)	Operations	38.68	199.00	7.26	26.78	26.78	0.66	58,354.57	8.16	0.59
HMLA/AH-1 (15 aircraft)	Operations	18.12	9.48	0.69	7.18	7.18	0.96	5,502.62	NA	NA
HMLA/UH-1 (12 aircraft)	Operations	22.85	11.99	0.87	9.08	9.08	1.21	6,955.02	NA	NA
Totals		**79.65**	**220.48**	**8.81**	**43.04**	**43.04**	**2.83**	**70,812.22**	**8.16**	**0.59**

NA - Not available

Presumes 2 VMM (12 aircraft/squadron) and 1 HMLA (15 AH-1 and 12 UH-1)

Total VMM/HMLA Aircraft Emissions within Hawaii (MCAS Emissions + Non-MCAS Emissions)

	Emissions (tons/yr) CO	NOX	SO2	PM10	PM2.5	ROG	CO2	CH4	N2O
Total VMM/HMLA Aircraft Emissions within Hawaii	95.53	245.45	10.09	48.56	48.56	3.29	78,588.99	9.07	0.67
Emissions totals greater than PSD reference of 250 tons/yr?	No	No	No	No	No	Not applicable	Not applicable	Not applicable	Not applicable

Total GHG Emissions for Proposed VMM/HMLA Aircraft

Squadron/ Aircraft	Emissions CO2 (tons/yr)	CH4 (tons/yr)	N2O (tons/yr)	CO2Eq (MMTCO2Eq)
VMM/MV-22 (24 aircraft)	64,844.90	9.07	0.67	0.0719
HMLA/AH-1 (15 aircraft)	6,267.87	0.00	0.00	0.0069
HMLA/UH-1 (12 aircraft)	7,476.23	0.00	0.00	0.0082
Totals	**78,588.99**	**9.07**	**0.67**	**0.0871**

MMTCO2Eq=[(CO2 tons/yr x 1.1023 metric tons/ton x CO2 GWP) + (CH4 tons/yr x 1.1023 metric tons/ton x CH4 GWP) + (N20 tons/yr x 1.1023 metric tons/ton x N2O GWP)] x [1MMT/1E+6 metric tons]

where,

CO2 GWP=	1
CH4 GWP=	21
N2O GWP=	310

Source: U.S. Environmental Protection Agency, April 15, 2011. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2009.

E-3: Aircraft Emissions
MV-22

Activity	Note	Hours in Cruise or No. of Ops (per year)	No. of Engines	Engine Mode	Time in Mode (minutes/ engine)	Fuel Rate/ Engine (lbs-fuel/hr-engine)	Emission Factor Units	Emission Factors (e) CO	NOX	SO2	PM10 (d)	PM2.5 (d)	ROG	CO2	CH4	N2O	Emissions (ton/yr) CO	NOX	SO2	PM10	PM2.5	ROG	CO2	CH4	N2O
Cruise (a)	(1)	4,920	2.00	-	-	1,910	(lbs/1,000 lbs-fuel)	0.52	14.09	0.40	1.58	1.58	0.01	3,209	0.45	0.03	4.89	132.41	3.76	14.85	14.85	0.09	30,155.61	4.23	0.28
Vertical Departure (b)	(1)	12,494	-	-	-	-	(lbs/op)	2.45	6.79	0.32	1.13	1.13	0.04	2,579	0.36	0.03	15.31	42.42	2.00	7.06	7.06	0.25	16,111.01	2.25	0.19
Vertical Arrival (b)	(1)	12,494	-	-	-	-	(lbs/op)	2.96	3.87	0.24	0.78	0.78	0.05	1,935	0.27	0.02	18.49	24.18	1.50	4.87	4.87	0.31	12,087.95	1.69	0.12
Non-MCAS Total																	**38.68**	**199.00**	**7.26**	**26.78**	**26.78**	**0.66**	**58,354.57**	**8.16**	**0.59**
Vertical Departure (b)	(1)	2,545	-	-	-	-	(lbs/op)	2.45	6.79	0.32	1.13	1.13	0.04	2,579	0.36	0.03	3.12	8.64	0.41	1.44	1.44	0.05	3,281.78	0.46	0.04
Vertical Arrival (b)	(1)	2,545	-	-	-	-	(lbs/op)	2.96	3.87	0.24	0.78	0.78	0.05	1,935	0.27	0.02	3.77	4.92	0.31	0.99	0.99	0.06	2,462.29	0.34	0.03
Touch & Gos	(2)	930	-	-	-	-	(lbs/op)	0.19	3.57	0.11	0.44	0.44	0.003	899	0.13	0.01	0.09	1.66	0.05	0.20	0.20	0.00	417.81	0.06	0.00
GCA Box	(2)	512	-	-	-	-	(lbs/op)	0.26	5.20	0.16	0.63	0.63	0.004	1,283	0.18	0.01	0.07	1.33	0.04	0.16	0.16	0.00	328.45	0.05	0.00
MCAS Subtotal																	**7.04**	**16.56**	**0.80**	**2.80**	**2.80**	**0.12**	**6,490.32**	**0.91**	**0.07**
Maintenance & Testing (c)	(1)	Ops/ aircraft																							
APU Check		20	1	APU Use	30.00	413	(lbs/1,000 lbs-fuel)	5.89	5.95	0.40	0.22	0.22	0.19	3,235	NA	NA	0.29	0.29	0.02	0.01	0.01	0.01	NA	NA	NA
Water Wash		8	1	APU Use	40.00	413	(lbs/1,000 lbs-fuel)	5.89	5.95	0.40	0.22	0.22	0.19	3,235	NA	NA	0.16	0.16	0.01	0.01	0.01	0.01	NA	NA	NA
		8	2	Main Engine Run	20.00	360	(lbs/1,000 lbs-fuel)	8.90	4.09	0.40	1.58	1.58	0.10	3,221	NA	NA	0.21	0.09	0.01	0.04	0.04	0.00	NA	NA	NA
Single Low Power-One Engine		20	1	APU Use	10.00	413	(lbs/1,000 lbs-fuel)	5.89	5.95	0.40	0.22	0.22	0.19	3,235	NA	NA	0.10	0.10	0.01	0.00	0.00	0.00	NA	NA	NA
		20	1	Low Power	15.00	360	(lbs/1,000 lbs-fuel)	8.90	4.09	0.40	1.58	1.58	0.10	3,221	NA	NA	0.19	0.09	0.01	0.03	0.03	0.00	NA	NA	NA
		20	1	Intermediate Power	10.00	660	(lbs/1,000 lbs-fuel)	3.33	6.02	0.40	1.58	1.58	0.02	3,219	NA	NA	0.09	0.16	0.01	0.04	0.04	0.00	NA	NA	NA
Single Low Power-Two Engine		30	1	APU Use	10.00	413	(lbs/1,000 lbs-fuel)	5.89	5.95	0.40	0.22	0.22	0.19	3,235	NA	NA	0.15	0.15	0.01	0.01	0.01	0.00	NA	NA	NA
		30	2	Low Power	20.00	360	(lbs/1,000 lbs-fuel)	8.90	4.09	0.40	1.58	1.58	0.10	3,221	NA	NA	0.77	0.35	0.03	0.14	0.14	0.01	NA	NA	NA
		30	2	Intermediate Power	10.00	660	(lbs/1,000 lbs-fuel)	3.33	6.02	0.40	1.58	1.58	0.02	3,219	NA	NA	0.26	0.48	0.03	0.13	0.13	0.00	NA	NA	NA
Single High Power		20	1	APU Use	10.00	413	(lbs/1,000 lbs-fuel)	5.89	5.95	0.40	0.22	0.22	0.19	3,235	NA	NA	0.10	0.10	0.01	0.00	0.00	0.00	NA	NA	NA
		20	2	Main Engine Start	10.00	360	(lbs/1,000 lbs-fuel)	8.90	4.09	0.40	1.58	1.58	0.10	3,221	NA	NA	0.26	0.12	0.01	0.05	0.05	0.00	NA	NA	NA
		20	2	Taxi Out/Tie Down	5.00	660	(lbs/1,000 lbs-fuel)	3.33	6.02	0.40	1.58	1.58	0.02	3,219	NA	NA	0.09	0.16	0.01	0.04	0.04	0.00	NA	NA	NA
		20	2	Low Power	20.00	360	(lbs/1,000 lbs-fuel)	8.90	4.09	0.40	1.58	1.58	0.10	3,221	NA	NA	0.51	0.24	0.02	0.09	0.09	0.01	NA	NA	NA
		20	2	Intermediate Power	10.00	1,530	(lbs/1,000 lbs-fuel)	0.79	11.64	0.40	1.58	1.58	0.01	3,212	NA	NA	0.10	1.42	0.05	0.19	0.19	0.00	NA	NA	NA
		20	2	High Power	5.00	2,510	(lbs/1,000 lbs-fuel)	0.29	17.97	0.40	1.58	1.58	0.01	3,204	NA	NA	0.03	1.80	0.04	0.16	0.16	0.00	NA	NA	NA
		20	2	Taxi In/Shut Down	5.00	660	(lbs/1,000 lbs-fuel)	3.33	6.02	0.40	1.58	1.58	0.02	3,219	NA	NA	0.09	0.16	0.01	0.04	0.04	0.00	NA	NA	NA
Prop Balance		5	1	APU Use	10.00	413	(lbs/1,000 lbs-fuel)	5.89	5.95	0.40	0.22	0.22	0.19	3,235	NA	NA	0.02	0.02	0.00	0.00	0.00	0.00	NA	NA	NA
		5	2	Low Power	20.00	360	(lbs/1,000 lbs-fuel)	8.90	4.09	0.40	1.58	1.58	0.10	3,221	NA	NA	0.13	0.06	0.01	0.02	0.02	0.00	NA	NA	NA
		5	2	Intermediate Power	10.00	1,530	(lbs/1,000 lbs-fuel)	0.79	11.64	0.40	1.58	1.58	0.01	3,212	NA	NA	0.02	0.36	0.01	0.05	0.05	0.00	NA	NA	NA
MCAS Maintenance & Testing Subtotal																	**3.55**	**6.31**	**0.31**	**1.05**	**1.05**	**0.06**	**0.00**	**0.00**	**0.00**
MCAS Total																	**10.59**	**22.86**	**1.12**	**3.84**	**3.84**	**0.17**	**6,490.32**	**0.91**	**0.07**
Total MV-22 Emissions																	**49.28**	**221.86**	**8.37**	**30.62**	**30.62**	**0.83**	**64,844.90**	**9.07**	**0.67**

Number of aircraft= 24
Number of pilots= 56

E-3: Aircraft Emissions
MV-22

Notes:

(1) AESO Memorandum Report No. 9946, Revision E, Aircraft Emissions Estimates: V-22 Takeoff and Landing Cycle and In-Frame, Maintenance Testing Using JP-5, January 2001.

(2) AESO Memorandum Report No. 9965, Revision B, Aircraft Emissions Estimates: V-22 Mission Operations Using JP-5, January 2001.

NA - Not available.

(a) Cruise hours shown here = Total flight hours for each pilot/yr x No. of pilots x % time below 3,000 feet OR 4,920 hrs/yr=125.5 hrs/yr-pilot x 56 pilots x 70%. Cruise hours errs on overestimating time in cruise mode and therefore emissions as cruise mode presumed to be equivalent to total flight hours.

Cruise Emissions = Hours in Cruise x No. of Engines x Fuel Rate (lbs-fuel/hr-engine) x Emission Factor (lbs-pollutant/1,000 lbs-fuel) x (1 ton/2,000 lbs)

(b) Total Arrivals/Departures Emissions = No. of Ops x Emission Factor (lbs/op) x (1 ton/2,000 lbs)

(c) Maintenance & Testing = No. of Aircraft x Ops/aircraft x No. of Engines x Time in Mode (minutes/engine) x Fuel Rate (lbs-fuel/hr-engine) x Emission Factor (lbs-pollutant/1,000 lbs-fuel) x (1 ton/2,000 lbs)

(d) PM emissions are represented either by PM10 or PM2.5, but not both. Military aircraft PM are submicron in size; hence, PM10 (measured) = PM2.5.

(e) Department of the Navy. October 2009. West Coast Basing of the MV-22 Final Environmental Impact Statement. (Table B1-86)

Denotes activities specific to MCAS airfield.

E-3: Aircraft Emissions
AH-1Z

Activity	Note	Hours in Cruise or No. of Ops (per year)	No. of Engines	Engine Mode	Time in Mode (minutes/ engine)	Fuel Rate/ Engine (lbs-fuel/hr-engine)	Emission Factor Units	Emission Factors CO	NOX	SO2	PM10 (3), (4)	PM2.5	ROG (3)	CO2	CH4	N2O	Emissions (ton/yr) CO	NOX	SO2	PM10	PM2.5	ROG	CO2	CH4	N2O
Cruise (a)	(1)	3,811	2.00	-	-	425.1	(lbs/1,000 lbs-fuel)	10.54	5.55	0.40	4.20	4.20	0.56	3,216.27	NA	NA	17.08	8.99	0.65	6.80	6.80	0.91	5,210.54	NA	NA
Mountain Pad (b)	(2)	1,845	-	-	-	-	(lbs/op)	0.76	0.36	0.03	0.28	0.28	0.04	213.93	NA	NA	0.70	0.33	0.03	0.26	0.26	0.04	197.35	NA	NA
Touch & Gos (c)	(2)	1,274	-	-	-	-	(lbs/op)	0.54	0.25	0.02	0.19	0.19	0.03	148.67	NA	NA	0.34	0.16	0.01	0.12	0.12	0.02	94.73	NA	NA
Non-MCAS Total																	**18.12**	**9.48**	**0.69**	**7.18**	**7.18**	**0.96**	**5,502.62**	**NA**	**NA**
Stop & Gos	(2)	1,690	-	-	-	-	(lbs/op)	0.79	0.32	0.02	0.26	0.26	0.04	195.57	NA	NA	0.67	0.27	0.02	0.22	0.22	0.03	165.28	NA	NA
Touch & Gos	(2)	4,649	-	-	-	-	(lbs/op)	0.54	0.25	0.02	0.19	0.19	0.03	148.67	NA	NA	1.26	0.58	0.05	0.44	0.44	0.07	345.61	NA	NA
GCA Box	(2)	511	-	-	-	-	(lbs/op)	2.46	1.12	0.08	0.88	0.88	0.12	671.22	NA	NA	0.63	0.29	0.02	0.22	0.22	0.03	171.56	NA	NA
MCAS Subtotal																	**2.55**	**1.14**	**0.08**	**0.89**	**0.89**	**0.13**	**682.45**	**NA**	**NA**
Maintenance & Testing (d)	(1)	Ops/ aircraft																							
B&B Wash @50 ft hrs -- Main Engine		5.40	2	Idle	5.00	164.0	(lbs/1,000 lbs-fuel)	39.81	3.28	0.40	4.20	4.20	2.54	3,059.84	NA	NA	0.04	0.00	0.00	0.00	0.00	0.00	3.39	NA	NA
Main Engine		5.40	2	25% Q	5.00	341.4	(lbs/1,000 lbs-fuel)	14.04	5.07	0.40	4.20	4.20	0.61	3,204.69	NA	NA	0.03	0.01	0.00	0.01	0.01	0.00	7.39	NA	NA
Engine Change -- Main Engine		0.30	2	Idle	10.00	164.0	(lbs/1,000 lbs-fuel)	39.81	3.28	0.40	4.20	4.20	2.54	3,059.84	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.38	NA	NA
Main Engine		0.30	2	25% Q	10.00	341.4	(lbs/1,000 lbs-fuel)	14.04	5.07	0.40	4.20	4.20	0.61	3,204.69	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.82	NA	NA
High Power -- Main Engine		2.80	2	Idle	60.00	164.0	(lbs/1,000 lbs-fuel)	39.81	3.28	0.40	4.20	4.20	2.54	3,059.84	NA	NA	0.27	0.02	0.00	0.03	0.03	0.02	21.08	NA	NA
Main Engine		2.80	2	27% Q	60.00	354.5	(lbs/1,000 lbs-fuel)	13.38	5.15	0.40	4.20	4.20	0.59	3,207.29	NA	NA	0.20	0.08	0.01	0.06	0.06	0.01	47.75	NA	NA
Tail Rotor Change -- Main Engine		0.20	2	Idle	10.00	164.0	(lbs/1,000 lbs-fuel)	39.81	3.28	0.40	4.20	4.20	2.54	3,059.84	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.25	NA	NA
Main Engine		0.20	2	25% Q	10.00	341.4	(lbs/1,000 lbs-fuel)	14.04	5.07	0.40	4.20	4.20	0.61	3,204.69	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.55	NA	NA
Main Rotor Change -- Main Engine		0.30	2	Idle	10.00	164.0	(lbs/1,000 lbs-fuel)	39.81	3.28	0.40	4.20	4.20	2.54	3,059.84	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.38	NA	NA
Main Engine		0.30	2	25% Q	10.00	341.4	(lbs/1,000 lbs-fuel)	14.04	5.07	0.40	4.20	4.20	0.61	3,204.69	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.82	NA	NA
MCAS Maintenance & Testing Subtotal																	**0.57**	**0.12**	**0.01**	**0.11**	**0.11**	**0.03**	**82.79**	**NA**	**NA**
MCAS Total																	**3.12**	**1.26**	**0.09**	**1.00**	**1.00**	**0.17**	**765.25**	**NA**	**NA**
Total AH-1Z Emissions																	**21.24**	**10.74**	**0.78**	**8.18**	**8.18**	**1.13**	**6,267.87**	**NA**	**NA**

Number of aircraft= 15
Number of pilots= 37

Notes:

(1) AESO Memorandum Report No. 9824, Revision B, Aircraft Emissions Estimates: AH-1W Landing and Takeoff Cycle and Maintenance Testing Using JP-5, November 2009.

(2) AESO Memorandum Report No. 9961, Revision A, Aircraft Emissions Estimates: AH-1 Mission Operations Using JP-5, November 2009.

1 Stop & Go = 1 Vertical Arrival + 1 Vertical Departure

NA - Not available.

(3) ROG emission factors provided by AESO. Personal communication (email) from Tuong Nguyen of AESO to mv22h1eis of Belt Collins Hawaii on 12 December 2011.

Stop and Go ROG emission factor and emissions is represented by HC from source (2).

(4) PM emissions are represented either by PM10 or PM2.5, but not both. Military aircraft PM are submicron in size; hence, PM10 (measured) = PM2.5.

(a) Cruise hours shown here = Total flight hours for each pilot/yr x No. of pilots OR 3,811 hrs/yr=103 hrs/yr-pilot x 37 pilots. Cruise hours err on overestimating time in cruise mode and therefore emissions as cruise mode presumed to be equivalent to total flight hours.

Cruise Emissions = Hours in Cruise x No. of Engines x Fuel Rate (lbs-fuel/hr-engine) x Emission Factor (lbs-pollutant/1,000 lbs-fuel) x (1 ton/2,000 lbs)

(b) Mountain Pad.

Mountain Pad Emissions = No. of Ops x Emission Factor (lbs/op) x (1 ton/2,000 lbs)

(c) Touch and Gos (T&G).

T&G Emissions = No. of Ops x Emission Factor (lbs/op) x (1 ton/2,000 lbs)

(d) Maintenance & Testing = No. of Aircraft x Ops/aircraft x No. of Engines x Time in Mode (minutes/engine) x Fuel Rate (lbs-fuel/hr-engine) x Emission Factor (lbs-pollutant/1,000 lbs-fuel) x (1 ton/2,000 lbs)

Denotes activities specific to MCAS airfield.

E-3: Aircraft Emissions
UH-1Y

								Emission Factors									Emissions (ton/yr)								
Activity	Note	Hours in Cruise or No. of Ops (per year)	No. of Engines	Engine Mode	Time in Mode (minutes/ engine)	Fuel Rate/ Engine (lbs-fuel/hr-engine)	Emission Factor Units	CO	NOX	SO2	PM10	PM2.5 (3),(4)	ROG (3)	CO2	CH4	N2O	CO	NOX	SO2	PM10	PM2.5	ROG	CO2	CH4	N2O
Cruise (a)	(1)	4,944.5	2.00	-	-	425.1	(lbs/1,000 lbs-fuel)	10.54	5.55	0.40	4.20	4.20	0.56	3,216.27	NA	NA	22.15	11.67	0.84	8.83	8.83	1.18	6,760.30	NA	NA
Mountain Pad (b)	(2)	1,230	-	-	-	-	(lbs/op)	0.76	0.36	0.03	0.28	0.28	0.04	213.93	NA	NA	0.47	0.22	0.02	0.17	0.17	0.02	131.57	NA	NA
Touch & Gos (c)	(2)	850	-	-	-	-	(lbs/op)	0.54	0.25	0.02	0.19	0.19	0.03	148.67	NA	NA	0.23	0.11	0.01	0.08	0.08	0.01	63.16	NA	NA
Non-MCAS Total																	**22.85**	**11.99**	**0.87**	**9.08**	**9.08**	**1.21**	**6,955.02**	**NA**	**NA**
Stop & Gos	(2)	1,127					(lbs/op)	0.79	0.32	0.02	0.26	0.26	0.04	195.57	NA	NA	0.45	0.18	0.01	0.15	0.15	0.02	110.18	NA	NA
Touch & Gos	(2)	3,100	-	-	-	-	(lbs/op)	0.54	0.25	0.02	0.19	0.19	0.03	148.67	NA	NA	0.84	0.39	0.03	0.29	0.29	0.05	230.41	NA	NA
GCA Box	(2)	341	-	-	-	-	(lbs/op)	2.46	1.12	0.08	0.88	0.88	0.12	671.22	NA	NA	0.42	0.19	0.01	0.15	0.15	0.02	114.38	NA	NA
MCAS Subtotal																	**1.70**	**0.76**	**0.06**	**0.59**	**0.59**	**0.09**	**454.97**	**NA**	**NA**
Maintenance & Testing (d)	(1)	Ops/ aircraft																							
B&B Wash @50 ft hrs -- Main Engine		5.40	2	Idle	5.00	164.0	(lbs/1,000 lbs-fuel)	39.81	3.28	0.40	4.20	4.20	2.54	3,059.84	NA	NA	0.04	0.00	0.00	0.00	0.00	0.00	2.71	NA	NA
Main Engine		5.40	2	25% Q	5.00	341.4	(lbs/1,000 lbs-fuel)	14.04	5.07	0.40	4.20	4.20	0.61	3,204.69	NA	NA	0.03	0.01	0.00	0.01	0.01	0.00	5.91	NA	NA
Engine Change -- Main Engine		0.30	2	Idle	10.00	164.0	(lbs/1,000 lbs-fuel)	39.81	3.28	0.40	4.20	4.20	2.54	3,059.84	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.30	NA	NA
Main Engine		0.30	2	25% Q	10.00	341.4	(lbs/1,000 lbs-fuel)	14.04	5.07	0.40	4.20	4.20	0.61	3,204.69	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.66	NA	NA
High Power -- Main Engine		2.80	2	Idle	60.00	164.0	(lbs/1,000 lbs-fuel)	39.81	3.28	0.40	4.20	4.20	2.54	3,059.84	NA	NA	0.22	0.02	0.00	0.02	0.02	0.01	16.86	NA	NA
Main Engine		2.80	2	25% Q	60.00	354.5	(lbs/1,000 lbs-fuel)	13.38	5.15	0.40	4.20	4.20	0.59	3,207.29	NA	NA	0.16	0.06	0.00	0.05	0.05	0.01	38.20	NA	NA
Tail Rotor Change -- Main Engine		0.20	2	Idle	10.00	164.0	(lbs/1,000 lbs-fuel)	39.81	3.28	0.40	4.20	4.20	2.54	3,059.84	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.20	NA	NA
Main Engine		0.20	2	27% Q	10.00	341.4	(lbs/1,000 lbs-fuel)	14.04	5.07	0.40	4.20	4.20	0.61	3,204.69	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.44	NA	NA
Main Rotor Change -- Main Engine		0.30	2	Idle	10.00	164.0	(lbs/1,000 lbs-fuel)	39.81	3.28	0.40	4.20	4.20	2.54	3,059.84	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.30	NA	NA
Main Engine		0.30	2	25% Q	10.00	341.4	(lbs/1,000 lbs-fuel)	14.04	5.07	0.40	4.20	4.20	0.61	3,204.69	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.66	NA	NA
MCAS Maintenance & Testing Subtotal																	**0.46**	**0.10**	**0.01**	**0.09**	**0.09**	**0.03**	**66.23**	**NA**	**NA**
MCAS Total																	**2.16**	**0.85**	**0.06**	**0.68**	**0.68**	**0.11**	**521.20**	**NA**	**NA**
Total UH-1Y Emissions																	**25.01**	**12.85**	**0.93**	**9.76**	**9.76**	**1.33**	**7,476.23**	**NA**	**NA**

Number of aircraft= 12
Number of pilots= 31

(1) AESO Memorandum Report No. 9824, Revision B, Aircraft Emissions Estimates: AH-1W Landing and Takeoff Cycle and Maintenance Testing Using JP-5, November 2009.
(2) AESO Memorandum Report No. 9961, Revision A, Aircraft Emissions Estimates: AH-1 Mission Operations Using JP-5, November 2009.
1 Stop & Go = 1 Vertical Arrival + 1 Vertical Departure
(3) ROG emission factors provided by AESO. Personal communication (email) from Tuong Nguyen of AESO to mv22h1eis of Belt Collins Hawaii on 12 December 2011.
Stop and Go ROG emission factor and emissions is represented by HC from source (2).
(4) PM emissions are represented either by PM10 or PM2.5, but not both. Military aircraft PM are submicron in size; hence, PM10 (measured) = PM2.5.
NA - Not available.
(a) Cruise hours shown here = Total flight hours for each pilot/yr x No. of pilots OR 4,944.5 hrs/yr=159.5 hrs/yr-pilot x 31 pilots. Cruise hours errs on overestimating time in cruise mode and therefore emissions as cruise mode presumed to be equivalent to total flight hours.
Cruise Emissions = Hours in Cruise x No. of Engines x Fuel Rate (lbs-fuel/hr-engine) x Emission Factor (lbs-pollutant/1,000 lbs-fuel) x (1 ton/2,000 lbs)
(b) Mountain Pad.
Mountain Pad Emissions = No. of Ops x Emission Factor (lbs/op) x (1 ton/2,000 lbs)
(c) Touch and Gos (T&G).
T&G Emissions = No. of Ops x Emission Factor (lbs/op) x (1 ton/2,000 lbs)
(d) Maintenance & Testing = No. of Aircraft x Ops/aircraft x No. of Engines x Time in Mode (minutes/engine) x Fuel Rate (lbs-fuel/hr-engine) x Emission Factor (lbs-pollutant/1,000 lbs-fuel) x (1 ton/2,000 lbs)

Denotes activities specific to MCAS airfield.

E-3: Aircraft Emissions
Aircraft Activity for Air Emission Estimates

Activity		Units	VMM MV-22	HMLA AH-1Z	HMLA UH-1Y	HMLA Total
Cruise	(1)	Hours	4,920	3,811	4,944.5	NA
Vertical Departure	(2)	Operations	12,494	-	-	-
Vertical Arrival	(2)	Operations	12,494	-	-	-
Mountain Pad	(2), (4)	Operations	-	1,845	1,230	3,075
Touch & Gos (T&G)	(2), (4)	Operations	-	1,274	850	2,124
Vertical Departure	(3), (4)	Operations	2,545	1,690	1,127	2,817
Vertical Arrival	(3), (4)	Operations	2,545	1,690	1,127	2,817
T&G	(3), (4)	Operations	930	4,649	3,100	7,749
GCA Box	(3), (4)	Operations	512	511	341	852

Denotes activities specific to MCAS airfield.

(1) Hours based on Training & Readiness (T&R) Manual flight hours. Excludes core basic training (100/1000 series) as this time is presumed to occur out of Hawaii.

Cruise hours for each squadron by aircraft type = flight hours for each pilot/yr x No. of pilots x percent of time below 3,000 feet

MV-22 Cruise Hrs = 125.5 hrs/pilot x 56 pilots/yr x 70% below 3,000 feet = 4,920 hrs/yr

AH-1 Cruise Hrs = 103 hrs/pilot x 37 pilots/yr x 100% = 3,811 hrs/yr

UH-1 Cruise Hrs = 159.5 hrs/pilot x 31 pilots/yr x 100% = 4,944.5 hrs

(2) Tactical training operations provided by USMC squadron leader pilots participating in planning phase. Details and assumptions for AESO air emission factors presented in Aircraft Activity tables in this appendix.

(3) Y.Ebisu & Associates. Acoustic Study for the Environmental Impact Statement for Basing of MV-22 and H-1 Aircraft in Support of III MEF Elements in Hawaii (working draft). March 2011.

(4) Using Y.Ebisu reference (3), ops were speciated by aircraft (AH-1 v. UH-1) using the following ratios: AH-1/total H-1s = 15/27=0.6 and UH-1/total H-1s = 12/27 = 0.4

E-4: Operational Air Emissions (non-aircraft)

(same for Alternatives A and B)

Annual Non-Aircraft Operational Emissions (TPY) of 10 MV-22 Squadrons at MCAS Miramar (Year 2017)[1]

Source Type	ROG/HC	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O
Personal-Owned Vehicles	5.59	40.59	5.19	0.03	0.37	0.36	5,186.53	0.10	0.01
Government-Owned Vehicles	0.57	3.63	1.76	0.01	0.12	0.12	463.44	0.01	0.00
Ground/Tactical Support Equipment	20.49	201.95	17.56	0.09	1.93	1.89	25,802.63	0.47	0.04

[1] U.S. Navy. West Coast Basing of the MV-22 Final EIS, October 2009. Table B1-75.

Annual Non-Aircraft Operational Emissions (TPY) of 2 MV-22 Squadrons at MCB Kaneohe Bay (Year 2018)

Source Type	ROG/HC	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O
Personal-Owned Vehicles (a)	2.32	16.84	2.15	0.01	0.15	0.15	2,151.19	0.04	0.00
Government-Owned Vehicles (a)	0.24	1.51	0.73	0.00	0.05	0.05	192.22	0.00	0.00
Ground/Tactical Support Equipment (b)	8.71	85.83	7.46	0.04	0.82	0.80	10,966.12	0.20	0.02
Totals	11.26	104.17	10.35	0.05	1.02	1.00	13,309.53	0.25	0.02

(a) Source Type Annual Operational Emissons (TPY) = [Source Type Annual Operational Emissions (TPY) of 10 MV-22 Squadrons at MCAS Miramar (Year 2017)] x [Base Population of 2 MV-22 and 1 H-1 Squadrons/Base Population of 10 MV-22 Squadrons at MCAS Miramar (Year 2017)]

Where,

[Base Population of 2 MV-22 and 1 H-1 Squadrons/Base Population of 10 MV-22 Squadrons at MCAS Miramar (Year 2017)] = [1,000/2,411]

and "Base Population" has been synonymous with military population in estimation of emissions at MCAS Miramar (Year 2017).

(b) Source Type Annual Operational Emissons (TPY) = [Source Type Annual Operational Emissions (TPY) of 10 MV-22 Squadrons at MCAS Miramar (Year 2017)] x [Number of Aircraft with 2 MV-22 and 1 H-1 Squadrons/Number of Aircraft with 10 MV-22 Squadrons at MCAS Miramar (Year 2017)]

Where,

[Number of Aircraft with 2 MV-22 and 1 H-1 Squadrons/Number of Aircraft with 10 MV-22 Squadrons at MCAS Miramar (Year 2017)] = [(24 MV22 + 27 H1)/(120 MV22)]

Annual Non-Aircraft Operational GHG Emissions of 2 MV-22 Squadrons at MCB Kaneohe Bay (Year 2018)

Source Type	CO_2 (tons/yr)	CH_4 (tons/yr)	N_2O (tons/yr)	CO_2Eq (MMTCO2Eq)
Personal-Owned Vehicles [a]	2,151.19	0.04	0.00	0.0024
Government-Owned Vehicles [a]	192.22	0.00	0.00	0.0002
Ground/Tactical Support Equipment [b]	10,966.12	0.20	0.02	0.0121
Totals	13,309.53	0.25	0.02	0.0147

MMTCO2Eq=[(CO2 tons/yr x 1.1023 metric tons/ton x CO2 GWP) + (CH4 tons/yr x 1.1023 metric tons/ton x CH4 GWP) + (N20 tons/yr x 1.1023 metric tons/ton x N2O GWP)] x [1MMT/1E+6 metric tons]

where,

CO2 GWP=	1
CH4 GWP=	21
N2O GWP=	310

Source: U.S. Environmental Protection Agency, April 15, 2011. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2009.

APPENDIX F

Biological Resources

F-1
Memorandum: Risk of Fire from V-22 Exhaust

F-2
Memorandum: Downwash from V-22 Exhaust

F-3
Natural Resource Survey

F-4
Evaluation of Species Proposed for ESA Listing

DEPARTMENT OF THE NAVY
PROGRAM EXECUTIVE OFFICER
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IN REPLY REFER TO

Ser PMA-275/V22/357
JUL 21 2008

From: PMA-275 Program Manager
To: Headquarters, Marine Corps,
Department of Aviation, Aviation Logistics Support Branch
3000 Marine Corps, Pentagon Rm 5E518
Washington DC 20350-3000

Subj: RISK OF FIRE FROM V-22 EXHAUST

Ref: (a) Bell Boeing Test Report 901-993-356, Appendix E
(b) NAVAIR Safety Action Record (SAR) 22-02, Grass Fire Due to hot Exhaust

Encl: (1) Excerpt from A1-V22AB-NFM-000 MV-22B NATOPS Flight Manual
(2) U.S. Air Force JOPREP JIFFY report DTG 302000Z MAY 2007
(3) Excerpt from NSWCCD-65-TR-2006/12 March 2006, Structural Evaluation of an LHD-Class Amphibious Ship Flight Deck Subjected to Exhaust Gas Heat from a MV-22 Osprey Aircraft
(4) Excerpt from National Institute for Standards and Technology (NIST) Technical Note 1481, Ignition of Cellulosic Fuels by Heated and Radiative Surfaces, March 2007

1. To support the transition of the MV-22B Osprey aircraft to the west coast, the program office has been requested to provide information concerning the risk of a grass fire due to the exhaust temperature of the V-22. This letter summarizes the V-22 program office's assessment of that risk.

2. The tiltrotor configuration of the V-22 necessitates that the engine exhaust be directed down with the nacelles in the vertical position. This places the engine exhaust exit 4ft 4in above the ground. To reduce heating of the ground and aircraft components, the V-22 incorporates an exhaust deflector system which directs the exhaust gasses outward, away from the aircraft and the ground. The exhaust deflector system is activated at low power settings with Weight on Wheels, but can be de-selected by the pilot. A temperature profile of V-22 exhaust with the coanda system off is illustrated in enclosure (1). With exhaust deflectors off, the V-22 exhaust temperature at the exit plane is 515 deg F above the ambient temperature decreasing to 150 deg F above ambient temperature at a distance of 4ft 4in below the bottom of the nacelle IR suppressor.

3. To date, there has been one documented grass fire attributed to V-22 exhaust. The fire occurred approximately 10 miles southwest of Troy, Alabama. Enclosure (2) contains the U.S. Air Force JOPREP JIFFY report, similar to a U.S. Marine Corps flash report, detailing the incident. The probable cause of the fire was attributed to an interruption of the exhaust deflector operation. With the exhaust deflector inoperative, the exhaust was directed straight down, increasing the temperature directly below the nacelle to a temperature high enough to support combustion of grass.

4. Testing to measure the effectiveness of the coanda exhaust deflection was performed in 1997. The maximum ground temperature achieved during this testing was 422 deg F (reference a). To quantify the flight deck heating characteristics of V-22 exhaust, with the exhaust defection system operating, testing was conducted aboard USS Wasp in 2005. An instrumented flight deck was constructed to measure deck temperatures for a V-22 with exhaust deflectors operating, at varied engine power settings. A graph of flight deck temperature (in deg F) versus time is presented in enclosure (3). These results show that the flight deck temperature reached 300 deg F approximately 10 minutes after engine start, attained a maximum temperature of 380 deg F 30 minutes after engine start, and remained at 380 deg F for as long as 90 minutes after engine start.

5. Information concerning the combustion temperatures of various plant based materials may be found in NIST Technical Note 1481, Ignition of Cellulosic Fuels by Heated and Radiative Surfaces. This testing was conducted to characterize the ignition behavior of typical outdoor fuels by heated mufflers and catalytic converters found on outdoor power equipment. The fuels tested included shredded newsprint, tall fescue, cheat grass, fine Florida grass, and pine needles. A summary of the test results is presented in enclosure (4), showing time to glowing ignition (in seconds) versus temperature (in deg C) for both no wind and high wind conditions. The figures show glowing ignition is reached at temperatures as low as 572 deg F (300 deg C). This is 150 to 192 deg F above the maximum ground temperatures achieved with exhaust deflectors operating during the 1997 coanda and the 2005 USS Wasp flight deck heating tests.

6. The Naval Air Systems Command (NAVAIR) system safety has also conducted a safety assessment of the risk of a grass fire caused by hot exhaust (reference b). This safety assessment took into account all the information presented above as well as extenuating circumstances such as rigid vegetation extending higher into the exhaust stream and leaking fuel or hydraulic fluid after an extended period with the engines shut down. After taking all of the data and possible circumstances into account, NAVAIR system safety assessed the risk of a grass fire as a remote frequency (> 1 event per million flight hours).

2

Subj: RISK OF FIRE FROM V-22 EXHAUST

7. The available data indicates, under normal operations, with exhaust deflectors operating, the exhaust of the V-22 should not heat ground to a temperature high enough to support combustion of plant based materials. This conclusion is also consistent with V-22 operational experience. After 44,000 V-22 flight hours and operations to numerous unprepared landing zones at bases and ranges including sites in Alabama, Arizona, California, Florida, Maryland, Nevada, New Mexico, North Carolina, and Virginia, there has been one documented fire with exhaust deflectors inoperative and no documented fires with exhaust deflectors operating.

8. Based on the information available, it is the assessment of PMA-275, that operations to unprepared surfaces can be safely accomplished provided exhaust deflectors are operable. Additional operational mitigations such as avoiding placing rigid vegetation such as bushes and brush directly beneath the nacelle and limiting time the aircraft is on deck in unprepared landing zones will further mitigate this already remote risk.

M.D. MULHERN
COL USMC

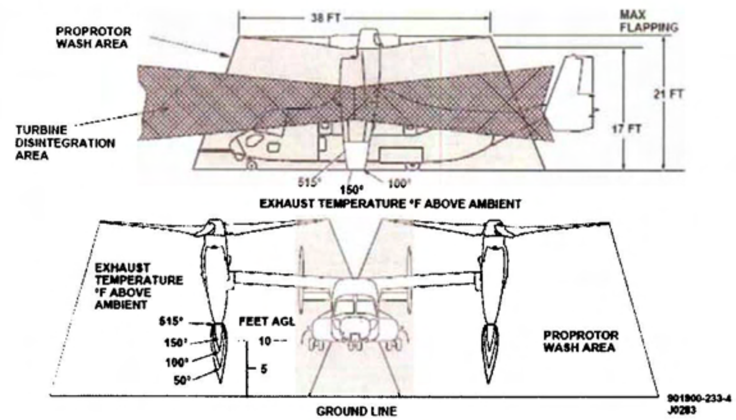

Figure 3-13. Danger Areas
A1-V22AB-NFM-000
NATOPS Flight Manual Navy Model MV-22B Tiltrotor, 1 October 2006

Encl (1)

UNCLAS

DTG: 302000Z MAY 2007

FM 1 SOW HURLBURT FIELD FL//CP//

UNCLAS JOPREP JIFFY

MSGID/OPREP-3H/1 SOW/052/MAY//
REF/A/DESC: INITIAL VOICE OPREP-3H REPORT/1 SOW/301951ZMAY2007/052//
FLAGWORD/HOMELINE/-// TIMELOC/300305ZMAY2007/TROY, AL/FINAL//
GENTEXT/INCIDENT IDENTIFICATION AND DETAILS/THE COMMAND POST WAS NOTIFIED AT 300646Z MAY 2007 AND THE COMMANDER APPROVED THE VOICE REPORT AT 301932Z MAY 2007. THE INFORMATION WAS VERIFIED BY THE 8TH SPECIAL OPERATIONS SQUADRON AT 300646Z MAY 2007. A CV-22B, CALL SIGN RAVEN 47, TAIL NUMBER 04-0029 WAS ON A TRAINING MISSION AT A LANDING ZONE (RT392, N31.49.584/W086.10.996) 10NM SOUTHWEST OF TROY, ALABAMA. AT 300305Z MAY 2007, A GRASS FIRE ERRUPTED UNDER THE RIGHT ENGINE EXHAUST SUPRESSOR; THE PROBABLE CAUSE OF THE FIRE WAS DUE TO A MISSION COMPUTER FAILURE INTERRUPTING THE ENGINE EXHAUST DEFLECTOR SYSTEM. THE AIRCREW IMMEDIATELY TOOK OFF AND DETERMINED THAT THE FIRE WAS ONLY ON THE GROUND. RAVEN 47 COORDINATED A WITH LOCAL AIRSPACE CONTROLLING AGENCY FOR A FIRE RESPONSE CREW. ONCE THE FIREFIGHTERS WERE ON SCENE, THE AIRCRAFT RETURNED TO HOME STATION AT 300435Z MAY 2007. RULE 8.8 APPLIES. NO FURTHER INFORMATION AVAILABLE. THIS IS A COMMAND POST FINAL REPORT.//

UNCLAS

Encl (2)

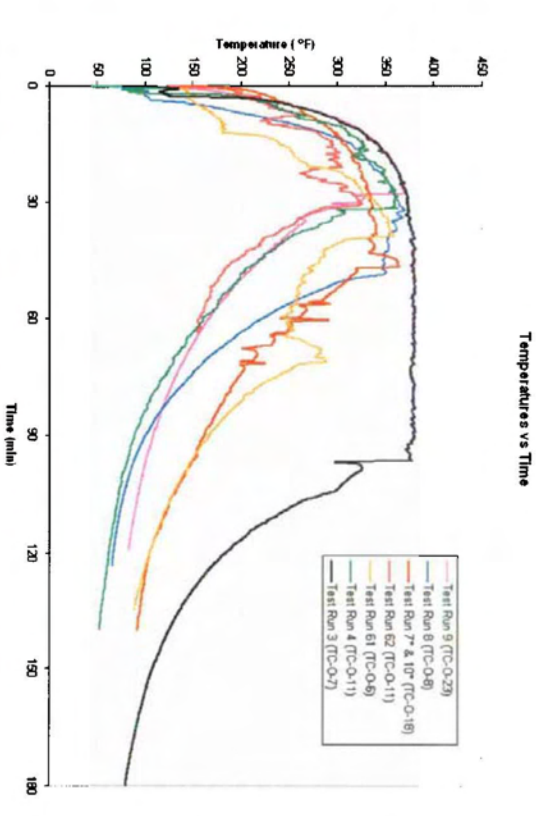

Figure 11. Measured Maximum Temperatures vs. Time (All Tests)
NSWCCD-65-TR-2006/12 March 2006
Structural Evaluation of an LHD-Class Amphibious Ship Flight Deck Subjected to Exhaust Gas Heat from a MV-22 Osprey Aircraft

Encl (3)

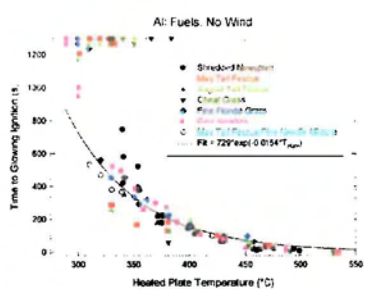

Figure 73. Data for time to glowing ignition with no applied wind are plotted as a function of heated plate temperature for seven fuels. Data near the upper temperature axis represent experiments for which ignition did not take place. The solid curve is the result of a least squares fit assuming an exponential dependence on heated plate temperature for all data where ignition was observed.

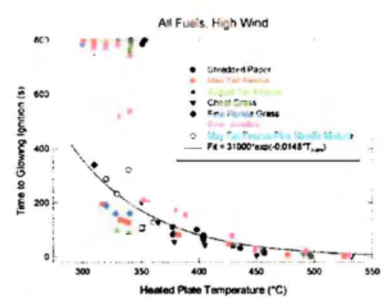

Figure 75. Data for time to glowing ignition with a high applied wind are plotted as a function of heated plate temperature for seven fuels. Data near the upper temperature axis represent experiments for which ignition did not take place. The solid curve is the result of a least squares fit assuming an exponential dependence on heated plate temperature for all data where ignition was observed.

NIST Technical Note 1481
Ignition of Cellulosic Fuels by Heated and Radiative Surfaces, March 2007

NIST Technical Note 1481

Ignition of Cellulosic Fuels by Heated and Radiative Surfaces

William M. Pitts

National Institute of Standards and Technology • Technology Administration • U.S. Department of Commerce

NIST Technical Note 1481

Ignition of Cellulosic Fuels by Heated and Radiative Surfaces

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Building and Fire Research Laboratory

March 2007

U.S. Department of Commerce
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Technology Administration
Robert Cresanti, Under Secretary of Commerce for Technology

National Institute of Standards and Technology
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National Institute of Standards and Technology Technical Note 1481
Natl. Inst. Stand. Technol. Tech. Note. 1481, 106 pages (March 2007)
CODEN: NSPUE2

Abstract

Experiments designed to characterize the ignition behavior of typical outdoor fuels by heated mufflers and catalytic converters found on outdoor power equipment are described. Ignition by direct contact with a heated surface and by radiation from a heated surface were considered. For the first scenario the fuel was placed in contact with an electrically heated surface, and the times required for ignition measured as a function of surface temperature. The effects of a wind on heated plate ignition were studied by passing air flows of 1.1 m/s and 2.5 m/s over the fuel bed. Fuels tested included shredded newsprint, four types of grass, pine needles, a grass/pine needle mixture and three types of dry leaves. Both glowing combustion and flaming were observed. The transition to flaming required glowing combustion to be present. Ignition times generally increased with decreasing surface temperature until a temperature was reached where ignition was no longer observed. Ignition times for given applied wind and surface temperature conditions and transition to flaming behavior were fuel dependent. An applied wind generally reduced the time required for ignition, with the reduction being greater for the higher velocity. A commercially available cone calorimeter operated in the non piloted ignition mode was used to impose known radiative heat fluxes on the fuel surface, and ignition times were measured as a function of applied heat flux. Shredded newsprint, two types of grass, pine needles, and non fire-retarded flexible polyurethane foam were studied. Ignition times for radiative heating increased with decreasing applied heat flux until levels were reached where ignition did not occur. The polyurethane foam had a distinctly different behavior than the cellulosic fuels. Comparison of the heated plate and radiative heating experiments suggests that they can be related using the black body temperature corresponding to the applied radiative heat flux.

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Executive Summary

Recently implemented and proposed regulations for outdoor power equipment require reductions in hydrocarbon and nitrogen oxides to levels that require the use of catalytic converters. Concerns have been raised that catalytic converters can result in increased temperatures for exhaust gases and surfaces that could increase the risk of fires. In response to this concern, The International Consortium for Fire Safety, Health, and the Environment (ICFSHE), with funding provided by the Outdoor Power Equipment Institute, awarded a contract to the SP Swedish National Testing and Research Institute (SP) for a “Scientific Evaluation of the Risk Associated with Heightened Environmental Requirements on Outdoor Power Equipment.” As part of this study ICFSHE requested that the Building and Fire Research Laboratory of the National Institute of Standards and Technology (BFRL/NIST) provide experimental support to SP. A work statement was adopted that involved characterizing the ignition of typical outdoor fuels by ignition sources representative of those expected for outdoor power equipment exhaust systems.

This report summarizes the findings of the BFRL/NIST investigation. One series of experiments was designed to simulate the ignition behaviors of fuels that come into direct contact with a heated surface. A series of experiments was run in which porous fuel beds were brought into contact with a 10.2 cm × 10.2 cm heated copper plate held at a constant temperature. The plate faced upward. A constant mass of the material to be tested was placed in a stainless steel wire screen cage to a depth of 2.5 cm, placed over the heated plate, and then exposed to the surface by removing a metal shutter from the bottom of the cage. The primary experimental measurements were whether or not glowing and/or flaming developed and, if so, the heating times required. Observations were made visually and by video recording of the experiments. Secondary observations included smoke behaviors, locations of initial burning, and the appearance of the fuel bed following an experiment. The effect of a wind on ignition behavior was investigated by running experiments with no wind and in the presence of low (1.0 m/s) and high winds (2.5 m/s). Heated plate temperatures were varied from temperatures in excess of 500 °C where ignition periods were short (a few seconds) down to temperatures where ignition of the fuels was not observed after many minutes.

A second series of experiments was designed to characterize ignition of porous fuel beds by radiative heating. Such heating occurs when fuel is located near, but not in direct contact with, a heated surface. The experiments were made with a cone calorimeter, a standard instrument designed primarily for heat release rate measurements with an applied radiative heat flux. Cone calorimeter measurements usually utilize an electrical spark as an ignition source, but these experiments were non piloted, and the spark was not used. Exposed fuel bed surfaces had the same dimensions as for the heated plate experiments, but samples were placed in sample holders with solid walls and were irradiated from above by a radiant source that was shielded from the fuel by a cooled shutter until the start of an experiment. Glowing and flaming ignition times were determined for a range of applied heat fluxes, from levels sufficient to induce ignition within a few seconds down to levels where ignition was not observed after many minutes. The only air flow was that around the sample induced by the experimental system. Useful secondary measurements included the heat release rate and mass for the sample holder and fuel as functions of time.

Heated plate ignition experiments were done for shredded newsprint, four grasses (two samples of tall fescue collected from the same location at NIST in May and August, cheat grass from California, and a sample of fine grass from Florida provided by a manufacturer of outdoor power equipment that was intended to simulate debris from the top of a mower housing), pine needles, and a mixture of May tall fescue, and pine needles. A limited number of tests were also run for boxwood, American elm, and pin oak leaves. Cone calorimeter tests were done for shredded newsprint, May tall fescue, cheat grass and pine needles. Samples of a non fire-retarded flexible polyurethane foam, representing a common plastic, were also tested in the cone calorimeter.

Some general observations from the heated plate experiments include the release of smoke, most likely a combination of condensed water and organic pyrolyzate as fuels are heated. The smoke distribution for experiments without a wind indicated that circular buoyant plumes were formed within the porous fuel beds by the flows rising from the heated plate and oxidizing fuel surfaces. With a wind applied to the fuel bed, smoke escaped along a band extending across the fuel bed perpendicular to the wind direction. This smoke distribution resulted from the interaction of the wind entering the fuel bed, which was slowed by interaction with the fuel, and the buoyancy driven flow. Qualitative observation indicated that the amount of pyrolysis occurring within a fuel bed was related to the amount of smoke observed. Smoke levels were generally heavy immediately prior to glowing or flaming ignition.

For heated plate temperatures around 550 °C all of the fuels ignited within a few seconds. As the plate temperature was reduced, the ignition times at first slowly increased until temperatures reached about 450 °C. Further reductions in temperature resulted in ignition times that increased more rapidly as the plate temperature was reduced. The dependence on temperature was shown to be captured well by fitting with exponential curves. Eventually, as the plate temperature was lowered, a point was reached for which a given type of fuel bed no longer ignited.

The ignition described above includes both glowing combustion and flaming. There were conditions for which glowing was observed but flaming was not and fewer examples of flaming without observed glowing. Even though glowing was not observed in all experiments in which flames were seen, in most experiments it appeared earlier. Video recordings of the transition to flaming showed that flames ignited within regions surrounded by intense glowing. A blue flame would suddenly appear and then spread rapidly before yellow flames appeared. These observations suggest that the transition to flaming requires the presence of high temperature glowing areas to supply the ignition energy and premixed volumes of gaseous fuel pyrolyzate and air having concentrations within the flammability limits for the mixture.

The general heated plate ignition temperature dependence discussed above was observed for the three wind conditions tested, but ignition times and fuel dependent transition to flaming behaviors depended strongly on wind condition. When a low wind was applied the ignition times were reduced from those for the same fuel without a wind, assuming ignition occurred for both conditions. Similar reductions in ignition times were observed when results for low and high winds were compared. For the lowest plate temperatures, the reductions in ignition times on going from no wind to high wind were on the order of a factor of two. Transition from glowing combustion to flaming was observed whenever glowing developed for shredded newsprint and pine needles. With a few isolated exceptions, none of the grass samples that

developed glowing in the absence of wind transitioned to flaming, while the August tall fescue, cheat grass, and fine Florida grass did transition to flaming when low and high winds were present. For most cases, glowing May tall fescue failed to transition to flaming with wind present. Note that the difference between the May tall fescue and August tall fescue implies seasonal differences for grass samples taken from the same location. The May tall fescue/pine needle mixture displayed flaming behaviors intermediate between those for the individual fuels, transitioning from glowing to flaming in over half of the experiments without wind and in all cases when wind was present.

Ignition times for the individual fuels displayed similar dependencies on heated plate temperature and wind as described above. By fitting the combined results for each wind condition to an exponential, it was possible to demonstrate that systematic effects of fuel were present that introduced ignition time variations that were larger than those observed for a given individual fuel. For a specified heated plate temperature and wind condition, the longest ignition times were found for the shredded newsprint and pine needles, while the grasses tended to have the shortest ignition times. The May tall fescue/pine needle mixture gave intermediate ignition times.

Minimum heated plate temperatures required for a given fuel and wind condition can be estimated from the experimental measurements. Values ranged from 290 °C to 380 °C and had complicated dependencies on fuel type and wind condition. These dependencies are described in detail in the full manuscript. In general, when a wind was not present the grasses tended to have higher minimum heated plate ignition temperatures than the shredded paper and pine needles. When wind was introduced the minimum temperatures for the grasses decreased while those for the shredded paper and pine needles increased such that the lowest minimum temperatures with wind tended to be those for the grasses. Inspection of the grass fuel beds following experiments at temperatures lower than required for ignition with no wind provided insight into the reason for this behavior. It was found that non glowing smoldering took place in the absence of a wind down to temperatures on the order of 300 °C. Presumably, when a wind was applied more oxygen was available at the fuel surface and sufficient heat was generated for the non glowing combustion to transition to glowing. Similar non glowing smoldering was not observed for shredded paper and pine needles. It is likely that for these fuels the applied wind cooled the samples and resulted in the higher minimum ignition temperatures. The May tall fescue/pine needle mixture without wind yielded the lowest observed minimum ignition temperature of 290 °C. This suggests that the May tall fescue component of the mixture was able to begin non glowing smoldering at this temperature and that the heat generated was sufficient to ignite glowing combustion on the pine needle fraction. Transition to flaming was observed in this particular experiment.

Limited experiments with a heated plate temperature of 380 °C indicated that leaves are likely to have similar ignition behaviors to those observed for the cellulosic fuels investigated more fully.

The cone calorimeter radiative ignition (glowing and flaming) experiments were run without a lateral air flow. Applied heat fluxes were varied from a high of 50 kW/m^2 down to values where ignition was not observed. Plots of ignition time versus applied heat flux had similar appearances to the plots of ignition time versus heated plate temperature discussed above. For the highest heat fluxes ignition times were on the order of a few seconds. As the applied heat flux was reduced to lower values, the ignition times increased slowly at first. Eventually, with further reductions, applied heat fluxes reached values where ignition times began to increase rapidly at rates that increased with decreasing flux. Ignition times of hundreds of seconds were observed before further reductions in applied heat flux resulted in no ignition. As for the heated plate experiments, the dependencies of ignition times on applied heat flux were well described by exponential curve fits.

Results for three of the fuels, shredded paper, May tall fescue, and cheat grass, fell on very similar curves, with the rapid increases in ignition beginning around 20 kW/m^2 and minimum applied heat fluxes required for ignition of approximately 10 kW/m^2. The ignition time for the pine needles was slightly different, with the rapid rise starting around 30 kW/m^2 and a slower rate of increase with decreasing heat flux than found for the three other fuels. A minimum applied heat flux for ignition was not determined for the pine needles.

Even though the ignition times as a function of applied heat flux were similar for the four fuels, transition to flaming behaviors were very different. Flaming was observed for all of the fuels with applied heat fluxes of 40 kW/m^2 and higher, and maximum observed heat release rates were similar. However, as the applied heat flux was reduced below 40 kW/m^2 only glowing combustion developed for the two grasses, while the shredded newsprint and pine needles continued to transition to flaming. These ignition behaviors were observed over applied heat fluxes in the 10 kW/m^2 to 40 kW/m^2 range. Observed time behaviors for heat release rate and mass loss were consistent with these observations. The highest heat release rates and mass loss rates were observed during flaming, while the values were much reduced during smoldering. The measurements for the glowing grass indicated that there were two distinct types of smoldering having different effective heats of combustion. There seemed to be an initial oxidation that converted a part of the grass to a high energy char, which then smoldered slowly with much slower mass loss but a comparable heat release rate.

The cone calorimeter results are in good agreement with the heated plate results with regard to flaming behavior for the grasses. They indicate that with no wind present it is very difficult to generate flaming, consistent with the absence of flaming in the heated plate experiments. The shredded newsprint and pine needles transitioned to flaming in all cases where glowing developed, again consistent with the heated plate experiments. Measurements of ignition times, heat release rates, and mass loss were similar for the May tall fescue and cheat grass. Recall that these two grasses had different behaviors with regard to transition to flaming in the presence of a wind. The similarity of the results suggests that the cone calorimeter is not able to distinguish fuels that have different flaming behaviors in the presence of wind.

Radiative ignition experiments were performed for polyurethane foam. The ignition time behavior was very different from those observed for the cellulosic fuels, and the minimum ignition applied heat flux was 23 kW/m^2. Heat release rate curves had two peaks corresponding to initial burning of the foam that generated a liquid component, which then burned as a pool fire. At the lowest applied heat fluxes the foam formed the liquid without oxidation, and if flaming ignited, it was only for the liquid fraction.

In order to determine if the response of a fuel to a radiative heat flux could be related to its response on a heated plate, black body temperatures corresponding to given applied heat fluxes were calculated. Comparisons of heated plate temperatures and the corresponding black body temperatures from the cone calorimeter results indicated that values for minimum ignition temperature and the temperature where the sharp increases in ignition times began were slightly higher for the black body temperatures, but were close enough to justify the approach. This is particularly true when it is noted that the application of heat to the bottom of the fuel beds and open walls of the fuel holder for the heated plate experiments should result in slightly lower ignition temperatures than the radiative heating experiments where heat is applied to the top of fuel beds enclosed on the sides.

A review of the literature identified very few experiments that could be compared directly to the current findings. Limited numbers of measurements of ignition times versus surface temperature were consistent for similar fuel beds. A review of experiments that identified minimum ignition temperatures yielded a wide range of values that were of little use for comparison. No experiments were identified that investigated non piloted radiative ignition of these types of fuels.

The experimental results are subject to uncertainties associated with such parameters as temperature measurement, identification of ignition time, and stochastic variations of fuel behavior and packing. Due to the limited number of measurements possible, it was not feasible to determine probability curves for such variables as ignition temperature as a function of heated plate temperature or applied heat flux. In spite of these uncertainties the results demonstrate that smoldering and flaming ignition of cellulosic fuel beds exposed to conditions chosen to be representative of those generated on heated exhausts of outdoor power equipment vary with surface temperature or applied heat flux, fuel type, wind, and season. In addition to these parameters, there are a number of others that would be expected to affect ignition behavior but were not varied in this study. These include fuel moisture, fuel bed exposed surface area, fuel bed thickness, fuel bed porosity, spatial orientation of the heat source and the fuel bed, and the accessibility of the interior of a fuel bed to an applied wind.

Keeping in mind the experimental uncertainties and additional parameters that could affect ignition behavior, it is possible to provide some general guidance with regard to expected ignition behaviors of cellulosic fuels when subjected to contact with a heated surface or exposure to thermal radiation. Curve fits to exponentials based on data for multiple fuels have been made that provide reasonable approximations for the observed variations in ignition times with heated plate temperature and applied heat flux. For the heated surface, these fits are available for three wind conditions. While clearly not representative of worst case conditions, these curves should be useful for assessing the likelihood of ignition and the time required for a generic cellulosic fuel subjected to conditions similar to those investigated here.

It is common to introduce safety factors when making engineering estimates having safety implications. For the ignition of cellulosic fuels by contact with a heated surface the following assumptions are appropriate: 1) ignition is possible for temperatures of 290 °C and higher, 2) any ignition that takes place will result in flaming, and 3) ignition times estimated from the exponential curve fits should be divided by a factor of two. The available experimental data cover a range of winds from 0 m/s to 2.5 m/s, and the fits can be used to estimate ignition times over this range. Caution should be exercised when extending the estimates to higher wind cases.

An exponential curve fit of ignition times versus applied heat flux has been determined from the radiative heating experiments. Similar assumptions to those above would allow this curve to be utilized for estimating ignition times for cellulosic fuel beds exposed to a given level of heat flux. However, based on the similar ignition time dependencies observed between heated plate temperatures and black body temperatures derived from the applied heat fluxes, it is recommended that black body temperatures based on the applied heat fluxes be used in conjunction with the exponential curves derived from the heated plate experiments to estimate ignition times for radiative heating. This has the advantage of providing estimates for ignition by radiative heating in the presence of a wind.

Suggestions are provided for improvements to the experimental system and for additional experiments.

1. Introduction

Concerns about the levels of hydrocarbons and nitrogen oxides released from the exhausts of outdoor power equipment (OPE) led the California Air Resources Board to approve regulations in September, 2003 requiring reductions in these species to levels which require the use of exhaust catalytic converters. Having received a required US Environmental Protections Agency (EPA) waiver, these regulations went into effect in 2007. The EPA is currently considering extending a similar regulation to the entire country. [1]

Exhaust catalysts operate by lowering the temperatures required to oxidize pollutant species. Since oxidation reactions are exothermic, heat is generated, and there is the potential for exhaust gas temperatures to increase when a catalyst is present. The use of a catalyst may raise the temperatures of the gases exhausted by the engine as well as the temperatures of exposed surfaces that form the exhaust system.

It is known that the temperatures generated by existing exhaust systems on OPE are high enough to be potential fire ignition sources for typical organic fuels. Several groups, including the Outdoor Power Equipment Institute (OPEI) and the National Association of State Fire Marshals (NASFM), questioned whether higher temperatures associated with the use of catalytic converters on OPE might result in an increased risk of unwanted fire.

In response to these concerns and at the request of NASFM, The International Consortium for Fire Safety, Health, and the Environment (ICFSHE), with funding provided by OPEI, awarded a contract to the SP Swedish National Testing and Research Institute (now renamed SP Technical Research Institute of Sweden, referred to as "SP") for a "Scientific Evaluation of the Risk Associated with Heightened Environmental Requirements on Outdoor Power Equipment." Phase I of this investigation included a literature review and development of an experimental research plan for studying this problem. The findings of the Phase I study are available. [2]

ICFSHE requested that the Building and Fire Research Laboratory of the National Institute of Standards and Technology (BFRL/NIST) provide experimental support to SP as part of the Phase II effort. A work statement entitled "Ignition of Fuels by Conductive, Radiative, and Conductive Heating" was prepared and submitted to ICFSHE and SP for consideration. The work statement proposed to experimentally characterize the ignition behaviors of a variety of natural and man made organic fuels when exposed to heat sources believed to be representative of those generated by the exhausts of OPE. This work statement was accepted and research funding was provided to BFRL/NIST by ICFSHE with technical management and oversight provided by SP.

The original work statement included ignition studies using three types of heat sources—heated plate (conductive), heated flow (convective), and radiative. A variety of materials were to be investigated including a grass, pine needles, leaves, sawdust, oil, and gasoline. Tests were proposed to characterize the effects of spatial orientation, an imposed wind, and an uneven heat distribution on the heated plate.

Initial testing showed the ignition of grasses was dependent on the type of grass and the presence or absence of a wind played a dominant role in ignition behavior. Based on these observations and with the agreement of SP, the test matrix was modified to focus more attention on the effects of grass type and wind condition. It was decided that characterizing ignition by a heated plate and by radiation was more important than characterizing ignition due to a convective heat flow, and this heat source was dropped from the investigation. Ultimately, ignitions studies on a variable-temperature heated plate were carried out for shredded newsprint, four different grass samples, pine needles, and a grass/pine needle mixture. Three wind conditions—no wind and two imposed wind velocities of 1.1 m/s and 2.5 m/s—were used. A limited number of tests were done with three types of leaves. Radiative ignition studies were performed as a function of applied heat flux for shredded newsprint, two types of grass, pine needles, and non fire-retarded flexible polyurethane foam.

The following section, Section 2, provides an overview of relevant past studies and introduces some concepts useful for the later discussion. The experimental systems and procedures are discussed in Section 3. Section 4 presents the experimental findings for the investigation. The final section, Section 5, summarizes the findings along with the implications for possible ignition by heated plates or radiative surfaces.

2. Important Concepts and Literature Review

The focus of this experimental program is the characterization of ignition for various fuels by heat sources deemed to be representative of those expected for exhaust systems on OPE such as lawn mowers. Two potential scenarios are emphasized. In the first it is assumed the fuel comes into direct contact with a heated surface. Since exhaust temperatures can vary over a wide range, the response of the fuel will be investigated as a function of surface temperature. In the second scenario the fuel is located close to, but sufficiently far from, a heated surface that heating of the fuel is dominated by radiative heat transfer. In this case the important experimental parameter is the radiative heat flux (kW/m^2) impinging on the fuel surface. Since the heat flux depends on the radiating surface temperature to the fourth power, the fuel response to a range of heat fluxes is considered.

Since by definition OPE is operated outdoors, ignition of natural fuels such as grasses, pine needles, and leaves are considered to be particularly important. It is also possible that heated exhaust surfaces will come in contact with a variety of man-made fuels during storage. As a result there is a nearly infinite number of potential fuels that could be considered relevant to this problem. For this study the ignition behaviors of shredded newsprint, four types of grass (May tall fescue, August tall fescue, cheat, and fine Florida), pine needles, various types of leaves, a May tall fescue/pine needle mixture, and polyurethane foam were investigated. While chosen to be representative of possible fuels, care should be exercised in extrapolating the findings to additional fuels.

The focus of this investigation is ultimately fire safety. From this standpoint, "flaming combustion" in which gasified fuel molecules undergo a self sustaining reaction with oxygen in the air to release heat and light is considered to represent the most dangerous type of combustion.

The natural fuels chosen for study as well as the shredded newsprint contain high concentrations of cellulose along with other natural polymers such as hemicellulose, and lignin. Materials containing these polymers are known to be susceptible to a type of surface combustion known as smoldering. In his review, Ohlemiller defines smoldering as "a slow, low-temperature, flameless form of combustion, sustained by heat evolved when oxygen directly attacks the surface of a condensed-phase fuel." [3]

Smoldering usually involves both endothermic and exothermic processes. Moisture removal from the fuel and gasification of low molecular weight fuel molecules (known as pyrolysis) generally require energy input. As described by Ohlemiller, fuel pyrolysis often leads to the formation of a poorly characterized carbon-enriched material referred to as char. Oxidative surface reactions with char are exothermic and provide the heat necessary to sustain smoldering. [3] Note that fuel pyrolysis is possible without oxidation. Local surface oxidation can also occur near a heated surface without the development of self-sustaining smoldering.

Once initiated, in most cases the smoldering reaction rate is limited by the amount of oxygen available at the fuel surface. Therefore smoldering behavior is generally sensitive to parameters that affect the amount of oxygen reaching the surface. An example of such a parameter is the

porosity of a smoldering fuel bed. The more open the fuel bed, the more easily oxygen will be able reach a given fuel surface and support smoldering. The presence of an imposed or natural (buoyancy-driven) flow strongly influences the amount of oxygen reaching a smoldering fuel surface. Everyone is familiar with the increase in intensity that occurs when one blows on a piece of paper or wood with visible smoldering. The fuel surface-to-volume ratio is also an important parameter controlling smoldering behavior with high ratios favoring smoldering.

Most studies of smoldering consider such properties as the spread rate in a fuel bed. The study of Palmer, who investigated smoldering spread through a variety of materials and configurations, is a classic example. [4] Studies that consider ignition of smoldering are much rarer. In his comprehensive review on ignition, Babrauskas includes a section on smoldering in general and smoldering ignition in particular. [5] Many of the studies he summarizes involve determination of the minimum energy necessary to ignite smoldering. Of direct relevance to this study, Ohlemiller showed that the lowest temperature of a heated surface capable of igniting smoldering in a bed of cellulosic insulation varied with the size of the heater. [6,7] For a 0.48 cm diameter wire a minimum temperature of 380 °C to 385 °C was required, while the limit dropped to 255 °C to 260 °C for a 200 cm × 200 cm plate. Times required for ignition with these low temperatures were on the order of hours. Babraukas also discusses a limited number of studies in which the time to ignition was determined as a function of applied heat flux. Materials studied included cotton fabrics and polyurethane foam. [5]

A number of parameters have been identified as important in controlling smoldering behavior in porous fuel beds such as those considered in this study. [3,5] The fuel must be capable of forming a rigid char during pyrolysis. Char formation varies widely in solid fuels. Charring and char oxidation rates in cellulosic fuels are known to be sensitive to the concentration of various inorganic salts, metals, and metal hydroxides. The amount of moisture absorbed in the fuel is a very important parameter. Physical properties of the fuel beds such as size, thickness, and porosity also play roles.

Babrauskas notes that there are two smoldering modes that are characterized by whether or not oxidizing surface temperatures are high enough to emit visible light. [5] The type of smoldering in which light is emitted is often referred to as "glowing combustion." Drysdale includes a short discussion of glowing combustion as part of a discussion of smoldering in his book. [8] In the current work smoldering in which there is no visible light produced will be referred to as "non glowing combustion." It appears that little previous research has considered the conditions necessary for the development of glowing combustion or its general behavior.

It is well known in the fire community that under certain conditions smoldering will spontaneously transition to flaming combustion. [5,8] While the general requirements for ignition in the gas phase are known, there is little practical understanding of the transition to flaming from smoldering solids. At a minimum, it is necessary that a solid fuel pyrolyze with a sufficient rate to generate a premixed fuel/air mixture that lies between the lean and rich flammability limits. Such a mixture can ignite in two well defined ways—piloted and non-piloted. In "piloted ignition" a source of heat and free radicals, such as a flame or spark, are used to initiate the combustion reactions, which then become self sustaining. In non-piloted ignition the flammable fuel/air mixture must be heated to a point where free radicals are generated within the mixture, and rapid chain branching chemical reactions lead to sustained combustion. Typically, higher temperatures must be present for non piloted ignition than for piloted ignition.

In the current work a cone calorimeter will be used for the radiative ignition studies. Babrauskas and Parker have described the use of the instrument for this purpose. [9] Most ignition experiments that have been done in the cone utilized an electric discharge as a pilot for the flame. It is possible to operate the system without a spark in order to study non piloted ignition.

A primary focus of this work is the ignition behavior of cellulosic fuels. Babrauskas included a review of ignition of forest materials, vegetation, and hay in his comprehensive monograph on ignition. [10] His general comments concerning such measurements are relevant. He points out that there are numerous measurements of ignition temperatures in the literature, but that the results vary widely. Potential sources of these variations include fuel composition and moisture content, but Babrauskas argues that variations due to such factors should be much less than observed, and he attributes much of the variability to experimental protocols and operator inexperience.

Many of the ignition studies cited by Babrauskas involve determining a lower temperature limit for combustion. A variety of heating approaches were employed with the most prevalent being immersion in air held at a constant temperature in an oven. Minimum ignition temperatures reported for a variety of natural fuels ranged from 166 °C to as high as 675 °C. There is no indication of the times required for ignition or the type of combustion observed.

In a number of studies relatively large heated bodies were deposited on various types of porous natural fuel beds. Ignition temperature tended to be somewhat higher than reported for other ignition sources, with minimum values ranging between 450 °C and 650 °C.

More recently, several studies of radiant ignition of forest fuels have appeared. Most of these tests have utilized either the ISO 5657 [11] or cone calorimeter [12,13,14] tests. ISO 5657 and the cone calorimeter are similar tests, but differ in the sample size and configuration and in the type of igniter used in piloted ignition studies. Most of these tests were designed to measure the flammability of natural fuels and usually utilized piloted ignition. Some findings are summarized by Babruaskas, but it is difficult to draw conclusions relevant to the current investigation. [10]

In a book on the investigation of wildfires, Ford includes a useful summary of selected studies on wildland fuel ignition. [15] He discusses similar large variations in minimum ignition temperatures to those cited by Babrauskas, but notes wildland physicists have settled on a temperature of 320 °C as an arbitrary average. Ford summarizes the results of an extensive investigation of ignition by heated surfaces carried out at the Oregon State Engineering Research Station in 1949. Lower ignition temperatures for a wide range of woods and papers fell in a range of 220 °C to 300 °C.

There is an extensive literature available concerning the pyrolysis and burning behavior of cellulose and cellulosic fuels. The observed behaviors are quite complex and a detailed discussion is not appropriate for the purposes of this investigation. However, it is possible to

provide some guidance for the general effects of fuel composition on burning behavior. The recent review of Plucinski is useful for this purpose. [16] Quoting this author, “Plant tissue is approximately 50 % carbon, 44 % oxygen and 5 % hydrogen by mass and varies between 41-53 % cellulose, 16-33 % hemicellulose, and 16 – 33 % lignin. Cellulose tends to burn by flaming combustion and lignin by glowing combustion.”

In the following, several investigations are briefly summarized because they used experimental approaches similar to those of this study or considered similar fuels.

In a study primarily concerned with the temperatures generated by automobile exhaust systems, Harrison reported ignition times for a dry annual grass and dry pine needles as functions of the temperature of a heated barbeque charcoal igniter placed on top of piles of the fuels. [17] For both fuels the ignition times increased with decreasing temperature, with the times becoming longer as the temperature was lowered. For the grass the minimum ignition temperature was 400 °C and for the pine needles the corresponding temperature was 350 °C. Both fuels required about 4 min for ignition at these minimum temperatures. Ignitions at lower temperatures were not observed in experiments lasting six minutes. A 0.9 m/s (2 mph) wind had a noticeable effect on grass ignition time, reducing the ignition time for a 400 °C surface to 1.3 min.

In a particularly relevant investigation, Kaminski simulated the ignition of punky (decayed, crumbly, and dry) wood, cheat grass, saw dust, and tree moss by a chain saw muffler by attaching a wire heater to an actual muffler. [18] It was found that punky wood would smoke and glow at temperatures as low as 270 °C. The presence of a low wind reduced the time required for ignition and increased the intensity of the glowing combustion. Glowing for cheat grass was observed at 330 °C, but sawdust only browned under these conditions. The tree moss was reported to have a behavior similar to the punky wood.

In a series of reports Stockstad reported on non piloted and piloted ignition studies of rotten wood [19], cheat grass [20], and pine needles [21] in which minimum heat flux intensities for ignition, time to ignition, and temperatures at times of ignition were given. Small individual pieces of the samples were heated by immersion in a furnace. A variety of rotten woods were tested. Minimum temperatures for ignition were on the order of 270 °C to 300 °C. Times required for glowing combustion were on the order of 1 min. For cheat grass the minimum temperature for which non piloted ignition was observed was 450 °C with ignition times on the order of 20 s. Ignition of pine needles occurred for temperature as low as 365 °C, with glowing appearing after roughly 60 s.

Recently, Manzello et al. have investigated the ignition of shredded paper, pine needle, grass, and hardwood mulch fuel beds by glowing and flaming firebrands deposited on top of the beds. [22,23] Experiments were done with single and groups of four firebrands of two sizes (diameters of 25 mm and 50 mm). Imposed air flows of 0.5 m/s and 1.0 m/s were used. The effect of moisture level was tested by using 0 % and 11 % fuel moisture levels. Ignition by glowing brands is most relevant to the current study, and these findings can be summarized as follows. The only fuel that was readily ignited by a single firebrand was the shredded paper. Only glowing combustion was observed. When 4 brands were used the pine needle fuel beds ignited only with the 50 mm-diameter brands in the presence of the 1 m/s wind. In this case smoldering ignition with transition to flaming was observed for both fuel moistures. The larger firebrands induced smoldering in the dried hardwood mulch with both airflows, with the smoldering transitioning to flaming for the higher air flow. Grass only ignited when dry and exposed to four brands and the higher air flow. Combustion began as smoldering and transitioned to flaming.

White and coworkers have described on an effort to develop an approach for flammability measurements of vegetation using a cone calorimeter. [24,25,26] Measurements have been typically made with applied heat fluxes of 25 kW/m^2 or 50 kW/m^2 and piloted ignition. Changes in flammability due to seasonal variations for several species of ornamental vegetation [25] and for cheat grass grown in the presence of varying CO_2 concentrations [26] have been reported.

3. Experimental Systems and Procedures

3.1. Ignition by Thermal Conduction from a Heated Surface

Ignition of cellulosic fuels as the result of thermal conduction from a heated surface was investigated by placing loosely packed samples of the material to be tested in contact with a uniformly heated surface. The surface was oriented facing upward. The response of the sample to heating was observed while maintaining a constant surface temperature. The dependence of a given fuel response on surface temperature was determined by repeating the experiment for a range of surface temperatures. Experiments were done with and without a lateral air flow applied to the fuel bed.

3.1.1. Experimental System

3.1.1.1. Heated Plate

The heated plate was fabricated by inserting four Watlow* 300 W cartridge heaters (Model number E4A30) into a 10.2 cm × 10.2 cm square plate having a thickness of 1.9 cm. Machinable copper was used for the plate due to its high thermal conductivity, which minimized temperature gradients within the plate. Each heater was 10.2 cm long and had a diameter of 0.63 cm. The four heaters were inserted into four parallel 0.64 cm-diameter holes, drilled horizontally through the plate at the vertical center, and positioned 0.95 cm, 3.5 cm, 6.7 cm, and 9.2 cm from the perpendicular edge of the plate. The heaters were equipped with male National Pipe Thread (NPT) fittings and were inserted firmly into machined female NPT fittings in the copper plate. A schematic of the plate showing planar and side views is shown in Figure 1.

Two power supplies were utilized to provide electric current for the heaters. One of the sources was a Kepco Model ATE 100-2.5M capable of supplying up to 2.5 A at a maximum of 100 V DC. The second power supply was a Kepco Model ATE 150-7M that could provide up to 7 A with a maximum voltage of 150 V DC. One of the center cartridge heaters was connected to the smaller power supply, while the three remaining heaters were wired in parallel to the larger supply. Assuming that the four cartridge heaters are operated at the same current, this arrangement could provide a maximum current of 2.33 A to each heater.

The temperature of the plate was monitored using three Type K thermocouples†, which were press fit into 0.16 cm-diamter holes drilled from the back side of the plate to within 0.32 cm of

* Certain commercial equipment, instruments, or materials are identified in this document. Such identification does not imply recommendation or endorsement by the National Institute of Standards and Technology, nor does it imply that the products identified are necessarily the best available for the purpose.

† As explained in Section 5, the estimation of standard uncertainties (for time to glowing or flaming ignition and for maximum observed heat release rate) requires a greater number of experiments than could be performed within the scope of this project. In the absence of such data a qualitative approach was adopted in which the degree of collapse of experimental data onto well-defined curves was adopted as a qualitative basis fro assessing uncertainty; therefore, this report does not provide estimates of standard uncertainties, and graphs do not display error bars.

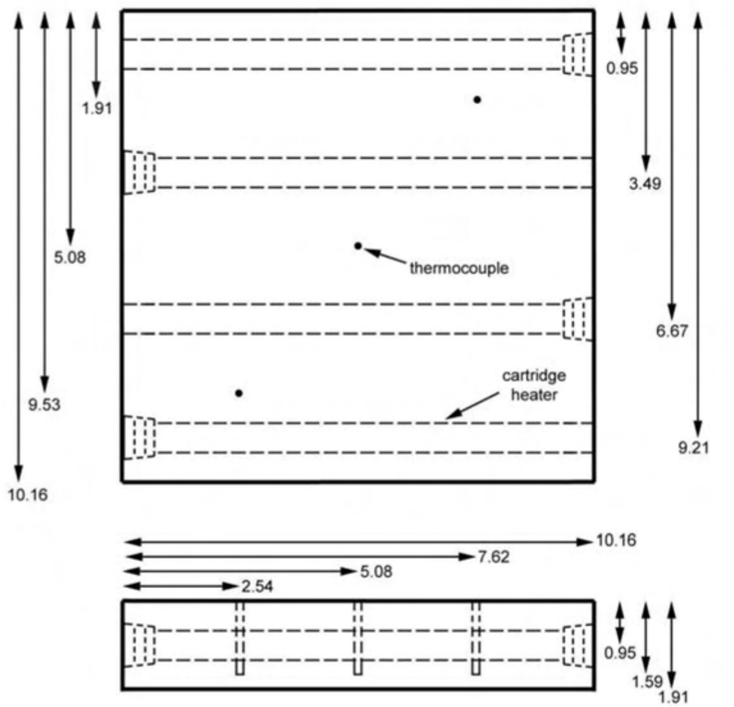

Figure 1. Schematic plan and side views are shown for the heated copper plate used for the ignition studies. All dimensions are in cm.

the top heated surface. Two of the mounting holes were located on opposite corners of the plate at distances of 1.91 cm from the edges parallel to the heaters and 2.54 cm from the edges perpendicular to the heaters. The third thermocouple was located at the center of the plate. The thermocouple leads were connected to Omega DP41-TC thermocouple readers that provided visual readouts of the temperatures at the three locations.

The heated plate was placed on a ring stand. Figure 2 shows a photograph of the plate with the heaters and thermocouples in place. Initial testing of the heated plate in ambient air showed that setting the two power supplies to the same voltage resulted in a current flow for the larger supply

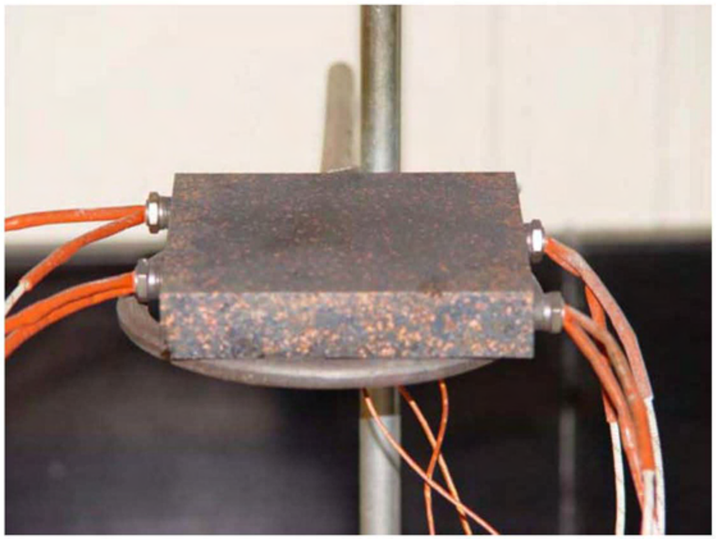

Figure 2. This photograph shows the heated copper plate used for ignition measurements of cellulosic fuels in place on a ring stand. The ends of the four cartridge heaters and their leads can be seen on the two edges of the plate. The leads for three thermocouples imbedded in the plate are visible below.

that was three times larger than recorded for the smaller. This is the expected behavior if the four cartridge heaters have the same resistance values. As the temperature of the plate was increased, the three thermocouple outputs provided temperature readings that agreed within 1 °C, indicating good uniformity of the temperature field within the plate. For recording purposes, the temperature of the thermocouple at the center of the plate was used.

Figure 3 shows the plate temperature recorded as a function of the current applied to each of the cartridge heaters as solid circles from an initial calibration. The result of a quadratic least squares curve fit is shown as a solid line for comparison purposes only. Over the course of the experiments small variations in temperature for a given current were observed that were most likely due to changes in the emissivity of the copper surface. Some changes in the physical appearance of the plate were apparent when the operating temperatures were varied.

3.1.1.2. Air Flows

Experiments were performed with and without air flows over the heated plate. Air flows were generated using a Dayton Model 4C443A blower delivering a nominal volumetric flow rate of

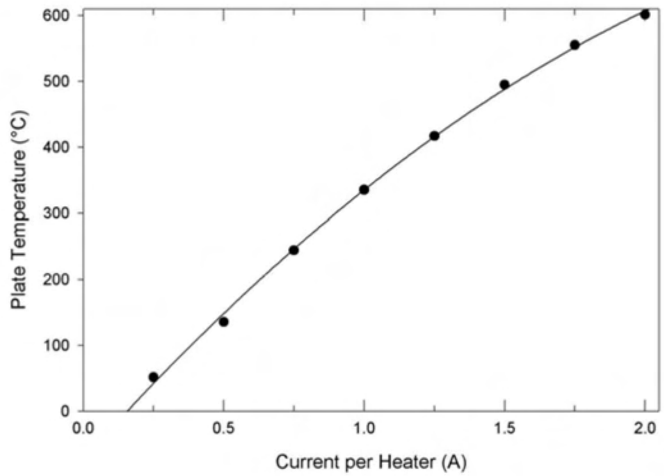

Figure 3. The temperature measured at the center of the heated copper plate is plotted as a function of the current applied to the four cartridge heaters embedded within the plate. Filled circles are the experimental measurements and the solid curve is the result of a quadratic least squares curve fit to the data.

219 L/s. The output of the blower was mounted at the same height as the heated plate and directed towards the plate from a distance of 134 cm. The air velocity at the plate was characterized by recording the output from an Applied Technologies, Inc. Model SPAS/24 sonic anemometer with a portable computer. The anemometer measures wind velocity in two dimensions. The probe was placed 1.2 cm above the plate such that one of the velocity components was aligned along the primary direction of the flow generated by the blower, as shown in Figure 4.

Figure 5 shows an example of the wind speed recorded by the sonic anemometer. Initially the blower was off. When the blower was turned on the air speed increased rapidly to values on the order of 2.5 m/s. Rapid fluctuations in speed are evident during the just over 300 s the fan was on. When the fan was turned off the speed dropped rapidly to that characteristic of the quiescent laboratory.

Averaging the data plotted in Figure 5 yielded means and root mean square (rms) values of 0.09 m/s ± 0.04 m/s and 2.5 m/s ± 0.3 m/s for the wind speeds with the fan turned off and on, respectively. The low wind speed recorded with the fan off is reasonable since the plate was located under an open exhaust hood. The mean wind speed recorded with the fan turned on should be indicative of the applied wind speed, but it likely that the fluctuations are underestimated due to the averaging inherent in recording over the 15 cm path length between

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Figure 4. Photograph showing the sonic anemometer probe used to characterize the applied wind velocity in place 1.2 cm above the unheated copper plate.

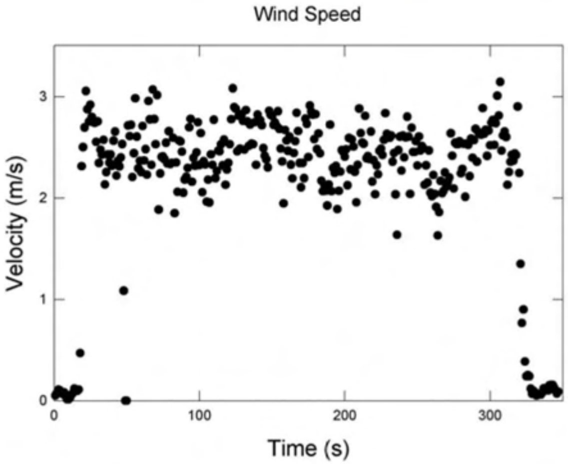

Figure 5. The wind speed above the copper plate along the primary flow direction of the blower recorded as a function of time is shown with the blower turned on and off.

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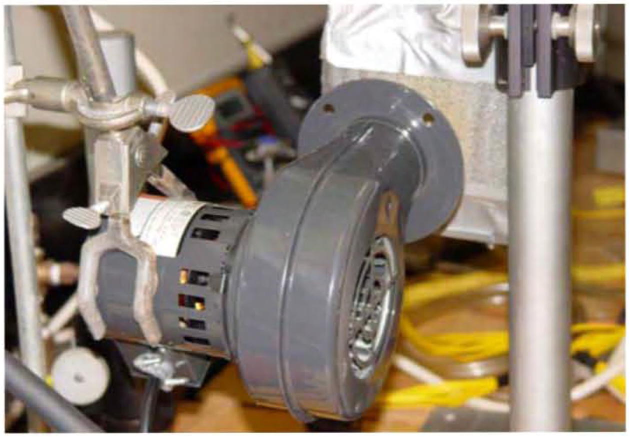

Figure 6. The blower with screens in place used to generate the “low” velocity air flow is shown.

the sonic transmitter and receiver. A more accurate value for the rms would have required measurements with much higher spatial resolution, which were not done.

Velocity measurements such as those shown in Figure 5 were repeated six times over a two month period. The average of the six mean measurements with the fan turned on was 2.53 m/s with individual standard deviations comparable to that for the data in Figure 5. The measured ratios of rms to the average varied from roughly 8 % to 11 %.

A wind speed of 2.5 m/s corresponds to 5.6 mph. It became clear early in the project that lower wind speeds affected the ignition behaviors of fuels placed on the heated plate when compared to cases without wind, and that it was desirable to apply a wind with a lower speed. Instead of generating the lower velocity by controlling the blower output, the velocity was reduced by leaving the flow unchanged and placing a series of four screens with an open aperture of roughly 5.3 cm × 11.4 cm in the flow path. The screens were placed on a holder that could be easily placed into and removed from the blower stream in a repeatable manner by attachment with a clamp to a horizontal rod supported by a vertical mount. Figure 6 shows a photograph of the blower with the screens in place.

The wind speed with the screens in place was measured in the same way described above. Four measurements yielded an average value of 1.1 m/s. The rms values for individual measurements varied from 13 % to 20 %, somewhat higher than observed for the higher speed flow. As discussed above, it is likely that the measurements underestimate the actual fluctuations.

In this report experiments with an applied wind of roughly 2.5 m/s will be referred to as “high wind” cases, while those using 1.1 m/s will be denoted as “low wind” cases. Note that these designations simply refer to the relative magnitudes of the flows used in this study and have no relevance to potential magnitudes of outdoor winds.

3.1.1.3. Wire-Screen Cage

The purpose of these experiments is to characterize the ignition behavior of typical outdoor cellulosic fuels when placed in contact with a heated surface. Common outdoor fuels such as grasses and pine needles consist of small pieces that form porous fuel beds. These materials had to be contained in some manner in order to create fuel beds that could be reproducibly brought in contact with the heated plate. It was viewed as desirable to allow the fuel beds to have free access to air from the sides and top. As a compromise for these competing requirements, the fuels were contained within a cage fabricated from stainless steel wire screen. The screen was formed from wires with a diameter of 0.71 cm and a wire spacing of 0.32 cm.

The wire-screen cage was designed so that the fuel beds would have nominal dimensions of 10.2 cm × 10.2 cm × 2.5 cm when the cage was placed over the heated plate. An open-bottom wire-screen cage was formed by starting with a 10.2 cm-square section of the wire screen that served as the top of the cage and attaching four wire-screen sidewalls with fine wire. Three of the sidewalls had widths of 10.2 cm and depths of 4.2 cm. Two slots that lined up with the threaded heater mounts visible in Figure 2 were cut in each of the two opposed sidewalls. These slots were wide enough to just allow the cage to slide down pass the mounts while the slot depths of 1.1 cm provided an open height above the plate of 2.7 cm when the cage rested on the mounts. The fourth side wall of the cage was formed from a 10.2 cm wide length of screen with a depth of 2.5 cm. When placed on the cage there was a narrow open gap of approximately 0.013 cm between the bottom of the short side wall and the top of the plate.

In order to apply the fuel within the wire-screen cage to the heated plate it was necessary to provide a bottom of the cage that could be removed. The bottom section that served this purpose is shown in place on the inverted wire-screen cage in Figure 7. This section was cut from a 0.008 cm-thick steel plate. The rectangular portion of the plate has dimensions of 10.2 cm ×10.8 cm and was designed to slide between the two deep sidewalls on opposite sides of the cage. The 2.54 cm × 1.27 cm tab on the right side of the bottom section in Figure 7 slides through a slot cut 2.5 cm from the top of the third deep sidewall and rests on top of the short sidewall on the opposite side of the cage. The narrow section on the left side served as a handle that allowed the bottom plate to be slid along the top of the plate and removed to expose the fuel to the plate.

The fuel to be tested was placed in the upside down wire screen cage to a depth of 2.5 cm. The bottom plate was then inserted into the slot as shown in Figure 7. By grasping the handle, the wire-screen cage was carefully inverted and place over the heated plate. The bottom was then rapidly removed by sliding it away from the cage. Note that the bottom plate insulated the fuel from the heated plate until it was rapidly removed, thus providing a well defined time of fuel application.

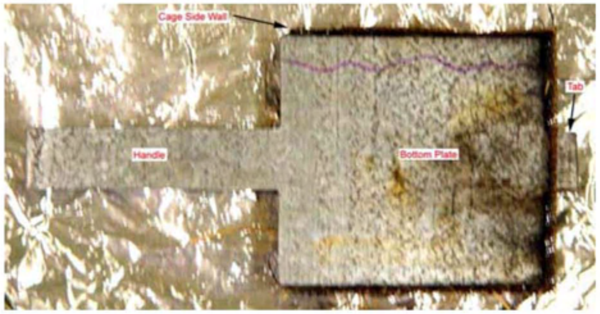

Figure 7. The wire cage with its removable steel-plate bottom in place is shown looking down from above.

It should be noted that the wire-screen cage provided resistance to the air flow into the fuel bed that varied with the velocity passing through the screen. A test with a single flat section of the screen placed upstream of the test plate indicated that the high wind flow velocity was reduced by 32 % by passing through the screen.

3.1.2. Visual Recordings of Ignition Experiments

The principle experimental diagnostic used for the heated plate ignition experiments was videography. Each ignition experiment was recorded using a Sony Model DCR-PC100 mini-DV video camera. The taped results were subsequently analyzed to determine the time when the fuel was placed on the plate and the times when glowing combustion and flaming were observed. Other behaviors such as the location and amount of smoke released could also be tracked. The temperature of the plate was monitored by reading the temperature recorded by the center thermocouple in the plate out loud so that it was recorded on the audio track of the video. Subsequent analysis of the video tape allowed the temperature to be determined as a function of time. Other visual observations were also recorded in this way.

3.1.3. Experimental Procedure

The various fuels investigated during the study are described below. For each fuel the mass of material required to fill the approximately 262 cm^3 volume of the wire-screen cage was determined, and this mass was used for all experiments with that fuel. In filling the cage no attempt was made to order or compress the fuel. The resulting fuel beds were typically loosely packed and porous. The density of the fuel bed was calculated by dividing the fuel mass by the nominal fuel bed volume.

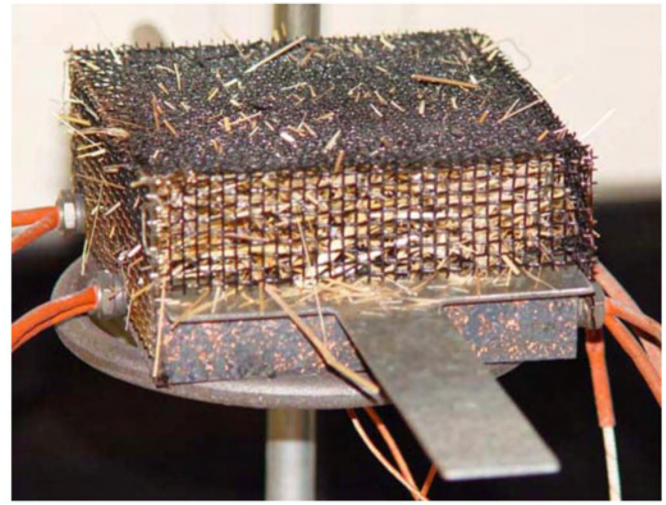

Figure 8. This photograph shows the wire-screen sample cage with its steel-plate bottom in place on top of the heated plate. The cage is filled with cheat grass. The fuel is placed on the plate by withdrawing the bottom of the cage using the handle visible in the photograph.

The pre-determined mass of fuel was then loosely evenly distributed into the inverted wire-screen cage through the open bottom. Once the fuel was distributed, the tab on the plate that formed the bottom of the cage was inserted into the slot in the wire-screen side wall and allowed to rest on the opposite side wall.

The first step in an experiment was to heat the plate to the desired temperature by adjusting the equal currents supplied to each heater by the two power supplies. When an experiment was to be run the camera was first started and identifying information such as the date and test conditions were recorded audibly. The wire-screen cage was then carefully inverted and placed over the heated plate as shown in Figure 8. Within a few seconds the plate was extracted from the bottom of the cage, and the fuel was applied to the plate. If a wind was to be applied, the fan was turned on immediately prior to or just after the application of the fuel.

The application of the fuel and wind changed the heat losses from the plate and adjustments to the currents were required to maintain a constant temperature. For instance, applying the fuel in the absence of the wind typically caused the temperature to increase, indicating that heat transfer to the fuel was more than offset by reduced heat losses from the plate. In this case the currents to the heaters needed to be reduced in order to maintain a constant temperature. On the other hand, applying a wind without adding the fuel caused the temperature to drop due to increased convective heat transfer to the air from the plate surfaces, and it was necessary to increase the currents to maintain a constant temperature.

By trial and error the amount of current change required to maintain a nearly constant temperature for a given fuel and wind condition was determined. As soon as the fuel was applied and the wind (if applicable) was turned on, the current would be manually adjusted to the appropriate level. During the remainder of the experiment the plate temperature would be monitored and small current adjustments would be made as necessary to hold the temperature variation within a small range. The actual current changes were not recorded, but it was noted that there was a correlation between the required current and the behavior of the fuels. For instance, when glowing combustion was observed, it was typical to have to reduce the current slightly in order to maintain the temperature.

Experiments showed that it was normally necessary to reduce the currents substantially when fuels were applied without a wind, relatively small changes in current were required when experiments were done with a low wind, and increased currents were needed when a high wind was used. The changes in temperature were relatively slow, and it was generally possible to hold the recorded temperatures within ± 2 °C. Occasionally larger excursions were observed, but variations were always much smaller than the smallest step size (typically 10 °C) used for plate temperature settings. Figure 9 shows a plot of representative temperature histories recorded for a range of temperature settings and wind condition (none, low, high). Times are generally shorter at higher temperatures since an experiment was halted when flaming was observed or visual observation (e.g., smoke no longer visible) suggested no additional reaction was taking place.

At the conclusion of an experiment the video camera was shut off. At a later time the video tape was replayed in order to record the plate temperature readings as a function of time, ignition times for glowing and flaming combustion, and other experimental observations such as smoke behavior.

3.2. Ignition by Thermal Radiation

Ignition of cellulosic fuels as the result of exposure to thermal radiation was investigated by placing loosely packed samples of the material to be tested in a cone calorimeter operated in a non piloted ignition mode. The exposed surface of the fuel bed was oriented facing upward. The response of the sample to an imposed heat flux was observed while maintaining a constant heat flux. The time required to ignite the fuel was recorded. The dependence of the ignition time on heat flux level for a given fuel was determined by repeating the experiment for a range of imposed heat fluxes. Other parameters available from the experiments, in addition to time to ignition, included time behaviors of heat release rate, mass, and smoke optical density.

3.2.1. Cone Calorimeter

The cone calorimeter is a widely available standard instrument used primarily to measure the heat release rate of small samples when subjected to a uniform radiative heat flux. Heat release rate is measured using the oxygen depletion approach. The cone calorimeter has been adopted

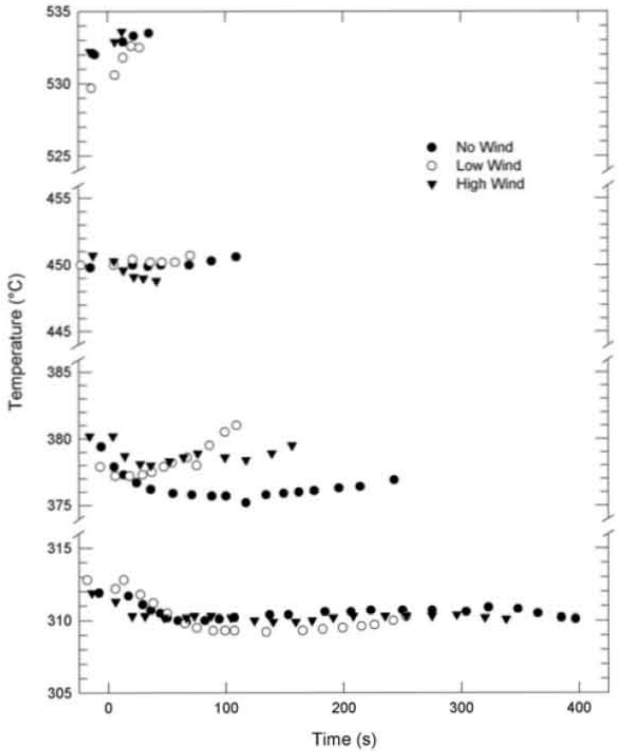

Figure 9. Temperatures recorded during experiments in which cellulosic fuels were place on a heated plate are plotted as a function of time. Zero time is defined as the time when the fuel was exposed to the surface.

as a standard method by ASTM International (ASTM E-1354) [12], the International Organization for Standardization (ISO 5660) [13], and the National Fire Protection Association (NFPA 264A) [14].

While primarily designed for heat release rate measurements, the cone calorimeter can be used to study radiative ignition since it provides a nearly uniform and easily varied source of radiative

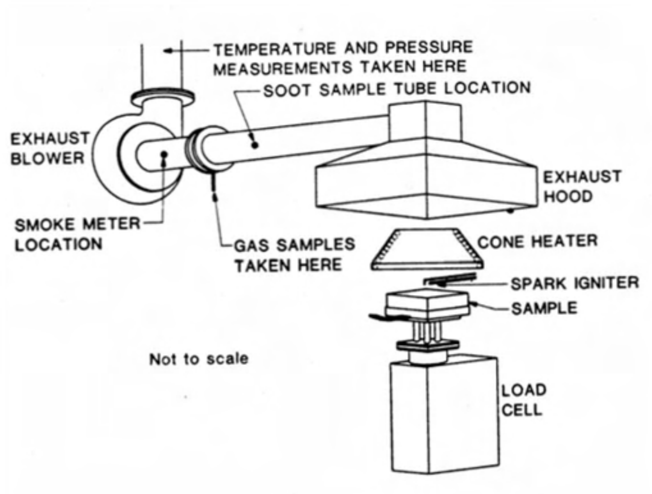

Figure 10. This schematic shows the principal components of the cone calorimeter used to investigate the ignition behavior of cellulosic fuels and polyurethane foam.

heat flux at the sample surface. Babrauskas and Parker describe the use of the cone calorimeter for ignition studies. [9]

Figure 10 shows a schematic diagram of a cone calorimeter. The principal components are a conical resistance heater wound in the form of a truncated cone with temperature control achieved using 3 type K thermocouples as inputs for a controller that automatically adjusts the current supply, cooled shutter to protect the sample before the start of a test, a specimen holder placed on top of a load cell for mass measurement, a spark igniter used for piloted ignition of fuel vapors, a hood and blower driven exhaust system equipped with an orifice plate for velocity measurements, a gas sampling port used to extract gases for oxygen (paramagnetic analyzer) and other molecular species concentration measurement, and a laser system for monitoring smoke obscuration.

The cone calorimeter used for these experiments was manufactured by Atlas Combustion Analysis Systems. It was subsequently modified by replacing the original software for controlling the experiment and performing analysis with software developed by Fire Testing Technology Ltd. The results of measurements include observed ignition times and heat release rate per unit area, sample and sample holder mass, and smoke optical density as a function of time, along with such derived properties as maximum heat release rate, time to maximum heat release rate, total mass loss, effective heat of combustion, etc. The experimental results were imported into spreadsheet files and displayed using a standard plotting software package.

Figure 11. A sample holder used during the radiative ignition experiments is shown filled with fuel.

3.2.2. Experimental Procedure

The experiments were performed while generally following the standard cone calorimeter protocols. Sample sizes were 10.2 cm ×10.2 cm × 2.54 cm and were contained within a sample holder formed from a double-layer of aluminum foil, which was open at the top. Note that unlike the experiments on heated surface ignition, the sides of the sample holder were closed. The sample holders for the plate heating and cone calorimeter experiments were the same size, and the mass of a particular fuel used was also the same. Figure 11 shows one of the sample holders filled with fuel. No external wind was imposed during these measurements, and the only air flow was that induced by the cone calorimeter blower and natural convection from the samples. The separation between the top of the fuel bed and base of the cone was 2.5 cm.

Prior to an experiment the radiative heat flux at the location of the sample was set by adjusting the current to the cone heater until the desired level was measured with a calibrated gauge. At this point the water-cooled shutter was positioned between the cone and the sample area to limit preheating of the sample. After the sample holder and fuel were placed in position and background measurements were completed, the shutter was rapidly removed to expose the sample to the imposed heat flux. This defines time zero. Cone experiments often incorporate a spark igniter above the sample to provide a pilot for the flammable gases that are generated from the fuel. Since the purpose of these experiments was to investigate non piloted ignition, the igniter was withdrawn from above the sample and was not activated during these measurements.

Ignition times were determined visually by noting the appearance of either glowing combustion or flaming. In practice, the measured heat release behaviors also provided good indications for ignition times. An experiment was allowed to continue until obvious changes in fuel appearance were no longer apparent and the time rates of change for mass and heat release rate were small.

3.3. *Fuels Investigated*

A variety of cellulosic fuels including shredded newsprint, four grasses, and pine needles were investigated. In addition, limited measurements were carried out on three types of dried leaves. The ignition behavior of a common plastic fuel, non fire-retarded flexible polyurethane foam, was investigated in the cone calorimeter.

Free moisture absorbed in the fuel is known to be an important parameter for the ignition and burning behavior of cellulosic fuels. No attempts were made to control free moisture, defined as the percentage mass of water relative to the dry material, in this study beyond allowing the fuels to come into equilibrium with the surrounding laboratories, which had nominal temperatures of 20 °C with variable relative humidity that did not exceed 50 %. Free moisture in the fuels was measured using the procedure described by Manzello et al. [22,23] in which the material to be tested is placed in an oven held at 105 °C for three hours and the amount of mass loss quantified. These authors showed that no further changes in mass occurred after 3 hours for these thin fuels.

Several grams of the material were placed in a small tared aluminum pan and weighed to ± 0.0001 g. The pan and grass were then placed in the oven. After three hours the pan was removed from the oven and allowed to cool in a desiccator. The cooled fuel sample and pan was quickly reweighed after removal from the desiccator in order to limit the uptake of moisture by the dried sample. The free moisture percentage was calculated using the following equation,

$$\frac{m_{f,m} - m_{f,d}}{m_{f,d} - m_p} \times 100, \qquad (1)$$

where $m_{f,m}$ is the measured mass of the pan and fuel with moisture, $m_{f,d}$ is the mass of the pan and dried fuel, and m_p is the mass of the empty pan.

3.3.1. Shredded Newsprint

Commercial newsprint was obtained from a local publisher as remnants of large 61.0 cm wide rolls. Measurements with a micrometer at several locations on a small area of the newsprint yielded a thickness of 6.4×10^{-3} cm. Sections of the newsprint were run through a shredder that generated strips that were roughly 0.4 cm wide by 4 cm long. There were substantial variations in the lengths of individual pieces.

Fuel beds were created by loosely packing 6.9 g ± 0.1 g of the shredded newsprint into the wire-screen cage sample holder. Figure 12 shows a photograph of the shredded newsprint in the wire-screen cage.

The free moisture percentage of the shredded newsprint was measured well after ignition testing was completed. Two independent measurements yielded values of 6.2 % and 6.4 %.

Figure 12. Photograph of shredded newsprint in wire-screen cage.

Figure 13. Photograph of May tall fescue in wire-screen cage.

3.3.2. May Tall Fescue Grass

A sample of tall fescue grass (*Festuca arundinacea*) was collected on the NIST campus (GPS location of 39.08.082 N, 77.12.709 W) on May 25, 2006. The site was the outfield of a softball field that was planted in tall fescue about six years ago. The grass had been cut within the past two days. Clippings that had been cut and expelled from the mower and were resting on top of the growing grass were collected. The grass clippings felt dry and light to the touch. The weather over the previous few days had been nearly ideal for drying with no rain, a temperature range of roughly 7 °C to 21 °C, and dew point temperatures on the order of 4 °C.

Spring is a time of rapid grass growth in this region. Significant rain had fallen within the past two weeks. The uncut grass was thick and dark green. As a result of the conditions, the grass had been fairly long when cut, with the clippings having a range of lengths varying from 8 cm to 15 cm. A small amount of the grass was topped with seeds. Even after drying the grass clippings retained a light greenish color. Much of the collected grass consisted of thin blades.

After several weeks of storage in a general purpose laboratory, three independent measurements of free moisture percentage taken over several days yielded values of 12.8 %, 11.9 %, and 13.6 %. These values are typical of those expected when the moisture in the grass has come into equilibrium with air in the surrounding laboratory.

As collected, the tall fescue did not pack well in the sample holders due to its length. Scissors were used to cut bunches of the grass into lengths of 2.5 cm to 5 cm, which were used to form the fuel beds. A mass of 9.0 g of material was found to be adequate for forming a 2.5 cm deep bed when lightly packed into the sample holders. Figure 13 shows a sample of tall fescue grass in the wire-screen cage used for the heated plate experiments. For the remainder of the report these samples will be referred to as “May tall fescue.”

Figure 14. Photograph of August tall fescue in wire-screen cage.

Figure 15. Photograph of cheat grass in cone calorimeter aluminum pan.

3.3.3. August Tall Fescue Grass

A second sample of recently cut tall fescue grass was collected from the same location as the May tall fescue on August 29, 2006. Samples of this grass will be referred to as August tall fescue. Once again, clippings created by mowing were collected from above the uncut grass.

August in this region is typically hot and often dry. Weather records indicate that over the four prior weeks daytime high temperatures ranged from about 27 °C to 38 °C, with lows ranging from 13 °C to 27 °C. The last significant rain had fallen on August 7th.

This grass had a very different appearance than that collected in May. It was tan colored and appeared to consist primarily of stalks as opposed to blades. Its length varied from about 2.5 cm to 7.5 cm, and it could be packed into fuel beds without cutting.

Figure 14 shows a fuel bed formed from 7.0 g of August tall fescue.

The grass felt dry to the touch when collected. A measurement of its free moisture percentage after two days in the laboratory yielded a value of 13.1 %.

3.3.4. Cheat Grass

Figure 15 shows one of the samples of cheat grass in an aluminum pan. Cheat grass (*Bromus tectorum*) is an invasive plant introduced into the United States in the 1890s. It has subsequently spread widely across the western United States. Cheat grass is a winter grass, growing rapidly in late winter and spring. In summer it dies off, leaving a dried grass that is widely regarded as highly flammable and a major contributor to wildland fires.

Figure 16. A photograph showing an uncut sample of cheat grass

The cheat grass for this investigation was provided by researchers from the United Stated Department of Agriculture, Agricultural Research Service Laboratory in Reno, NV. The grass was collected in the Honey Lake Valley of northeastern California (GPS coordinates 40.08.291 N, 120.04.672 W) on July 19, 2006 and shipped to Gaithersburg, MD. During the week prior to collection high temperatures were around 38 °C with relative humidity below 10 %.

Figure 16 shows a portion of the cheat grass as received. The grass was cut near its base and had heights on the order of 45 cm. The grass felt dry to the touch and was golden in color. It consisted of very slender stalks topped with branching seed structures known as panicles. The free moisture percentage of a sample of the grass was measured to be 11.2 %.

As received, the grass could not easily be packed into the fuel beds. The grass was cut into lengths of 2.5 cm to 5 cm using scissors. No special care was taken to isolate the stalks and panicles, and both were present in the fuel beds. A mass of 8.0 g was sufficient to fill the sample holders.

3.3.5. Fine Florida Grass

A grass sample collected at a lawn mower manufacturer's test site near Tampa, FL was provided for the study. The grass had been removed from the tops of mower decks and was intended for testing the debris that collects on mowers. The sample had been collected at least a year earlier and was stored in bags under dry conditions. The grassy material was cut finely and felt fluffy when unpacked, having a consistency similar to sawdust. The material was brown in color. No additional information was available, including the type of grass that had been cut or weather conditions. This material will be referred to as fine Florida grass.

An 8.0 g sample of the fine Florida grass just filled the wire-screen cage. Figure 17 shows a photograph of the cage filled with fire Florida grass. Two measurements of fuel moisture percentage recorded well after the ignition experiments were completed yielded values of 10.1 % and 9.6 %.

Figure 17. Photograph of fine Florida grass in wire-screen cage.

Figure 18. Photograph of pine needles in wire-screen cage.

3.3.6. Pine Needles

Pine needles were obtained from a commercial operation (Florida Pine Straw Company of Mayo, FL) that distributes pine needles for use as mulch. These needles come from loblolly pine trees (*Pinus taeda*). They are collected by machines that sweep up pine needles that have fallen to the ground. They were delivered in bales that were opened and left exposed to the laboratory.

The pine needles were dark brown and dry to the touch. The fuel moisture was measured to be 13.7 %. They had lengths that generally varied from 15 cm to 23 cm with rectangular cross sections having rough dimensions of 0.5 mm × 1.4 mm (dimensions were highly variable). Individual needles were brittle and easily broken. Often two or three pine needles were connected together at their base by a needle sheath, forming a fascicle. Since the needles were typically too long for the sample holders, they were cut into lengths between 2.5 cm and 5 cm using scissors for testing purposes. No attempt was made to separate the sheaths from the needles. Small debris, most often small pieces of pine wood, was removed when encountered.

The cut pine needles formed a dense bed, with 16.0 g used to fill the sample holders. Figure 18 shows a photograph of a bed of pine needles in the wire-screen cage.

3.3.7. May Tall Fescue/Pine Needle Mixture

A mixture of May tall fescue grass and pine needles was tested using materials processed as described above. The masses required to fill the cage for the grass (9 g) and pine needles (16 g) were quite different. The masses of each required for the mixture were calculated for a 50 %/50 % mixture by mass assuming the volumes of each component would be independent of mixing. The result was 5.8 g for a total mass of 11.6 g, with grass making up 64 % of the volume and the pine needles 36 %. The two materials were weighed independently and then mixed by hand until

Figure 19. Photograph of the May tall fescue/pine needle mixture in the wire-screen cage.

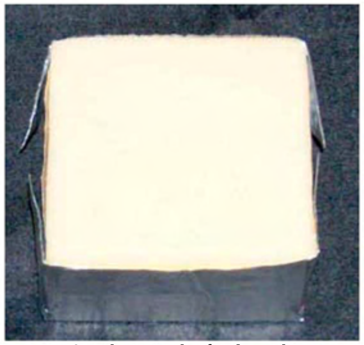

Figure 20. Photograph of polyurethane in a cone calorimeter sample holder.

they appeared to be evenly distributed. The mixture was then placed in the wire-screen cage. Figure 19 shows a photograph of the resulting mixture.

3.3.8. Preliminary Tests with Leaves

A limited number of heated-plate experiments were done using leaves collected locally. These included leaves from boxwood (*Buxus*), American elm (*Ulmaceae Ulmus Americana*) and pin oak (*Quercus palustris*).

3.3.9. Polyurethane Foam

Flexible polyurethane foam was tested in the cone calorimeter. The samples were obtained from a commercial supplier and were not fire retarded. The exact composition of the material is not known. The sample thickness was 5.1 cm. Sample masses varied over a range of 11 g to 12 g. Figure 20 shows a photograph of a sample of the polyurethane surrounded by the aluminum foil used as the holder for the cone experiments.

3.3.10. Fuels Summary

Table 1 includes the mass used, nominal density, and measured moisture content for all of the fuels used during the current investigation. Missing data represent cases for which the amount of fuel available was limited or measurements were not made.

Table 1. Summary of Fuels, Sample Mass Used, Nominal Fuel Bed Densities, and Measured Fuel Moisture

Fuel	Sample Mass (g)	Nominal Density (g/cm^2)	Fuel Moisture (%)
Shredded Newsprint	6.9	0.026	6.2 6.4
May Tall Fescue	9.0	0.034	12.8 11.9 13.6
August Tall Fescue	7.0	0.027	13.1
Cheat Grass	8.0	0.031	11.2
Fine Florida Grass	8.0	0.031	10.1 9.6
Pine Needles	16.0	0.061	13.7
May Tall Fescue/Pine Needle Mixture	11.6	0.044	--
Boxwood Leaves	8.0	--	--
American Elm Leaves	5.5, 5.5	--	--
Pin Oak Leaves	6.0, 9.4	--	--
Polyurethane Foam (5.1 cm thickness)	11 to 12	0.042 to 0.046	--

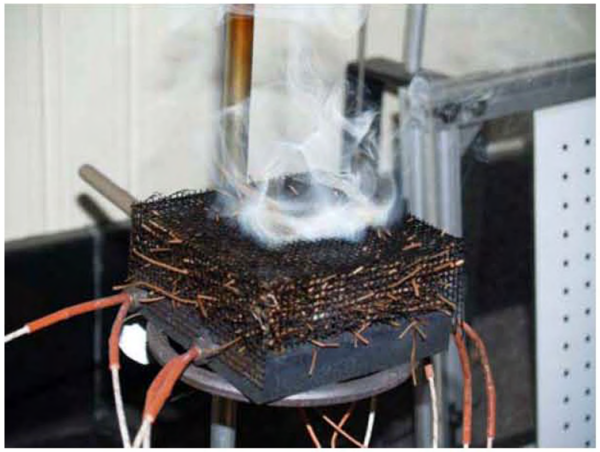

Figure 21. The smoke plume rising from a pine needle fuel bed in contact with the heated plate held at a temperature of 380 °C is shown 213 s after application.

4. Results

4.1. Some General Observations from Heated Plate Ignition Studies

A variety of qualitative observations provide insight into the characteristics and response of the porous fuel beds when placed on a heated plate. First, cases without an applied wind will be discussed. This will be followed by observations when low and high winds were used.

When the temperature of the heated plate was high enough, all of the fuels tested generated a white “smoke” that would flow from the top of the fuel bed. The composition of the smoke is unknown, but it is likely that it contained varying proportions of condensed water vapor and organic pyrolyzate. At times, particularly after it first appeared, the smoke would rise from localized sections of the fuel bed surface. More commonly, the smoke would appear over a large fraction of the surface area. In the latter case, the smoke immediately above the fuel bed typically assumed a circular shape such that there was a smoke-free area around the perimeter of the square fuel surface. Above the surface, the smoke would rise and its area would decrease so that the smoke near the surface adopted a conical shape. As the smoke moved further away from the plate it would develop the fluctuating shape characteristic of a buoyancy-dominated fluctuating flow. Figure 21 shows an example of this type of smoke flow for a bed of pine needles placed on the plate held at 380 °C.

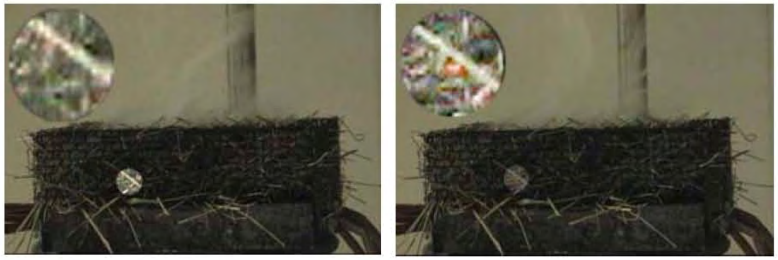

Figure 22 Two frames taken one second apart from a video of a hot surface ignition experiment with May tall fescue are shown. A small area of glowing combustion had appeared during the one second period (compare the blown up areas prior to (left) and after (right) ignition).

The appearance of smoke at the top surface of a fuel bed indicates that the bed is porous to the buoyant flow of heated gases generated within the bed by contact with the heated plate and any heat release taking place within the fuel bed. The characteristic shape of the smoke at the fuel surface suggests that the buoyant flow within the bed acts much like a buoyant plume in open air, entraining air radially inward that has passed through the sides of the fuel bed.

The amount of smoke released from a fuel bed (qualitative description, estimated visually) varied widely with time, the fuel tested, and plate temperature. The level of smoke observed ranged from just barely visible to quite heavy as seen in Figure 21. It was clear the smoke density was related to the amount of fuel pyrolysis that was taking place. Particularly for the lower plate temperatures where relatively long periods were required for glowing combustion and/or flaming to appear, the smoke would tend to increase with time, becoming quite heavy before glowing or flaming appeared.

During the experiments, the times for the appearance of glowing combustion and flame were noted visually and recorded audibly on the video tape. The times were determined a second time based on a visual review of the video tape. The video camera used for the investigation responds to light in the near infrared, and was particularly useful for detecting the onset of glowing combustion as long as it is not hidden from view within the fuel bed. For experiments without an applied wind, glowing combustion was usually observed on the video tape before it was seen visually. The sensitivity possible using the video camera is demonstrated in Figure 22, which compares two frames taken one second apart from a video of an ignition experiment for May tall fescue with a plate temperature of 381 °C and no wind applied. The appearance of the glowing combustion is easily identified by comparing the two enlarged areas. Glowing combustion would generally appear at a small single point in the fuel bed and then spread to cover larger areas.

The glowing combustion was not generally hidden within the fuel bed for cases without an applied wind because there was a high likelihood that it would appear on the side of the fuel bed facing the camera. The most likely reason for this side to be favored was the narrow open slit

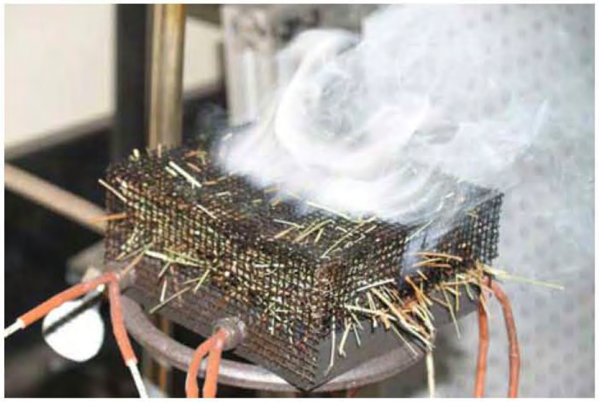

Figure 23. The smoke generated by a mixture of May tall fescue and pine needles applied to the heated plate at 380 °C in the presence of a low wind is shown 175 s after application.

between the heated plate and the base of the wire-screen sidewall. As discussed earlier, smoldering development is very dependent on the amount of oxygen reaching the fuel surface. Apparently, the small slit allowed more air to enter the cage from this side than passed through the screens on the other three sides, with the result that the initial surface heating required to ignite glowing combustion was more likely near the slit. The practical effect of this preference is likely a short decrease in the time required for glowing combustion to develop compared to that which would have been observed if the screen wall extended below the heated plate.

The observations changed substantially when a wind was applied. For both low and high wind cases, smoke that came from the top of the fuel bed tended to lie along a narrow band oriented perpendicular to the flow direction. Figure 23 shows an example of this behavior for the May tall fescue/pine needle mixture with a plate temperature of 380 °C and a low wind applied. This photograph was taken 175 s after the fuel was placed on the plate. Note that the band of smoke across the top of the fuel bed also extends down the side of the cage.

While the amount of smoke generated varied with fuel type, surface temperature, and time after fuel application, the formation of a smoke band was normally observed with an applied wind. The location of the smoke band relative to the upstream edge would often shift somewhat during an experiment. It was also observed that for a given fuel type, the band would be located further downwind for the higher wind case. The upstream edge of the band tended to appear anywhere from upstream of the center of the fuel bed to locations reaching at least 4/5 of the way across from the upstream side.

As the wind passed through the upstream side of the wire-screen cage, it was certainly attenuated in the manner shown experimentally above. The porous fuel bed would slow down the air flow further. It is the interaction of this attenuated wind with the buoyant flow rising from the heated plate and fuel that leads to the formation of the smoke band. The higher velocity flow is able to penetrate further, thus explaining the downstream shift observed for the higher wind velocities.

The presence of an air flow also affected observed ignition behaviors. The wind causes two competing effects that can affect surface ignition. On one hand, the flow convectively cools the fuel and reduces fuel surface reaction rates. On the other hand, it substantially increases the amount of oxygen reaching the fuel surface, which enhances surface reaction rates. For most of the experiments described below, the latter effect was dominant since both glowing and flaming combustion appeared at locations towards the upstream sides of the fuel beds.

One result of applying a wind was to slightly increase uncertainties associated with measurements of glowing ignition time. Unlike for no-wind cases, glowing ignition was often observed at locations well away from the fuel bed side facing the camera. This is another indication that wind is enhancing surface reactions, since it suggests it is overwhelming the effect of increased air flow through the narrow gap in the wires-screen cage on the camera side. The nascent ignitions with a wind were often hidden from the camera by the fuel bed, and it was common for the earliest observation of glowing combustion to be made visually by the observer. This effect is likely exacerbated when the ignition is location further within the fuel bed away from the observer. It is difficult to estimate how much earlier glowing combustion may have been present before it was detected, but it is likely to have involved relatively short periods since glowing combustion tended to spread rapidly in the presence of a wind, making it more apparent to both the observer and the video camera.

Once glowing combustion appeared, it tended to spread more rapidly and become more intense than in the absence of wind. Generally, the glowing would move downstream away from the location where it was first observed. Often a band of unburned fuel was observed along the upstream edge of the bed. Strong temporal oscillations in glowing intensity with periods on the order of a few seconds were frequently observed. It was unclear if these oscillations were due to variations in the wind velocity or some instability associated with the combustion behavior.

Some qualitative observations concerning the development and behavior of glowing combustion and the transition to flaming both with and without wind are relevant. Glowing combustion tended to appear at isolated small areas, here referred to as pinpoints, similar to those visible in Figure 22. In the absence of a wind the glowing pinpoints could usually be observed moving slowly over individual pieces of fuel. This seems to imply that glowing combustion is a distinct process from non glowing combustion that is self sustaining. As noted above, glowing is generally believed to be due to surface oxidation of char that had been formed by earlier fuel pyrolysis.

In the presence of a wind, the intensity of glowing was enhanced substantially and at times would appear to be more wide spread than the pinpoints typically observed without wind, with glowing over longer lengths of individual fuel elements.

A glowing fuel element appeared to be capable of inducing glowing in nearby fuel elements. As a result glowing combustion usually spread away from locations where it was initially noted. In this way volumes of glowing combustion would develop. Since the number of glowing fuel elements was increasing, the amount of heat release associated with glowing would increase during these glowing periods.

In numerous experiments the transition to flaming was captured on video. A blue flame would appear over a small volume within the fuel bed and then spread rapidly to other locations. At times, these flames moved with speeds on the order of tens of cm/s. The location where the initial flame appeared was always surrounded by an area of extensive glowing. Within a short period of time yellow flames would appear, and the flaming became self sustaining.

The observations concerning transition to flaming suggest that gaseous combustion developed in regions within the fuel beds where a flammable premixed gaseous fuel/air mixture had accumulated and eventually ignited. A rapidly spreading blue flame is characteristic of a premixed flame. The gaseous fuel was generated by pyrolysis of the solid fuel and mixed with air diffusing or flowing into the fuel bed. The initial rapid spread of the flames indicates that flammable mixtures were present over extensive volumes. Heat and/or free radicals are necessary to ignite a premixed fuel/air mixture. The fact that ignitions were observed in areas of intense glowing suggests that sufficient heat was present to ignite the locally flammable gas mixture. While not conclusive, the observation that transition to flaming occurred in areas of intense glowing suggests that glowing is required to ignite flaming in these pyrolyzing fuel beds.

Once a premixed flame developed, the increased heat release rate rapidly pyrolyzed additional fuel, which then burned as a diffusion flame. The appearance of yellow flames, due to soot formation and subsequent irradiance from within the flame, is indicative of diffusional flame burning.

4.2. Shredded Newsprint

Both heated plate and cone calorimeter ignition experiments were done for this fuel.

4.2.1. Heated Surface Ignition Results

Figure 24 shows heated-plate results for the times required for the onset of glowing combustion and flaming as functions of surface temperature and wind condition for shredded newsprint. The symbols and protocols used in this figure will be used throughout the remainder of the report. The wind condition is indicated by both symbol and color as follows: no wind—red circle, low wind—green square, and high wind—blue triangle. Filled symbols represent results for glowing combustion, while open symbols are used for the onset of flaming. As the temperature was lowered, temperatures were eventually reached where neither glowing combustion nor flaming were observed after long periods. These experiments were allowed to proceed until it became clear (no indication of additional reaction) that ignition was unlikely. Instead of showing the actual experimental times, these results are indicated by plotting the appropriate filled symbol near the upper temperature axis.

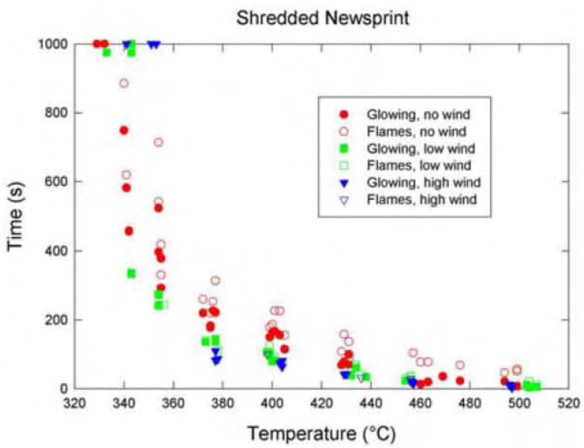

Figure 24. Ignition times for glowing combustion and flaming are shown as a function of temperature for shredded newsprint fuel beds applied to a heated plate. Results are included for no wind, low wind, and high wind cases.

While there is some scatter in results, clear trends emerge from the measurements shown in Figure 24. As expected, the times required for the appearance of glowing combustion and flaming increased as the plate temperature decreased, with data for all of the conditions falling on well defined curves. For temperatures around 500 °C glowing ignition appeared within a few seconds. With a wind applied the glowing combustion rapidly transitioned to flaming, while periods ranging from 26 s to 50 s were required when no wind was present. The time required for the appearance of glowing combustion increased to more than 400 s at temperatures around 340 °C. One of the three tests around this temperature did not transition to flaming, but the other two did, requiring 38 s and 137 s after glowing first appeared. A review of the data shows that for the 30 experiments where glowing was observed without an applied wind, only four failed to transition to flaming. These four had heated plate temperatures of 342 °C , 375 °C, 429 °C, and 469 °C. The wide temperature range suggests that the failure to transition was somehow dependent on a property of the fuel and not directly related to the surface temperature.

For temperatures between 380 °C and 500 °C the effect of applying a wind was to reduce the times required for glowing ignition to appear as compared to cases without wind. These reductions approached 50 % for the lower part of this temperature range. The reductions were greater with a high wind than with a low, though the reductions were smaller than those between the no-wind and low-wind cases.

The time required for transition to flaming was much shorter with wind applied than for the no-wind cases. In all cases with an applied wind, if the shredded newsprint began to glow, it transitioned to flaming in a short period of time.

When the heated plate temperature was lowered to around 350 °C glowing combustion was no longer observed in the presence of the high wind, but ignition still occurred for the low wind and no wind conditions. Even though glowing combustion did not develop, there were indications that some pyrolysis of the fuel did occur. Smoke was observed rising from the fuel bed within a few seconds of being placed on the plate. However, after a short period of time the smoke died off, and there was no additional indication of reaction.

As a test, when it was apparent that no further visual signs of reaction were present, the wind was turned off with the fuel bed still on the plate during one of the tests around 350 °C. The fuel began to smoke immediately, and flames appeared quickly when the wind was turned back on after two minutes. These observations indicate that for plate temperatures around 350 °C the high wind within the fuel bed convectively cooled the fuel to a point where it could not sustain glowing combustion.

As the plate temperature was lowered from around 350 °C to around 340 °C, a similar behavior was seen with low wind flows, with only one of the three tests igniting at the lower plate temperature. As for the high-wind cases around 350 °C, the fuel bed began to smoke again when the wind was turned off. In one case, glowing combustion was observed when the wind was turned back on after a couple of minutes.

Shredded newsprint placed on the heated plate at 333 °C and exposed to the low wind also failed to develop glowing combustion, but light smoke did appear shortly after the fuel was applied and then dissipated and died off. Figure 25 shows photographs of the bottom and top of this fuel bed after removal from the plate. Inspection shows that the shredded newsprint was heavily blackened on the downwind side of fuel bed base and that there was a light brown band evident across the top of the fuel bed perpendicular to the wind flow about ¾ of the way across the bed from the upstream edge. The absence of blackening on the upstream portion of the fuel bed base provides additional support that the air flow cooled the fuel sufficiently that pyrolysis could not take place, while further downstream the cooling prevented the development of smoldering from the pyrolysis region in immediate contact with the heated plate. The brown band on the top is located at the location where smoke was observed coming from the fuel bed. It may be due to either deposited smoke coming from below or light pyrolysis of the fuel by the heated wind-driven plume passing through the fuel bed.

At temperatures around 340 °C glowing combustion was observed for all three experiments run without an applied wind. There was considerable scatter in the times required for glowing to appear. When the temperature was lowered an additional 10 °C glowing combustion did not develop, even though some smoke was released and blackening of the fuel bed base occurred. This blackening is evident in Figure 26, which shows the bottom and top of the shredded newsprint after removal from the plate held at 332 °C. The blackened newsprint extends across the bottom of the fuel bed except for the outer edges. On the top there is a roughly circular area that is browned. The degree of darkening and the diameter of the circle were found to increase

Figure 25. Bottom (left) and top (right) views of a shredded newsprint fuel bed are shown after the fuel was removed from the heated plate held at 333 °C with a low wind applied. Glowing combustion was not observed.

Figure 26. Bottom (left) and top (right) views of a shredded newsprint fuel bed are shown after the fuel was removed from the heated plate held at 332 °C with no wind applied. Glowing combustion was not observed.

with fuel depth. Similar to the low wind case, this behavior suggests that the browning resulted from soot deposition from or light pyrolysis due to the thermal plume within the porous fuel bed. These images reveal that even though the plate surface temperature was high enough to cause some pyrolysis of the fuel in immediate contact, it was insufficient to allow self-sustained smoldering to develop and did not provide sufficient heat to ignite glowing combustion.

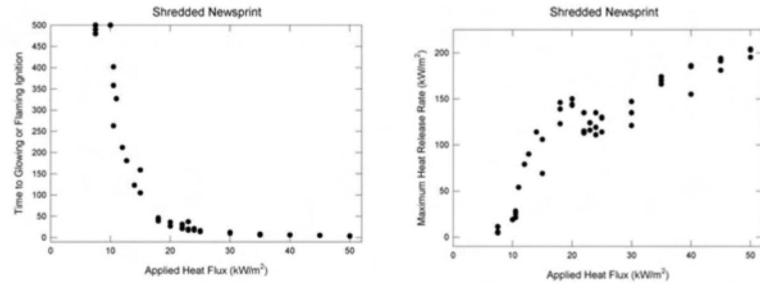

Figure 27. Values of time to glowing or flaming ignition and maximum observed heat release rate are plotted as functions of applied heat flux for shredded newsprint fuel beds.

4.2.2. Radiative Heating Ignition Results

The ignition behaviors of shredded newsprint fuel beds subjected to various applied heat flux (AHF) levels of thermal radiation were characterized using the cone calorimeter. The most direct indicator of ignition behavior dependence on AHF is the time required for flaming ignition. Figure 27 summarizes the time to glowing or flaming observations for shredded newsprint. Neither glowing nor flames appeared with very low AHFs. These experiments are indicated by the values plotted near the upper AHF axis, actual experimental times were usually longer. The heat release rate (HRR) behavior is widely considered the most important fuel flammability parameter. Maximum observed HRRs are plotted as a function of AHF in Figure 27.

For AHFs ranging from 20 kW/m^2 to 50 kW/m^2 times to ignition decreased slowly from about 20 s to around 4 s with increasing AHF. For AHFs below 20 kW/m^2 ignition times began to rise rapidly with decreasing AHF, approaching 350 s for 11 kW/m^2. Flaming ignition did not occur for AHFs around 10 kW/m^2, but glowing ignition was observed, requiring between 250 s and 400 s. Glowing combustion was not observed when the AHF was decreased to 7.5 kW/m^2.

Maximum HRRs showed a comparable dependence on AHF. For AHFs between 20 kW/m^2 and 50 kW/m^2 maximum HRRs increased slowly with increasing AHF. This is the expected behavior and is commonly observed in cone calorimeter experiments since the rate of fuel pyrolysis is expected to decrease at lower AHFs. For AHFs below 20 kW/m^2 the maximum HRRs dropped faster, approaching the noise floor of the experiment for an AHF of 7.5 kW/m^2.

Additional details concerning the response of shredded newsprint to a radiative heat flux can be obtained by considering the time behaviors of the HRR and mass loss behavior. Figure 28 shows plots of these variables as a function of time for three experiments with AHFs of 50 kW/m^2. The results show that the HRRs began to increase immediately, reaching maximum values in 16 s, while the samples mass loss began with the application of the heat flux. These observations are

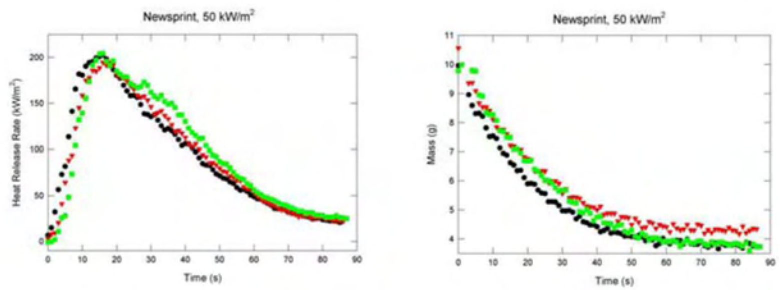

Figure 28. Heat release rates and sample masses are plotted as a function of time for three experiments with a 50 kW/m^2 heat flux applied to shredded newsprint fuel beds.

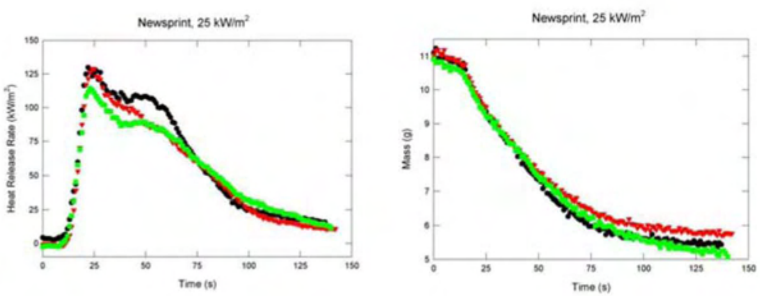

Figure 29. Heat release rates and sample masses are plotted as a function of time for three experiments with a 25 kW/m^2 heat flux applied to shredded newsprint fuel beds.

consistent with rapid flaming observed with this AHF. Most of the samples HRR and mass loss were complete after 90 s.

Three similar plots are shown in Figure 29 for an AHF of 25 kW/m^2. The major difference between Figure 28 and Figure 29 is the presence of substantial induction periods lasting approximately 11 s for the 25 kW/m^2 AHF cases during which there were low mass loss rates and extremely low HRRs. The absence of a measurable HRR during the induction periods indicates that oxidation and heat generation were not occurring even though fuel moisture removal or slow non oxidative pyrolysis, indicated by the mass loss, was taking place. Once oxidation and heat release began, as evidenced by a measurable HRR, the HRR grew rapidly, and flaming was observed within a short period of time, similar to the behavior observed with the 50 kW/m^2 AHFs. This suggests that once smoldering, and likely glowing combustion, developed there was a rapid transition to flaming.

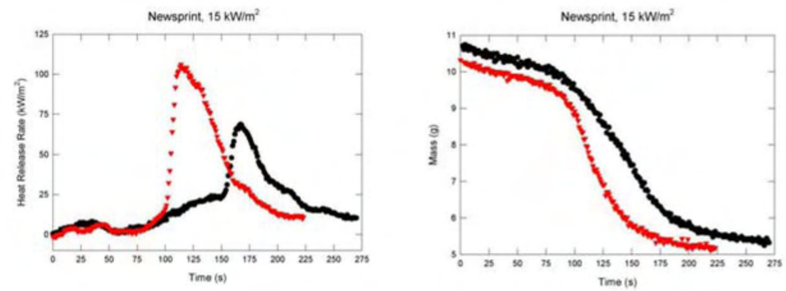

Figure 30. Heat release rates and sample masses are plotted as a function of time for two experiments in which a 15 kW/m^2 heat flux was applied to shredded newsprint.

Figure 30 shows similar plots of HRRs and sample masses for two experiments with an AHF of 15 kW/m^2. The observed data differ markedly from those with higher AHF values described above. As for an AHF of 25 kW/m^2, there is an induction period following the application of the heat flux during which mass loss is observed, but there is no measurable HRR. For 15 kW/m^2 this period lasted about 75 s. After this time the HRR began to increase slowly for both experiments, and there is a marked increase in the mass loss rate. The relatively small values and initial slow growth of the HRRs suggest that smoldering had developed and was spreading within the fuel beds.

The two experiments had different behaviors once smoldering developed. For one, the HRR seemed to grow more quickly, and there was a distinct transition to flaming roughly 25 s after smoldering developed that resulted in a sudden large increase in HRR by nearly 100 kW/m^2, with a substantial increase in the mass loss rate at the same time. For the second experiment the smoldering phase lasted much longer (roughly 75 s), and the HRR due to smoldering was much higher. When flaming did develop around 150 s, the HRR increase and overall peak values were considerably reduced compared to the other case. Apparently, the longer smoldering time resulted in a reduction in the rate of fuel pyrolysis during flaming as well as the fuel available to support flaming. The mass loss behavior also reflects this difference, and the mass loss rate was lower during flaming for the second experiment.

For AHFs as low as 11 kW/m^2 the HRR and mass behaviors were similar to those in Figure 30. For 11 kW/m^2 there was an induction period that lasted roughly 200 s, followed by a period of smoldering during which the HRR and mass loss slowly increased with time, followed by a short flaming period that appeared roughly 125 s after smoldering first started. It is the sum of the induction period followed by the smoldering period that combine to give the observed flaming ignition times.

As seen in Figure 27, flaming ignition was not observed for AHFs of 10.5 kW/m^2 or less. HRR measurements with AHF around 10 kW/m^2 did show that there was still an induction period during which mass loss took place, but there was no measurable HRR. The induction period was

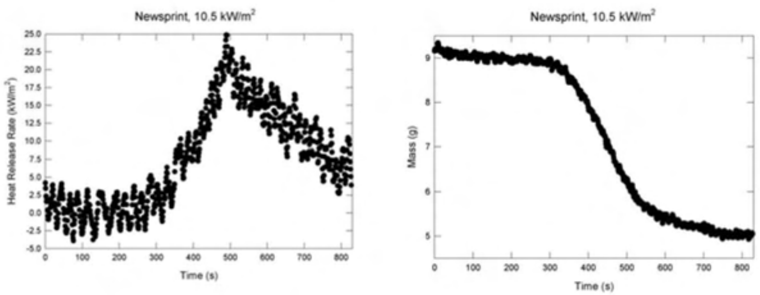

Figure 31. Heat release rates and sample masses are plotted as a function of time for an experiment in which a 10.5 kW/m^2 heat flux was applied to shredded newsprint.

followed by a period during which smoldering developed and was marked by an initially increasing HRR and accelerated mass loss rate. Figure 31 shows an example of this behavior with an AHF of 10.5 kW/m^2. Note that nearly 300 s was required for smoldering to develop.

When an AHF of 7.5 kW/m^2 was used there was a very small amount of mass loss immediately following the application of the heat flux. After this, the mass no longer changed. The HRR remained very close to zero over a 600 s period.

Figure 32 shows the appearance of a newsprint fuel bed after applying 7.5 kW/m^2 for several minutes. There is some light browning on the top of the bed, but no indication of a self-sustained reaction. The non uniform browning may be associated with small spatial variations in the heat flux from the cone heater or to variations in cooling associated with natural flow from the heated fuel surface.

4.3. May Tall Fescue

Both heated plate and cone ignition experiments were done for this fuel.

4.3.1. Heated Surface Ignition Results

Figure 33 summarizes the temperature dependence of the times required for glowing combustion and flaming following the application of May tall fescue fuel beds to the heated plate. The most striking feature of the data is the nearly complete absence of flaming combustion. For the 28 cases in which glowing combustion was observed, only three resulted in flaming. It should be noted that even though a transition to flaming did not occur, the glowing combustion could be quite intense, particularly with an applied wind. When flaming did appear, it was weak and short lived. There is no apparent temperature dependence for whether flaming occurred or not. The flaming behavior for May tall fescue contrasts with that found for shredded newsprint, where

Figure 32. Photograph of the top surface of a shredded newsprint fuel bed following application of a 7.5 kW/m^2 heat flux.

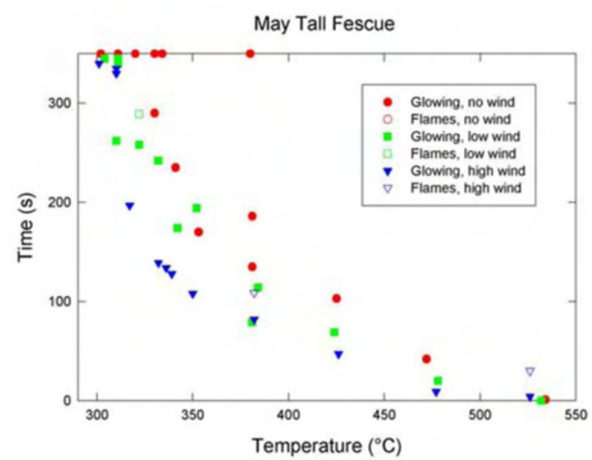

Figure 33. Ignition times for glowing combustion and flaming are shown as a function of temperature for May tall fescue grass fuel beds applied to a heated plate. Results are included for no wind, low wind, and high wind cases.

flaming combustion took place in nearly every experiment in which glowing combustion was observed.

Even though there is scatter in the glowing combustion data, it is clear that the times required for ignition fall on three distinct bands corresponding to no wind, low wind, and high wind conditions. The times required for ignition increased from near zero around 525 °C to periods approaching 300 s for temperatures around 325 °C. Similar to observations for the shredded newsprint, the ignition times for a given temperature decreased with increasing wind. Unlike for the shredded newsprint, the largest reductions occurred on going from low wind cases to high wind cases.

The proportional change in going from no wind to low wind seems smaller than for the shredded newsprint. At the lower temperatures the reduction in ignition times on going from no wind to high wind appears to be greater than a factor of two for the grass.

There are other differences between the May tall fescue and shredded newsprint results. Even though the shredded newsprint transitions to flaming much more readily than the grass, the May tall fescue seems to smolder more easily. This can be seen by comparing times required for glowing combustion at a given temperature, which are generally lower for the grass, and noting that glowing combustion develops for lower plate temperatures (as low as 310 °C) than for the shredded newsprint (as low as 340 °C).

Another difference between the shredded newsprint and May tall fescue concerns the lowest temperatures for which smoldering or flaming was observed for the three wind conditions. For newsprint, combustion appeared at lower plate temperatures as the wind was decreased, with the lowest temperatures capable of igniting the newsprint being observed for the no-wind condition. The opposite is true for the data shown in Figure 33, with the lowest ignition temperatures observed with wind present. This observation suggests that for the low temperature end of the surface ignition curve the development of glowing combustion for May tall fescue is more sensitive to the amount of air supplied to the fuel surface than is shredded newsprint, since the additional air effectively counteracts the additional cooling resulting from the air flow.

The appearance of the fuel beds following an experiment provides additional insights into the importance of air flow on the reaction behavior of the May tall fescue fuel beds. Figure 34 shows bottom and top views of a fuel bed that had developed glowing combustion after being placed on the heated plate held at 341 °C without an applied wind. It is clear that the smoldering spread through the entire bed. There is a narrow region of unburned fuel around the three edges of the fuel bed with wire-screen extending below the plate. No unburned fuel is evident on the side of the cage with the narrow open slit at the base of the wire-screen side wall. In fact, the remaining fuel at this location seemed to be grayer, suggesting more complete combustion. These observations agree with the earlier discussion that the air inflows on the cage side wall with the open slit differs from that through the sides with full wire-screen sidewalls.

Figure 35 shows photographs of the bottom and top of a fuel bed following removal from the heated plate held at 336 °C with a high wind applied. Glowing combustion was observed at

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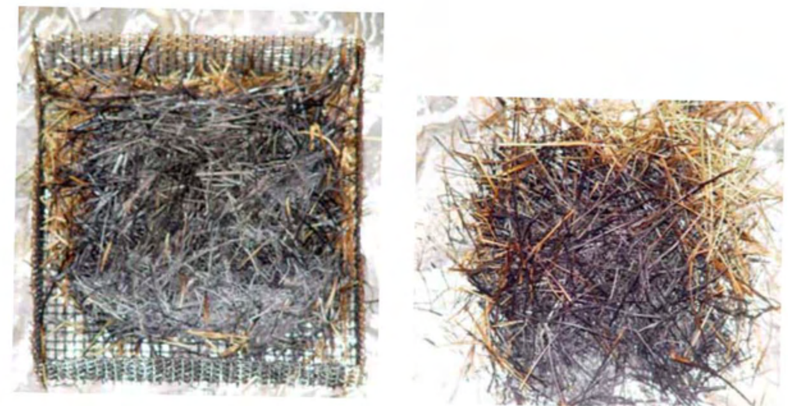

Figure 34. Bottom (left) and top (right) views of a May tall fescue fuel bed are shown after the fuel was removed from the heated plate held at 341 °C with no wind applied. Glowing combustion was observed after 235 s.

Figure 35. Bottom (left) and top (right) views of a May tall fescue fuel bed are shown after the fuel was removed from the heated plate held at 336 °C with a high wind applied. Glowing combustion was observed after 134 s.

134 s following application to the plate and was allowed to proceed for a period of time. The effects of the air flow are marked. The fuel bed has three distinct bands that run perpendicular to

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Figure 36. Bottom (left) and top (right) views of a May tall fescue fuel bed are shown after the fuel was removed from the heated plate held at 311 °C with no wind applied. Glowing combustion was not observed.

the wind direction and extend from the top to the bottom of the bed. There is an area of unburned grass on the upstream side of the bed. Apparently, cooling associated with the air flow was sufficient to prevent propagation of the glowing combustion into this area. Near the center there is a grayish area indicating more complete combustion. This is likely the result of more intense reaction due to a greater availability of air. On the downstream side of the fuel bed the tall fescue is simply blackened, suggesting incomplete reaction of the fuel. This type of burning pattern is typical of those observed with an applied wind, but with the low wind the unburned upstream portion was narrower, and the gray band was located closer to the upstream edge.

It was noted above that glowing combustion for the May tall fescue was not observed below 340 °C in the absence of a wind. However, the appearance of the fuel beds following exposure to the heated plate at lower temperatures indicates that non glowing smoldering was still taking place at much lower plate temperatures. Figure 36 shows the bottom and top of a fuel bed that was held at 311 °C without an applied wind. The bottom of the fuel bed is heavily blackened across its entire extent. On the top there is circle of similar blackened material surrounded by a band of unburned grass. Such blackening is not expected in the absence of fuel surface oxidation. These observations indicate that a non glowing smolder wave started near the heated plate and passed upward to the top surface of the fuel bed. The most likely reason for the area of unburned grass around the outside of the top surface is that this grass was cooled by air being entrained in the thermal plume rising from the heated surface and smoldering fuel.

For the lowest plate temperature tested without an applied wind, 302 °C, the fuel bed had a similar appearance to that seen in Figure 36.

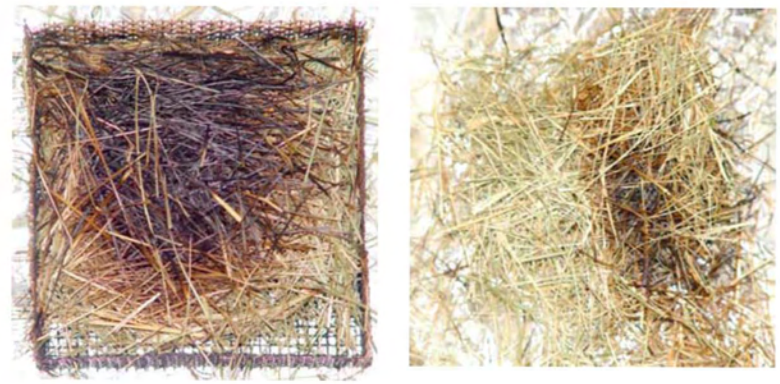

Figure 37. Bottom (left) and top (right) views of a May tall fescue fuel bed are shown after the fuel was removed from the heated plate held at 311 °C with a low wind applied. Glowing combustion was not observed.

Figure 37 shows similar photographs for a fuel bed held at the same surface temperature, 311 °C, as in Figure 36, but with a low wind applied. Most of the bottom is blackened with the exception of a narrow band along the upwind (right hand side in photograph) edge. On the top surface of the fuel bed there is a brown band that extends across the bed perpendicular to the wind direction and just downstream of the center. Deeper within the bed the band is much darker. Clearly there had been some pyrolysis of the fuel in contact with the plate and in the vicinity of the line plume formed by heated gases rising within the fuel bed. Smoldering does not seem to have occurred, since there is no indication that areas of pyrolysis moved away from the heated areas.

Tests with low and high winds with plate temperatures near 300 °C showed partial blackening of the bottoms of the fuel bed, but there were larger areas of unblackened fuels along the upstream edges. For the high wind case, this area extended nearly half way across the bed. For both low and high wind cases there were light brown bands across the tops of the fuel bed, with the band for the high wind case located further downstream.

4.3.2. Radiative Heating Ignition Results

The heated plate experiments for May tall fescue showed that these fuel beds were unlikely to transition to flaming, even when glowing combustion was present. With one exception, flaming was only observed in the radiative ignition experiments for AHFs equal to or greater than 40 kW/m^2. On the other hand, glowing combustion was observed with much lower AHFs. Figure 38 shows the times required for glowing or flaming combustion to appear following application of the radiative heat flux as a function of the AHF. Similar to the results for shredded newsprint (see Figure 27), the ignition times increased very slowly as the AHF was reduced from

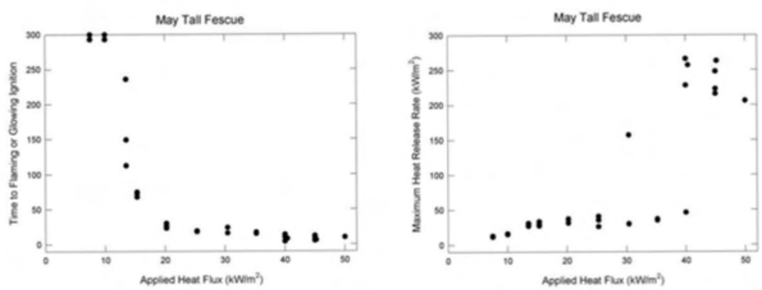

Figure 38. Values of time to flaming or glowing ignition and maximum observed heat release rate are plotted as functions of applied heat flux for May tall fescue fuel beds.

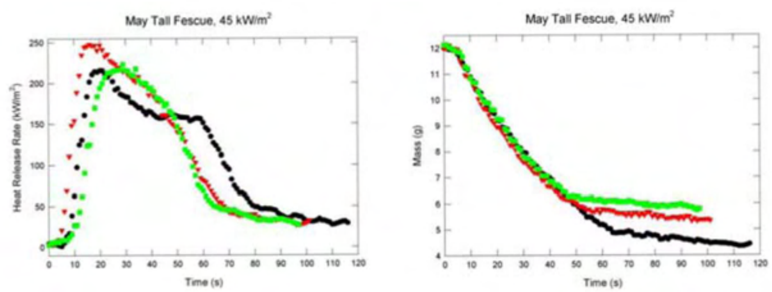

Figure 39. Heat release rates and sample masses are plotted as a function of time for three experiments in which a 45 kW/m^2 heat flux was applied to May tall fescue.

50 kW/m^2 to 20 kW/m^2. For still lower AHFs the ignition times began to increase rapidly with decreasing AHF before ignition was no longer observed with AHFs near 10 kW/m^2 and lower.

Even though the ignition time plots for shredded newsprint and May tall fescue have similar appearances, distinct differences in burning behavior appear in the plots of maximum HRR versus AHF. Maximum HRRs for the shredded newsprint remained high for AHF as low as 11 kW/m^2, while maximum HRRs for the May tall fescue dropped to low values for AHFs lower than 40 kW/m^2. The abrupt drop in HRR for the May tall fescue around an AHF of 40 kW/m^2 is due to the absence of flaming combustion at lower AHFs.

Plots of HRR and fuel mass versus time provide additional insights into the ignition behaviors of the May tall fescue fuel beds. Figure 39 shows three sets of results for an AHF of 45 kW/m^2. After a brief period during which there was a relatively slow loss of fuel mass and low HRR, both the HRRs and mass loss rates increased rapidly, reflecting the onset of flaming. Flaming

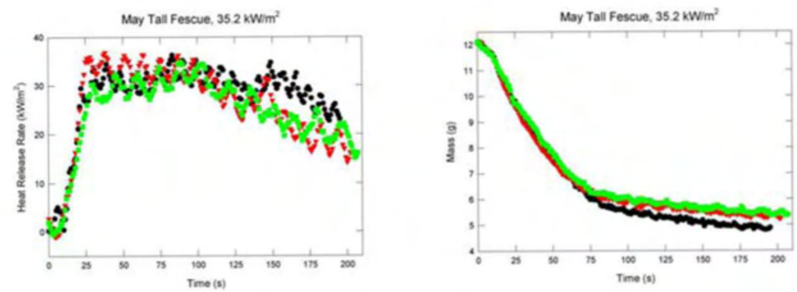

Figure 40. Heat release rates and sample masses are plotted as a function of time for three experiments in which a 35.2 kW/m^2 heat flux was applied to May tall fescue.

lasted for about 50 s to 60 s before dying down. Apparently, smoldering combustion continued after the flaming period since measurable HRRs and low mass lost rates were still present.

Flaming was not observed when an AHF of 35.2 kW/m^2 was applied to the May tall fescue. Figure 40 shows HRRs and masses for three experiments. Similar to Figure 39, there is a brief induction period lasting about 10 s during which there is little HRR, but mass loss is taking place. After this time, the HRRs began to increase rapidly, rising to values on the order of 32 kW/m^2. HRR values remained nearly constant for about 50 s before beginning to fall slowly. The fuel mass loss rate abruptly accelerated at the same time the HRR first begins to rise. This is near the time when glowing combustion first appeared, suggesting that glowing combustion spreading over the fuel bed is responsible for the increased HRR and mass loss rate. At roughly the same time that the HRR began to drop slowly there was a distinct change in the slope of the mass loss, with the mass loss rate decreasing abruptly.

When the effective heat of combustion (EHC) is defined as the HRR divided by the mass loss rate, it is clear that the EHC abruptly increased at the time when the mass loss rate drops. These observations suggest that at least two types of fuel surface oxidation reactions were taking place. The first has a relatively low EHC and likely corresponds to oxidative surface reaction of easily pyrolysed fuel components. Initial pyrolyis of cellulosic fuels is known to form an enriched-carbon char that has a higher EHC that reacts more slowly. The oxidation of the char formed during the initial more rapid oxidative pyrolysis of the grass is most likely responsible for the period of relatively high HRR with relatively low mass loss rate.

In Figure 39 it is evident that the HRR and mass loss behavior following the flaming periods are similar to those observed at the longest times in Figure 40. This suggests that the flaming observed for the May tall fescue with the highest AHFs also formed a high energy containing char that then oxidized more slowly.

Comparison of the HRR and mass loss behaviors observed for AHFs over the range of 20 kW/m^2 to 35 kW/m^2 showed that they were similar to those in Figure 40 with some variation in slopes

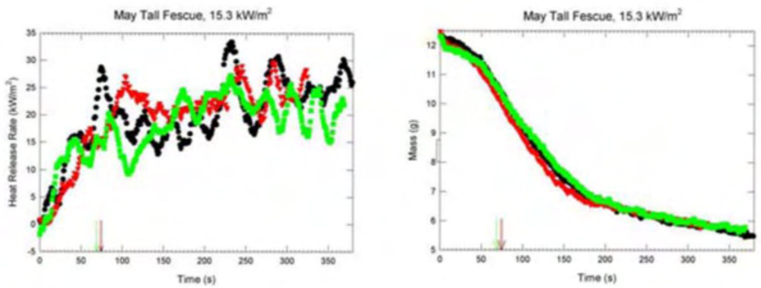

Figure 41. Heat release rates and sample masses are plotted as a function of time for three experiments in which a 15.3 kW/m^2 heat flux was applied to May tall fescue. The arrows indicate the times when glowing combustion appeared.

and transition times. The relatively short times required for glowing combustion to develop for these AHFs (see Figure 38) suggest that glowing combustion rapidly developed and spread over the fuel bed, leading to the formation of chars that then oxidized more slowly.

For AHFs less than 20 kW/m^2 the time required for glowing combustion to develop rapidly increased. Figure 41 shows three sets of measured HRRs and masses as a function of time for an AHF of 15.3 kW/m^2. Color-coded arrows have been added to the plots indicating the times when glowing combustion was observed. The data show that low HRRs developed shortly after the fuel was exposed to the AHF. Relatively slow mass loss rates appeared around the same time. Around 50 s after exposure there was a clear shift in the mass behavior, with the mass loss rate increasing. This change is most likely associated with the development of sustained smoldering. Interestingly, glowing combustion did not appear until about 20 s after smoldering developed. This suggests that the initial smoldering is non glowing and that transition to glowing required a short period of time. These conclusions are consistent with findings from the heated plate experiments that showed that non glowing smoldering occurred at lower temperatures.

The observation of nearly constant HRRs while there is a distinct reduction in the mass loss rate around 175 s indicates that two distinct EHCs occurred for this lower AHF. This behavior is similar to that observed with AHFs covering the 20 kW/m^2 to 35 kW/m^2 AHF range.

Figure 42 shows similar plots for three experiments with an AHF of 13.5 kW/m^2. For each there was a short induction period at the start of the heating during which the HRR remained close to zero but during which there was a slow mass loss. After the induction period the HRR began to rise, but the increases were much slower than when 15.3 kW/m^2 was used. At roughly 75 s there was a distinct increase in the mass loss rate suggesting that smoldering had developed. Glowing combustion was not observed until much later when a significant fraction of the more rapid mass change had already occurred. The sustained HRR and reduced mass loss rate at longer times again indicates that an initial pyrolysis produced a char that then oxidized with a higher effective

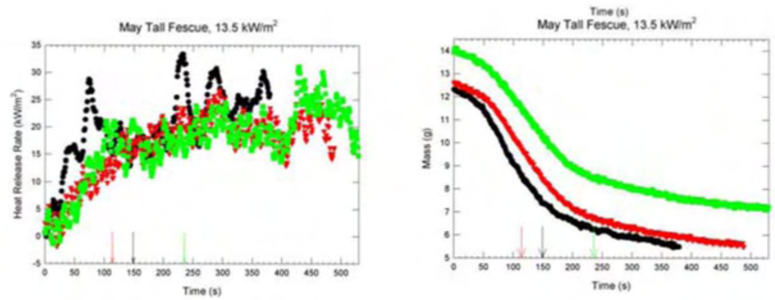

Figure 42. Heat release rates and sample masses are plotted as a function of time for three experiments in which a 13.5 kW/m^2 heat flux was applied to May tall fescue. The arrows indicate the times when glowing combustion appeared.

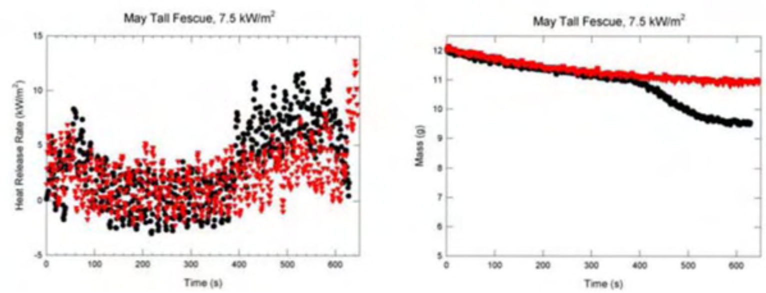

Figure 43. Heat release rates and sample masses are plotted as a function of time for two experiments in which a 7.5 kW/m^2 heat flux was applied to May tall fescue.

heat of combustion. The much longer periods required for each of these stages as compared to cases with AHFs of 15.3 kW/m^2 requires a strong dependence on AHF.

Glowing combustion was not observed for experiments with AHFs of 10 kW/m^2 and 7.5 kW/m^2. Figure 43 shows plots of HRR and mass as functions of time for two experiments with an AHF of 7.5 kW/m^2. After the heat fluxes were applied there were long periods lasting several hundred seconds during which a very slow mass loss occured without significant HRR. The mass lost could be due to non oxidative pyrolysis or moisture removal. During one of the experiments the mass loss rate accelerated around 400 s. There seems to have been a very small increase in the measured HRR at the same time, suggesting limited oxidation was taking place. Interestingly, both the HRR and mass loss rate seemed to decrease back to the lower levels after about 100 s, a time when a large fraction of the original mass remained. This suggests that even though some

Figure 44. This slightly out of focus photograph shows the top surface of a May tall fescue fuel bed following application of an applied radiative heat flux that was insufficient to induce glowing combustion.

non glowing oxidation took place, there was no sustained smoldering. There is a hint that the HRR for the second run may have started to increase after 600 s, just as the experiment ended.

Results with AHFs of 10 kW/m^2 were similar to those for 7.5 kW/m^2 with a nearly linear mass change over the first 200 s followed by an increased mass loss rate lasting about 100 s. There seemed to be a very small HRR that only developed at roughly the same time as the change in mass lost rate. After 600 s about 20 % of the original mass remained.

Some blackening of the grass was observed at the lower AHFs. Figure 44 shows an example of a fuel bed at the conclusion of an experiment in which glowing combustion did not occur. Some blackening of the surface is evident. The blackening is not uniform, but has a distribution over the top of the fuel bed that is similar to that seen for the shredded newsprint in Figure 32. As before, this distribution could be due to the air flow distribution or small variations the cone thermal radiation distribution.

4.4. August Tall Fescue

Only heated plate ignition experiments were performed for August tall fescue. Figure 45 shows the measured ignition times for glowing combustion and flaming as a function of the heated plate temperature. The results will be compared with the corresponding results for May tall fescue shown in Figure 33.

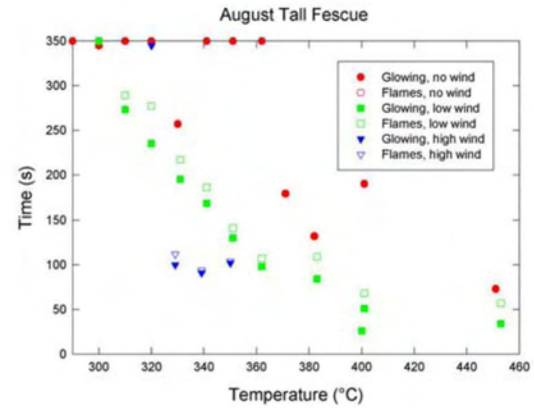

Figure 45. Ignition times for glowing combustion and flaming are shown as a function of temperature for August tall fescue grass fuel beds applied to a heated plate. Results are included for no wind, low wind, and high wind cases.

The most dramatic difference between the two fuels is that the August tall fescue was much more likely to transition to flaming in the presence of a wind. Only three such transitions with limited flaming times were observed with the May tall fescue, while all of the August tall fescue samples exposed to the wind transitioned to flaming. These flames were robust and lasted for many seconds. Figure 46 shows an example of the flames for an experiment with the heated plate held at 310 °C in the presence of the low wind. Flames were observed 289 s after the fuel was applied to the plate and the photograph was taken 5 s later. The strong glowing that tended to develop along the upstream edge with an applied wind is also visible in this image.

The transition to flaming for August tall fescue required the presence of a wind. Flames were not observed for the five experiments without wind in which glowing combustion developed.

Even though flaming was more likely for August tall fescue than for May tall fescue, the August tall fescue required higher heated plate temperatures to induce glowing combustion in the absence of wind. With the one exception of a measurement with the plate temperature held at 380 °C, glowing combustion for the May tall fescue was observed for plate temperatures at or above 340 °C and was absent for plate temperatures around 320 °C. Both responses were observed with the plate temperature held near 330 °C. For the August tall fescue, again with the exception of one experiment, the glowing combustion was observed for temperatures of 370 °C and higher, while it was absent for temperatures of 360 °C and lower, suggesting a 30 °C difference between the two grass samples for the lowest temperatures required to induce glowing combustion when wind was absent.

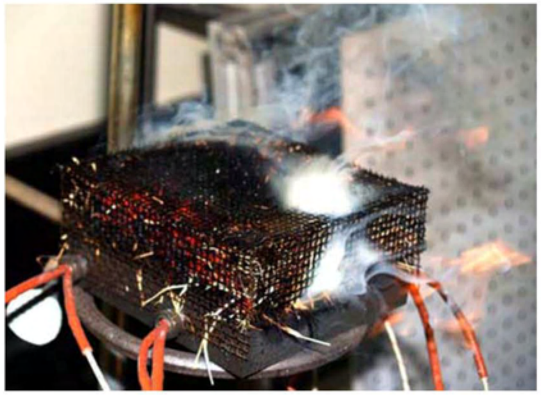

Figure 46. Photograph showing flaming from an August tall fescue fuel bed on the heated plate held at 310 °C in the presence of a low wind. Flames appeared 289 s after the fuel was placed on the plate, and the photograph was taken 5 s later. Strong glowing combustion is present along the upstream edge of the fuel bed.

Despite the fact that the transition to flaming behaviors for the two grasses were very different in the presence of a wind, the dependencies of glowing combustion ignition times on the plate temperature were similar. For both the lowest plate temperature for which glowing combustion developed in the presence of a low wind was around 310 °C, and the times required for ignition were similar, with roughly 275 s being required around 310 °C. The data for the August tall fescue indicate that the glowing combustion ignition times in the presence of a low wind are reduced from those in the absence of the wind, in a manner similar to those for the May tall fescue. Recall that the effect of the low wind was somewhat less than observed for the shredded newsprint.

The high wind results for August tall fescue are limited. However, similar to the May tall fescue, the times required for glowing combustion ignition fall somewhat below those with a low wind. For the May tall fescue glowing combustion, ignition was observed for plate temperatures as low as 317 °C, while the lowest ignition temperature for August tall fescue was 329 °C. Due to the limited measurements, it is not possible to determine if this difference is statistically significant.

The appearance of the fuel beds following experiments in which ignition was not observed provides additional insight in the smoldering of August tall fescue. Even though glowing combustion was not generally observed for temperatures below 360 °C without a wind, images indicate that non glowing smoldering developed and spread partially through the fuel beds with temperatures as low as 300 °C. Figure 47 shows the bottom and top of a fuel bed after being placed on the heated plate at 300 °C. The bottom of the fuel bed is blackened over a large fraction of its area. Three narrow bands of unblackened fuel are visible along the edges. The top

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Figure 47. Bottom (left) and top (right) views of an August tall fescue fuel bed are shown after the fuel was removed from the heated plate held at 300 °C with no wind applied. No glowing combustion was observed.

of the fuel bed is also blackened, indicating that smoldering had passed upward through the bed even though the smoldering seems to have progressed upward primarily on the right side of the fuel bed and on the side facing the camera where the open slit was present in the wire-screen cage. At higher plate temperatures where glowing combustion was not observed, the fuel beds had similar appearances, but the fractions of the bottom and top surfaces blackened were larger.

Figure 48 shows the appearance of the bottom and top of an August tall fescue fuel bed after removal from the heated plate held at 290 °C without a wind applied. A blackened area covers much of the bottom of the fuel bed, but on the top the only indication of the heating is a small circular brownish area near the center. As discussed earlier, this browning may be due to the deposit of smoke in the thermal plume coming from below or to light heating of the fuel by the thermal plume. In either case, it is clear that smoldering did not propagate upward to the top of the fuel bed from below. While sufficient to cause pyrolysis of the fuel in direct contact with the heated plate, this plate temperature was too low to generate sustained smoldering.

A fuel bed that was placed on the heated plate held at 310 °C with a low wind applied is shown in Figure 49. This is the same fuel bed shown in Figure 46. Both glowing combustion and flaming were observed. Much of the fuel bed is blackened, but there is an area of unburned grass on the downstream edge of the bed. This suggests that air entrained into the burning fuel bed was able to cool the fuel sufficiently to limit glowing combustion and flame spread. In the image showing the bottom of the fuel bed there is a small gray area on the upwind edge (right side of photograph) indicating that some ash formation had occurred. This suggests that complete oxidation of the char formed by the initial fuel pyrolysis was aided by the presence of the wind.

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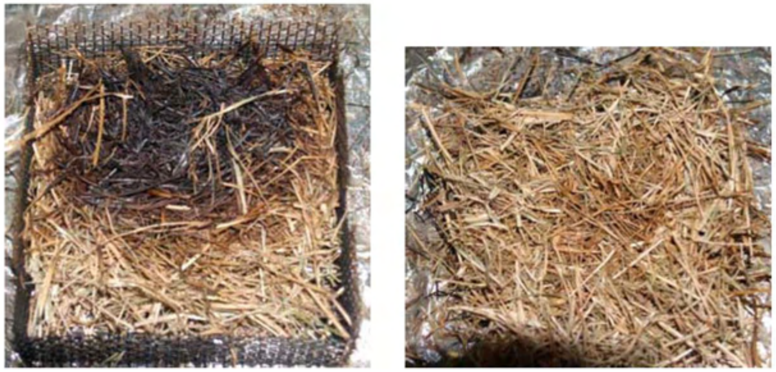

Figure 48. Bottom (left) and top (right) views of an August tall fescue fuel bed are shown after the fuel was removed from the heated plate held at 290 °C with no wind applied. No glowing combustion was observed.

Figure 49. Bottom (left) and top (right) views of an August tall fescue fuel bed are shown after the fuel was removed from the heated plate held at 310 °C with a low wind applied. Glowing combustion and flaming were observed.

The appearance of fuel beds that did not develop glowing combustion in the presence of a wind provides evidence for the important role that convective cooling played in hindering the development of smoldering at low plate temperatures. Figure 50 shows the bottom and top of the fuel bed following application to the heated plate held at 320 °C in the presence of a high wind. On the bottom there is a band of blackened fuel perpendicular to the wind direction that

Figure 50. Bottom (left) and top (right) views of an August tall fescue fuel bed are shown after the fuel was removed from the heated plate held at 320 °C with a high wind applied. No glowing combustion was observed.

covers about ¼ of the bed width on the downstream side starting near the center of the bed. This distribution suggests that the wind passing through the upstream side of the cage as well as the air entrained into the resulting thermal plume from the downstream side were effective in cooling the fuel to a level where significant pyrolysis could not take place. The top of the fuel bed shows only a very narrow band of browning due either to smoke deposition or light pyrolysis. These photographs show that significant smoldering did not develop within the fuel bed.

The fuel beds for the cases with low wind for which glowing combustion was not observed had similar appearances to those for the high wind case shown in Figure 50. The area subject to blackening on the bottoms of the fuel surfaces and the degree of browning at the top varied with the heated plate temperature.

4.5. Cheat Grass

Both heated plate and cone calorimeter ignition experiments were done for this fuel.

4.5.1. Heated Surface Ignition Results

Figure 51 shows a plot of times to glowing combustion and flaming as a function of heated plate temperature for cheat grass fuel beds. As observed for the other fuels discussed thus far, even though there is scatter in the experimental results, the data fall on three broad bands corresponding to no wind, low wind, and high wind cases, with the ignition times increasing as the plate temperature decreases. Considering the results for glowing combustion, when ignition occurs for a given plate temperature, the data for no wind lies at longer times, followed by the low-wind results, with the shortest times required for the high-wind cases.

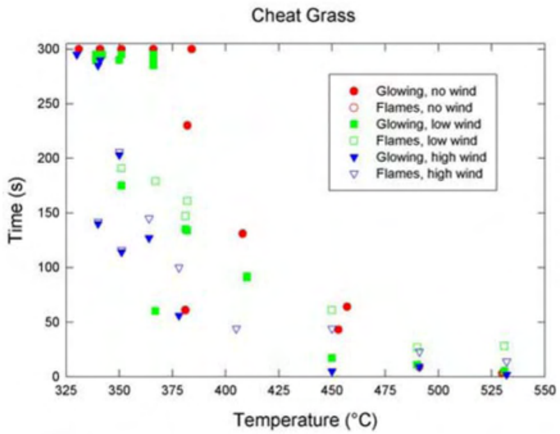

Figure 51. Ignition times for glowing combustion and flaming are shown as a function of temperature for cheat grass fuel beds applied to a heated plate. Results are included for no wind, low wind, and high wind cases.

The general behavior of the cheat grass with regard to transition to flaming was the same as observed for the August tall fescue. Flaming was not observed when a wind was not applied to the fuel bed, and transition to flaming occurred for all experiments in which glowing combustion developed in the presence of low or high wind.

More detailed comparison with the results for August tall fescue suggests that cheat grass may have a slightly reduced tendency to develop glowing combustion. For both fuels the results suggest that glowing combustion no longer developed when the plate temperature was reduced from around 380 °C to around 360 °C. However, the lowest temperatures for which glowing combustion were observed for the cheat grass were around 340 °C and 350 °C for low and high winds cases, respectively. The corresponding values for August tall fescue were 310 °C and 330 °C. Recall that these temperatures for the August tall fescue were already higher than observed for the May tall fescue, suggesting the tendency for cheat grass to develop glowing combustion is considerably lower than for the May tall fescue.

The appearance of cheat grass fuel beds for which glowing combustion did not develop in the absence of a wind provides additional evidence that the tendency for the cheat grass fuel beds to smolder (either non glowing or glowing) was reduced compared to the August tall fescue. Figure 52 shows photographs for a fuel bed that did not develop glowing combustion when placed on the heated plate held at 341 °C. The bottom of the fuel bed is heavily blackened indicating significant pyrolysis took place. On the top of the fuel there is a darkened circular area near the center that indicates that non glowing smoldering spread upward through the fuel bed. This darkened area is surrounded by fuel that is not discolored and the darkened area is not

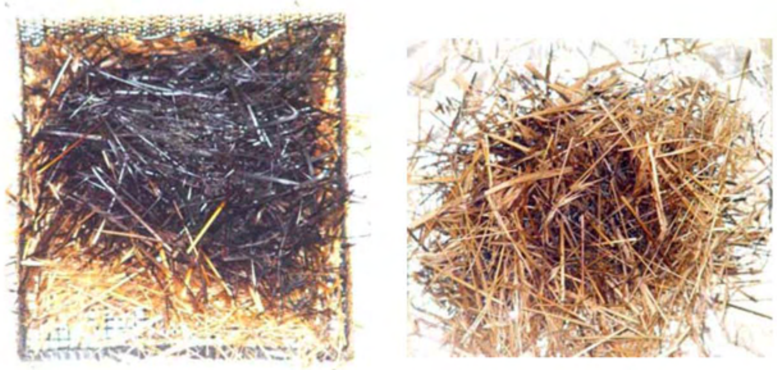

Figure 52. Bottom (left) and top (right) views of cheat grass fuel bed are shown after the fuel was removed from the heated plate held at 341 °C with no wind applied. No glowing combustion was observed.

as blackened as the bottom of the fuel bed, suggesting that smoldering was barely sustained. Similar fuel bed photographs for the heated plate held at 331 °C show that even though the fuel was pyrolyzed on the bottom, smoldering did not reach the top surface, which was barely browned near the center. For August tall fescue, non glowing smoldering was observed for plate temperatures down to 300 °C, but not for 290 °C.

The appearance of the cheat grass fuel beds that did not develop glowing combustion in the presence of low and high winds was similar to those already described for other fuels, with blackening on the bottom primarily on the downstream side and a narrow brown band across the top perpendicular to the wind flow direction. Figure 53 shows an example of this for a heated plate temperature of 350 °C in the presence of a low wind. Once again the cooling effect of an applied wind has been shown to be important for the fuel reaction behavior at low heated plate temperatures.

4.5.2. Radiative Heating Ignition Results

Figure 54 shows plots of the times required for glowing or flaming ignition and maximum HRRs as functions of AHF for the cheat grass. Similar to the results for May tall fescue (see Figure 38), flaming was only observed for the highest AHFs used, but glowing combustion was seen for AHFs extending down to approximately 10 kW/m^2. The maximum values of HRR measured for flaming cheat grass were roughly 80 % of those measured for the May tall fescue, even though the initial mass of cheat grass was only 11 % less (8.0 g versus 9.0 g). Quantitative comparison shows that slightly more heat was released by the smoldering May tall fescue for given AHFs in the 10 kW/m^2 and 35 kW/m^2 range.

Figure 53. Bottom (left) and top (right) views of a cheat grass fuel bed are shown after the fuel was removed from the heated plate held at 350 °C with a low wind applied. No glowing combustion was observed.

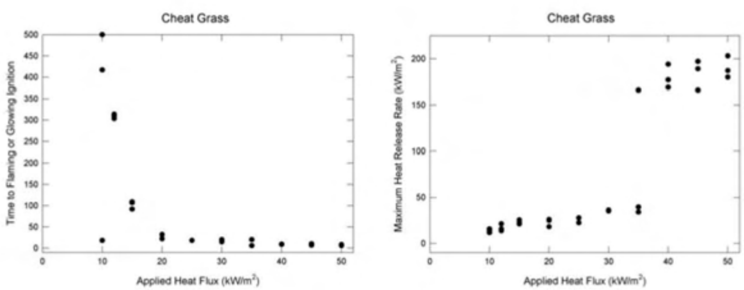

Figure 54. Values of time to flaming ignition and maximum observed heat release rate are plotted as functions of applied heat flux for cheat grass.

The heated plate ignition experiments indicated that cheat grass and May tall fescue had similar behaviors when no wind was applied, but that the grasses displayed very different transition to flaming behaviors when wind was present. Since the cone calorimeter results are similar for the two fuels, it seems likely that radiative heating experiments are not sensitive to fuel behaviors that depend strongly on the presence of wind.

Figure 55 shows the time dependencies of HRR and sample mass measured for an AHF of 45 kW/m^2. Figure 39 shows corresponding results for May tall fescue. The general behaviors are quite similar for the two grasses.

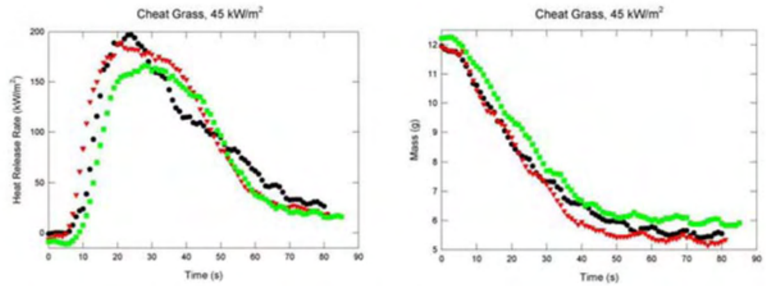

Figure 55. Heat release rates and sample masses are plotted as a function of time for three experiments in which a 45 kW/m^2 heat flux was applied to cheat grass.

Results for HRR and mass loss versus time for experiments with glowing cheat grass had similar time dependences to those for the May tall fescue shown in Figure 40 to Figure 42. Note that this indicates that smoldering cheat grass also has two distinct effective heats of combustion, implying that high energy char was formed and then slowly oxidized.

Glowing combustion was observed for only one of three cheat grass samples run with the AHF set to 10 kW/m^2. All three had HRRs and fuel variations with time similar to those observed for the May tall fescue with an AHF of 7.5 kW/m^2 shown in Figure 43. There were long induction periods lasting about 200 s during which the mass decreased but no heat was released. This was followed by periods during which the mass loss rate was noticeably faster and the HRR rose to about 10 kW/m^2. These observations suggest that non glowing smoldering was taking place at these times. Glowing combustion was observed for one sample at 417 s. By this time the mass loss rate had decreased, indicating that the char formed earlier was being oxidized.

4.6. Fine Florida Grass

Only heated plate ignition experiments were performed for the fine Florida grass. Figure 56 shows the times required for glowing combustion and flaming to appear as functions of heated plate temperature for no, low, and high wind conditions. The results for the different wind cases fall on three distinct curves, with the no wind cases requiring longer times and the high wind cases the shortest times. The reduction in ignition times was largest between the no wind and low wind conditions.

With one exception, flaming was not observed in the absence of wind. In contrast, flaming occurred in each experiment with a low or high wind during which an ignition was noted. In Figure 56 many of the measurements with wind only show the times when flames appeared. For most of these experiments glowing combustion was observed prior to the appearance of flames, but the time differences were too small to be resolved on the plot. The dependence of the transition from glowing combustion to flaming on wind condition is similar to those for August

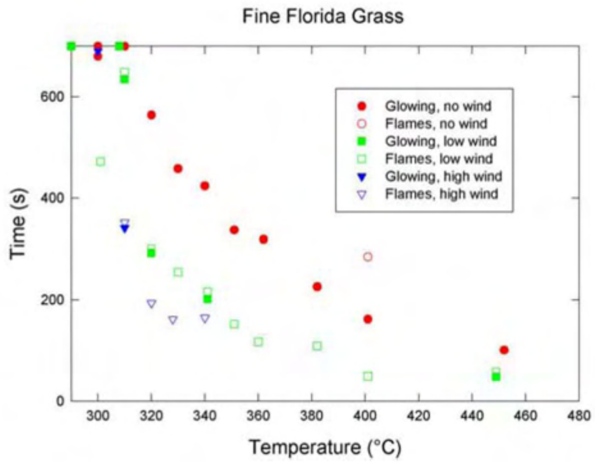

Figure 56. Ignition times for glowing combustion and flaming are shown as a function of temperature for fine Florida grass fuel beds applied to a heated plate. Results are included for no wind, low wind, and high wind cases.

tall fescue (Figure 45) and cheat grass (Figure 51), but the times required for transition are generally shorter. These three types of grass all differ from May tall fescue, since it tended to not flame for any of the wind conditions.

Even though the dependence of ignition behavior on wind condition for the fine Florida grass is the same as observed for August tall fescue and cheat grass, the lowest plate temperatures required for glowing combustion ignition are considerably lower. Ignitions were observed for plate temperatures as low as 321 °C, 301 °C, and 310 °C for the no, low, and high wind cases, respectively. Corresponding values for August tall fescue and cheat grass were 371 °C, 310 °C, and 331 °C and 381 °C, 351 °C, and 340 °C. On the other hand, the lower heated plate temperature ignition limits for May tall fescue (330 °C, 310 °C, and 317 °C, respectively), which had a different transition-to-flaming behavior, are similar to those for the fine Florida grass.

Even though May tall fescue and fine Florida grass have similar lower plate temperature limits for the development of glowing combustion in the absence of wind, comparison of Figure 33 and Figure 56 shows that much longer periods were required for the appearance of glowing at a given plate temperature for the fine Florida grass. This observation, along with the earlier findings that non glowing smoldering developed for August tall fescue and cheat grass for plate temperatures well below those for which glowing combustion occurred, suggests that each of these grasses is capable of non glowing smoldering and that the lower plate temperature limit for glowing

Figure 57. Bottom (left) and top (right) views of a fine Florida grass fuel bed are shown after the fuel was removed from the heated plate held at 321 °C with no wind applied. Glowing combustion was observed.

combustion depends on the ease with which non glowing smoldering transitions to glowing combustion.

Figure 57 shows bottom and top views of a fine Florida grass fuel bed after it was removed from the heated plate held at 321 °C. A large fraction of the fuel bed is blackened on the bottom showing that the grass in contact with the heated plate was pyrolyzed. Two areas at opposite corners of the fuel are blackened on the top. This indicates that smoldering passed from the bottom to the top of the fuel bed at these locations. The absence of blackening at other locations on the top surface suggests that the fuel bed was barely able to support smoldering at this heated plate temperature. Even so, glowing combustion was observed during this experiment.

The corresponding photographs for a fuel bed placed on the heated plate at 310 °C are shown in Figure 58. The blackening on the bottom shows that the fuel in contact with the plate was pyrolyzed. Unlike for the higher plate temperature cases shown in Figure 57, the top of fuel bed is only lightly browned in the center showing that smoldering for this fuel bed did not progress to the top from the bottom surface. The light brown area is either due to deposited smoke or limited pyrolysis due to the thermal plume that developed within the fuel bed.

The observations above suggest that if non glowing smoldering developed in these fine Florida grass fuel beds, it would transition to glowing combustion. This was not the case at the lower heated plate temperatures for the other grasses discussed above, for which non glowing combustion was observed without transition to glowing combustion.

The tops and bottoms of fuel beds for which glowing combustion was not observed in the presence of a wind had similar appearances. Figure 59 shows an example for the heated plate

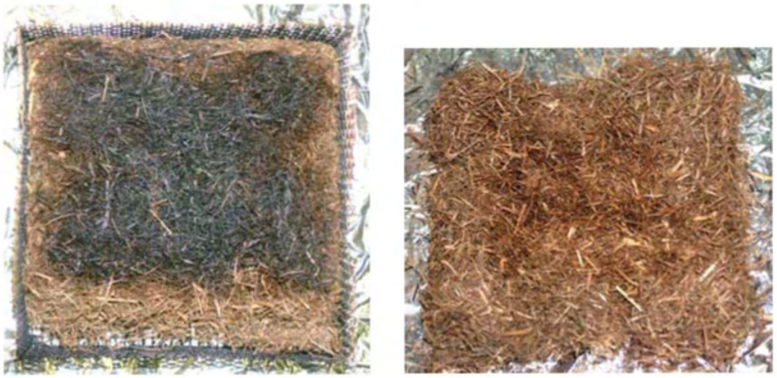

Figure 58. Bottom (left) and top (right) views of a fine Florida grass fuel bed are shown after the fuel was removed from the heated plate held at 310 °C with no wind applied. Glowing combustion was not observed.

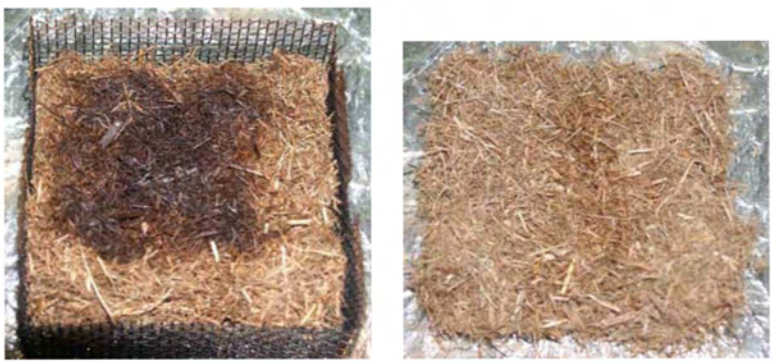

Figure 59. Bottom (left) and top (right) views of a fine Florida grass fuel bed are shown after the fuel was removed from the heated plate held at 290 °C with a low wind applied. Glowing combustion was not observed.

held at 290 °C with a low wind. A rectangular area of the bottom fuel surface is blackened, with unblackened bands visible along the upstream (wider band on right side of image) and the downstream edges. As discussed earlier, convective cooling due to wind flow over the fuel and the thermal plume formed by the rising heated gases seemed to cool the fuel and limit reaction at

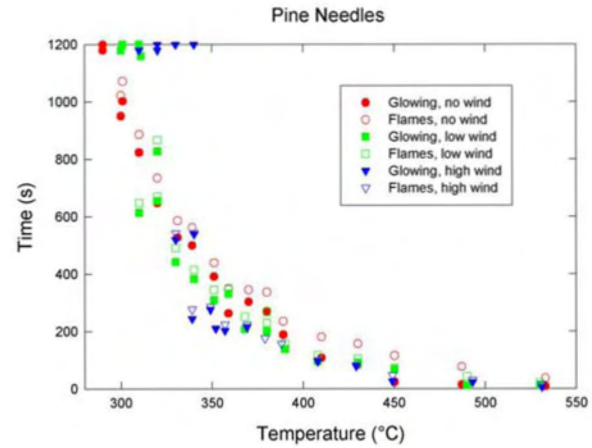

Figure 60. Ignition times for glowing combustion and flaming are shown as a function of temperature for pine needle fuel beds applied to a heated plate. Results are included for no wind, low wind, and high wind cases.

the upstream and downstream edges. The top of the fuel bed appears to be completely unaffected by the heating except for a narrow light brown band running perpendicular to the wind flow direction just downstream of the center. This band is either due to deposited smoke or light pyrolysis by the thermal plume.

4.7. Pine Needles

Both heated plate and cone ignition experiments were done for this fuel.

4.7.1. Heated Surface Ignition Results

The times required for the appearance of glowing combustion and flaming are plotted as a function of heated plate temperature for pine needle fuel beds exposed to no wind, low wind, and high wind in Figure 60. Results for the three wind conditions fall on well defined curves with the data with no wind requiring longer times for a given plate temperature and the measurements with a high wind requiring the shortest periods. The relative separations of the curves are somewhat less than observed for the grasses discussed above, but similar to those for shredded newsprint (see Figure 24).

Figure 61. Bottom (left) and top (right) views of a pine needle fuel bed are shown after the fuel was removed from the heated plate held at 290 °C with no wind applied. No glowing combustion was observed.

There are several differences between the pine needle results and those for the grass samples discussed earlier. Perhaps the most important is that the transition from glowing combustion to flaming was observed for all samples that developed glowing combustion, irrespective of wind condition. All of the grasses were unlikely to flame without an applied wind, and the May tall fescue resisted flaming even in the presence of a wind. Interestingly, the shredded newsprint flaming behavior was similar to that for pine needles.

In contrast to the grass findings where the fuel beds developed glowing combustion at lower plate temperatures when a wind was present, the high wind condition resulted in the highest plate temperatures for which the pine needles did not begin glowing. Glowing combustion for the pine needle fuel beds no longer occurred in the presence of a high wind for plate temperatures between 330 °C and 340 °C. Glowing ignition in the presence of a low wind was not observed below temperatures of about 310 °C, while plate temperatures had to fall below 300 °C before glowing combustion did not develop when no wind was present. Shredded newsprint is the only other fuel that showed a similar dependence on wind, but the range of temperatures over which the transition from glowing to non glowing occurred for the three wind conditions was somewhat smaller, taking place from about 350 °C to 330 °C.

Another difference between the shredded newsprint and pine needle fuel beds and the grass fuel beds is the time required for glowing combustion to develop at the low ends of the heated plate temperature ranges. For the grasses these times ranged between 200 s and 600 s, with the Florida fine grass responsible for the longest times. For the shredded newsprint and pine needles the maximum periods observed approached 1000 s.

Figure 61 shows photographs of the bottom and top of one of the pine needle fuel beds after removal from the heated plate held at a temperature of 290 °C in the absence of wind. The

Figure 62. Bottom (left) and top (right) views of a pine needle fuel bed are shown after the fuel was removed from the heated plate held at 340 °C with no wind applied. No glowing combustion was observed.

bottom of the fuel bed is blackened, indicating that some pyrolysis of pine needles in contact with the heated plate took place. Smoldering clearly did not spread from the bottom to the top of the fuel bed since there is little, if any, discoloration of the fuel on the top surface. Since fuel beds placed on the heated plate held at temperatures only 10 °C higher developed glowing combustion and flaming, this suggests that if non glowing smoldering did start in these fuel beds, it always transitioned to glowing combustion and ultimately flaming.

Figure 62 shows the bottom and top of a fuel bed that did not develop glowing combustion when placed on the heated plate held at 340 °C with the high wind. A narrow band on the bottom of the fuel bed is blackened on the downstream side. There is little indication of pyrolysis on the upstream side. This is an indication that convective cooling of the fuel has limited reaction at these locations despite an increased air supply. Smoldering clearly did not develop within the fuel bed since the top of the fuel bed shows only a hint of discoloration at the downstream edge. Photographs for other low and high wind cases where glowing combustion did not occur have similar appearances, even though in some the bands of discoloration on the tops of the fuel beds were more pronouced. These observations are consistent with those discussed earlier for other fuel beds that did not smolder in the presence of wind.

4.7.2. Radiative Heating Ignition Results

Plots of time to flaming ignition and maximum HRR as functions of AHF are included in Figure 63 from cone calorimeter measurements with pine needles. The data span a range of AHFs from 15 kW/m^2 to 50 kW/m^2. Flaming ignition was observed over this entire range of AHF. Unfortunately, measurements are not available for lower AHFs.

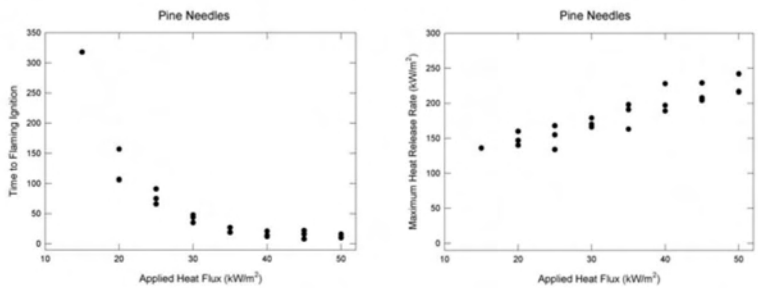

Figure 63. Values of time to flaming ignition and maximum observed heat release rate are plotted as functions of applied heat flux for pine needles.

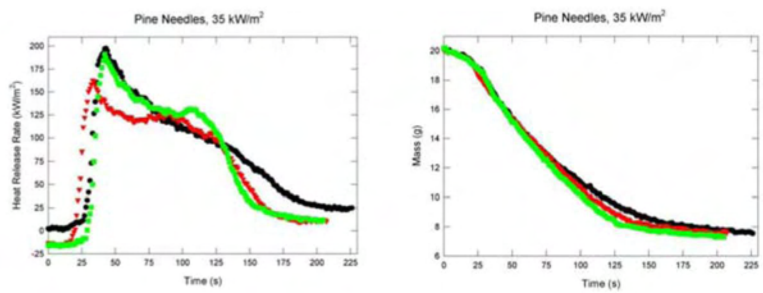

Figure 64. Heat release rates and sample masses are plotted as a function of time for three experiments in which a 35 kW/m^2 heat flux was applied to pine needles.

Less than 30 s was required for ignition with AHFs equal to or greater than 35 kW/m^2, and the ignition times varied little with AHF over this range. For AHFs around 30 kW/m^2 the ignition times began to increase more rapidly with decreasing AHF. The general dependence of ignition times on AHF is similar to those observed for shredded newsprint, May tall fescue, and cheat grass, but for these fuels the rapid increases in ignition times began when the AHF was on the order of 20 kW/m^2, and the rates of increase with decreasing AHF were higher.

Even though the dependence of the ignition times on AHF is highly non linear, the values of maximum HRR appear to have a nearly linear dependence, falling with decreasing AHF over the entire AHF range. This behavior is expected for fuels where the pyrolysis rate during flaming combustion is proportional to the AHF.

Additional insight into the ignition behavior of pine needles is provided by considering the time behaviors of the HRR and mass loss. Figure 64 shows results for three experiments with an AHF

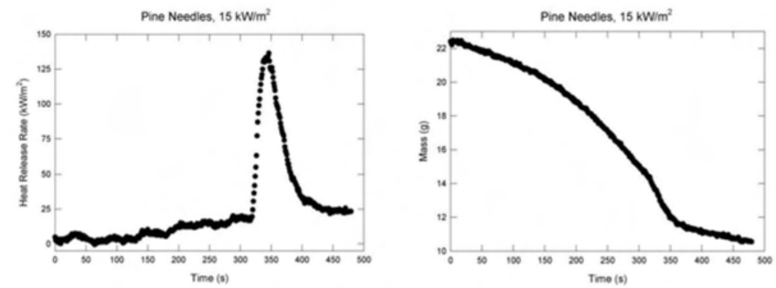

Figure 65. Heat release rates and sample masses are plotted as a function of time for an experiment in which a 15 kW/m^2 heat flux was applied to pine needles.

of 35 kW/m^2. Short induction periods were present at the beginning during which there were relatively low mass loss rates and very little heat release. After the induction period, there were abrupt increases in the rates of mass loss and the HRRs rose very rapidly to their maximum values. Flaming combustion lasted roughly 125 s, before the HRRs and mass loss rates decreased rapidly to levels expected for smoldering and then decreased slowly.

Time plots for an AHF of 30 kW/m^2 have a similar appearance to those in Figure 64, with the exception that the induction periods increased substantially, varying from about 35 s to 50 s, and the HRRs increased slowly to values on the order of 20 kW/m^2 before the rapid increase associated with the transition to flaming. As the AHFs were reduced further the induction periods continued to increase.

Figure 65 shows the HRR and mass loss curves for an experiment with an AHF of 15 kW/m^2. There was a period of roughly 125 s at the start during which the HRR was very close to zero and mass was being loss relatively slowly. After the induction period the HRR began to increase slowly and the slope of the mass loss curve also increased slowly. After about 200 s the HRR had increased to roughly 20 kW/m^2, and there was a sudden transition to flaming.

These data reveal that for low AHFs there are at least three distinct processes involved in the ignition of pine needles. The first is a period during which the fuel mass decreases, but there is little if any heat release. The mass loss is likely due to drying of the fuel and non oxidative fuel pyrolysis. During the second phase the fuel surface begins to oxidize and surface temperatures rise slowly. The increasing surface temperatures lead to more intense pyrolysis since the mass loss rates increase and smoldering spreads. It is unclear if glowing combustion developed in the cone experiments, but observations from the heated plate experiments suggest that non glowing smoldering is not likely to play an important role for this fuel. For these fuel beds, transition to flaming seems to take place when the measured HRRs reach a value of approximately 20 kW/m^2.

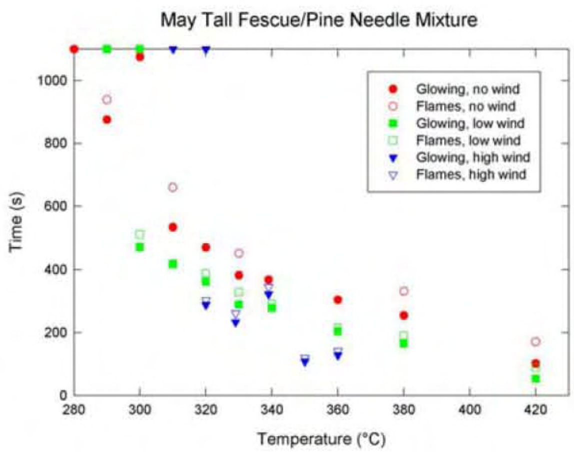

Figure 66. Ignition times for glowing combustion and flaming are shown as a function of temperature for May tall fescue/pine needle mixture fuel beds applied to a heated plate. Results are included for no wind, low wind, and high wind cases.

4.8. May Tall Fescue/Pine Needle Mixture

Only heated plate ignition experiments were performed for the May tall fescue/pine needle mixture. Figure 66 shows the times required for the development of glowing combustion and flaming plotted as a function of plate temperature for no, low, and high wind cases. The results for the different wind conditions fall on well defined curves with ignition times that increase as the plate temperature decreases. Generally, for a given plate temperature, the longest ignition times were observed for no wind cases and the shortest are for high wind cases.

The two fuels in the mixture were chosen because they represented two extremes in the ignition behaviors observed for the natural fuels considered in this study. May tall fescue (see Figure 33) had a low tendency to flame when placed on a heated plate for any of the wind conditions tested, while the pine needles (see Figure 60) transitioned to flaming whenever glowing combustion developed. The application of a wind resulted in larger reductions in glowing combustion ignition times with a given plate temperature for the May tall fescue. In the presence of a wind the development of glowing combustion in the May tall fescue was observed for lower plate temperatures than when a wind was not present. The opposite was true for pine needles. The times required for the appearance of glowing combustion at a given plate temperature were typically much longer for the pine needles as compared to the May tall fescue.

Comparison of Figure 66 with Figure 33 and Figure 60 suggests that a 50 %/50 % mixture by mass of May tall fescue and pine needles resulted in fuel beds with ignition behaviors that were intermediate between those for the individual fuels, but which also had some properties that might be considered less desirable than those for the individual fuels alone.

The results in Figure 66 show that the fuel mixture was much more likely to flame than the May tall fescue. Transition from glowing combustion to flaming was observed in all cases with an applied wind and in just over half of the cases without wind. It is noteworthy that the tendency for the mixture to flame is greater than for all of the grasses tested. For the experiments without an applied wind, there is no clear correlation of the appearance of flames with plate temperature, suggesting that the probability of transition to flaming for this fuel mixture is related to the flammability of the gases generated by pyrolysis and not to the specific local ignition conditions.

For the lower plate temperatures where both of the indivual fuels developed glowing combustion, the ignition times for the mixture tended to lie between those observed for the individual fuels, but to fall somewhat closer to those for the May tall fescue. As an example, consider the low-wind experiments with plate temperatures around 310 °C. Glowing combustion required over 600 s to develop for the pine needles, while the comparable time for the May tall fescue was between 250 s and 275 s. The ignition time for the mixture was just over 400 s. This behavior suggests that the May tall fescue first develops non glowing smoldering with the heat generated by the surface oxidation being transferred to both non smoldering May tall fescue and pine needles. Eventually surface temperatures on a portion of the mixed fuel reach a point where transition to glowing combustion occurs. This glowing combustion spreads and increases the heat release until it is sufficient to ignite the pyrolysis gases generated by the smoldering, and transition to flaming takes place.

For the pine needles the lowest plate temperature where glowing and flaming ignition was observed was 300 °C without a wind present, and roughly 1000 s was required for glowing combustion to develop. For the same plate temperature the May tall fescue/pine needle mixture with a low wind required just under 500 s to begin glowing and rapidly transition to flaming. The lowest plate temperature that produced a glowing and/or flaming ignition for all of the fuels studied during this study was the 290 °C ignition of the fuel mixture in the absence of the wind. As discussed earlier, non glowing smoldering was observed for the May tall fescue for the lowest plate temperature, 302 °C, run without an applied wind. It is likely that non glowing smoldering of the May tall fescue within the fuel mixture generated the initial heat necessary to ignite glowing combustion in the fuel mixture.

The conclusion that non glowing combustion of the May tall fescue component is responsible for the initial heat release in the fuel mixture is supported by the photographs of the bottom and top of the fuel bed shown in Figure 67 for an experiment with the heated plate held at 280 °C and no applied wind. No glowing combustion was observed in this experiment. The bottom of the fuel bed is blackened, indicating significant fuel pyrolysis had occurred. On the top there is a circular dark brown area indicating that some pyrolysis of the fuel mixture took place here as well. Given the low plate temperature, pyrolysis on the top of the bed would not have been expected unless a non glowing smolder front had passed upward through the fuel bed. It has been shown that smoldering in the pine needle beds studies here always involved glowing combustion.

Figure 67. Bottom (left) and top (right) views of a May tall fescue/pine needle mixed fuel bed are shown after the fuel was removed from the heated plate held at 280 °C with no wind applied. No glowing combustion was observed.

At lower plate temperatures the effect of applying a wind to the fuel mixture was to decrease the likelihood of ignition since glowing combustion was observed for lower plate temperatures in the absence of a wind than with wind present. This dependence on wind is the same as observed for pine needles and suggests this component of the fuel mixture dominated this particular behavior.

The importance of convective cooling of the mixed fuel by an applied wind on the ignition behavior is demonstrated by the images shown in Figure 68 for a fuel bed removed from the heated plate held at 320 °C in the presence of a high wind. On the bottom of the fuel bed there is a small blackened area on the downstream half of the bed. Fuel pyrolysis has clearly occurred here. There is some discoloration of the fuel bed along a narrow band lying perpendicular to the wind direction near the downstream edge suggested smoke deposition from or some light pyrolysis by the thermal plume passing through the fuel bed. Similar observations for other fuels have been attributed to convective cooling of the fuel near the heated plate.

4.9. Preliminary Tests with Leaves

A limited number of ignition experiments were carried out on the heated plate using three types of dried leaves. All of these tests were run with heated plate temperatures of 381 °C. This temperature was chosen because the experiments discussed above indicated that this temperature is high enough to ensure that glowing combustion will develop in a reasonably short period of time.

A single experiment was done for 8 g of boxwood leaves placed on the heated plate without a wind. Glowing combustion was observed 90 s after the leaves were applied, but transition to

Figure 68. Bottom (left) and top (right) views of a May tall fescue/pine needle mixed fuel bed are shown after the fuel was removed from the heated plate held at 320 °C with a high wind applied. No glowing combustion was observed.

flaming did not occur. Photographs of the fuel bed showed blackening on the bottom, a circular blackened area on the top, and an area of unreacted fuel around the outside edge of the bed.

Two experiments were run with 5.5 g of elm leaves. When a low wind was used, glowing combustion and flaming appeared nearly simultaneously after 93 s. Smoke was observed coming from the fuel bed along a line perpendicular to the wind flow direction located about 2/3 of the way across the bed from the upstream edge. Photographs show that most of the fuel was blackened. For the second experiment no wind was applied. Glowing combustion developed 253 s after fuel application, but no transition to flaming was observed. The glowing combustion spread quickly to cover most of the fuel bed.

Two repeats of an experiment with the oak leaves in the presence of a low wind were done. For the first test 6.0 g of leaves were used. Neither glowing combustion nor flaming were observed, but heavy smoke was observed along a line perpendicular to the wind flow direction, indicating that pyrolysis was occurring. Photographs after the experiment showed that the bottom was heavily blackened, but the top appeared to be unaffected. This suggests that sustained smoldering did not occur. For the second experiment the mass of oak leaves was increased to 9.4 g. Glowing combustion was observed after 216 s, and flames appeared 11 s later. Both ignitions occurred near the surface of the heated plate. The fuel bed was completely blackened, and there was some ash formation.

The experiments with leaves are too few in number to draw many definite conclusions, but it is clear that leaves can ignite and flame for plate temperatures around 380 °C. The results also

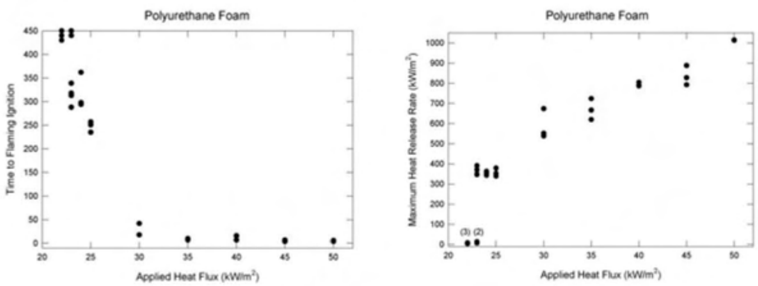

Figure 69. Values of time to flaming ignition and maximum observed heat release rate are plotted as functions of applied heat flux for polyurethane foam. Numbers in parentheses refer to the number of repeated measurements.

suggest that the application of a wind will have similar effects in enhancing ignition to those for the fuels discussed earlier.

4.10. Radiative Ignition of Non Fire-Retarded Flexible Polyurethane Foam

Non fire-retarded flexible polyurethane was included in the study as an example of a plastic material that might be found in an area where outdoor power equipment is stored. Experiments were done only in the cone calorimeter.

Figure 69 shows measured times to flaming ignition and maximum HRRs as a function of AHF. For AHFs between 30 kW/m^2 and 50 kW/m^2 the times required for flaming ignition increased slowly as the AHF decreased. When the AHF was decreased to 25 kW/m^2 the ignition times suddenly jumped to values on the order of 250 s. When the AHF was reduced to 24 kW/m^2 the ignition times increased by about another 50 s. Flaming was observed in only 4 of 6 tests with a further reduction of 1 kW/m^2 in AHF. Maximum ignition times for the cases that flamed were roughly 325 s. When the AHF was set to 22 kW/m^2 no flaming ignitions were observed for three tests.

Despite the highly non linear dependence of the ignition times on AHF, there was a nearly linear decrease in the maximum HRRs, with values dropping from about 1000 kW/m^2 for an AHF of 50 kW/m^2 to around 350 kW/m^2 for the lowest AHFs where ignition occurred.

Time resolved measurements of HRR and fuel mass reveal that the ignition and burning behaviors of the polyurethane foam were different from those observed for the other fuels. Figure 70 shows plots for an AHF of 50 kW/m^2. Following a brief induction period during which the HRR grew slowly and the mass loss rate was low, the HRR and mass loss rate grew

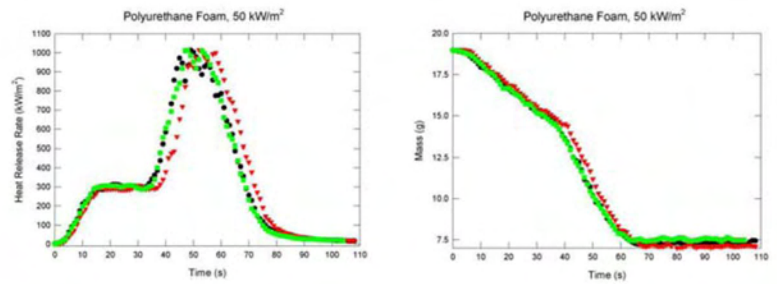

Figure 70. Heat release rates and sample masses are plotted as a function of time for three experiments in which a 50 kW/m^2 heat flux was applied to polyurethane foam.

rapidly to much higher plateau values that lasted about 25 s. About 40 s after exposing the sample to the AHF the HRR rate began to increase again, rising from about 300 kW/m^2 to a peak of around 1000 kW/m^2. The mass loss rate during this second burning phase was much higher than during the first. Following the second burning period the HRR fell rapidly to values close to zero, and the mass did not change appreciably.

Visual observations of flames spreading across a similar polyurethane foam provide a plausible explanation for the observed HRR behavior. As the flames spread onto unburned foam, the foam first darkened and began to shrink. As the foam continued to burn and shrink it generated a brown liquid that began to collect. Once the foam had fully collapsed, the liquid remained as a pool, which then burned as a pool fire. The first heat release peak in Figure 70 is likely associated with burning of the expanded foam. As the foam burned it was forming a liquid pool in the bottom of the sample pan, which eventually ignited and resulted in the second HRR peak.

The HRR and fuel mass time behaviors for tests with AHFs between 30 kW/m^2 and 50 kW/m^2 had similar appearances to those in Figure 70. As the AHF was reduced the induction period tended to increase. For an AHF of 30 kW/m^2 the induction times began to vary significantly, ranging from 15 s to 35 s.

Figure 71 includes plots showing HRR and fuel mass as a function of time for three experiments with an AHF of 25 kW/m^2. These curves have a very different appearance from those with an AHF of 50 kW/m^2 shown in Figure 70. There is a very long induction period during which a large fraction of the fuel mass is loss without significant heat release. This suggests that non oxidative pyrolysis of the foam was taking place. After periods ranging from 230 s to 250 s, the HRR began to rise quickly and flaming was present for a short period of time. During flaming the mass loss rates increased substantially, having slopes comparable to those present during the second burning phase with an AHF of 50 kW/m^2. Taken together, these observations suggest that the pyrolyzate generated directly from the foam was not ignited when a AHF of 25 kW/m^2 was used, but that the liquid pool that was generated by this pyrolysis did eventually ignite.

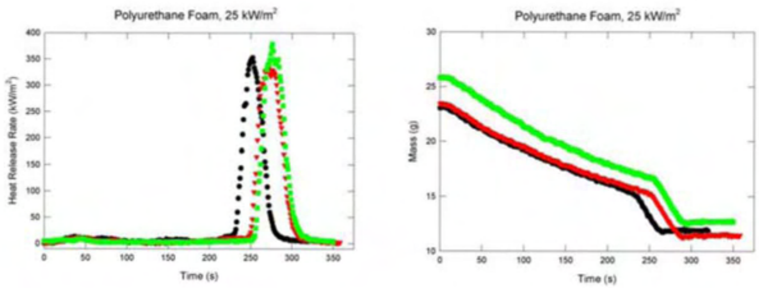

Figure 71. Heat release rates and sample masses are plotted as a function of time for three experiments in which a 25 kW/m^2 heat flux was applied to polyurethane foam.

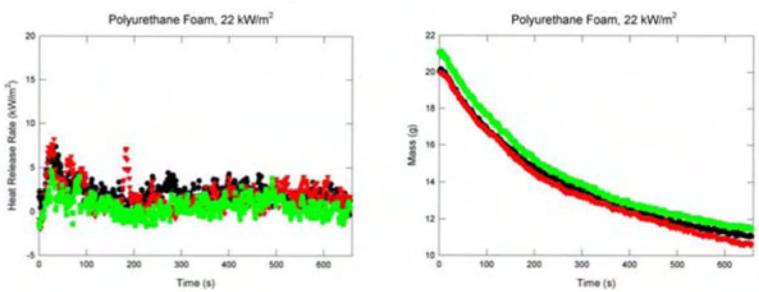

Figure 72. Heat release rates and sample masses are plotted as a function of time for three experiments in which a 22 kW/m^2 heat flux was applied to polyurethane foam.

During these experiments there was concern that the ignition of the foam might be due to the presence of the cone heater acting as a pilot for the pyrolysis gases being generated. This possibility was checked by making a video recording of the ignition. It was clear from analysis of this video that ignition occurred within the sample holder and then spread rapidly upwards.

Plots (not shown) of HRRs and fuel mass as functions of time for the three experiments with an AHF of 24 kW/m^2 and the four experiments that ignited with an AHF of 23 kW/m^2 are similar to those shown in Figure 71 with induction times that determine the times to ignition shown in Figure 69.

Figure 72 shows similar plots for an AHF of 22 kW/m^2 for which ignitions were not observed. The HRR plots suggest that there were brief periods during which some oxidation was occurring, but overall the HRRs were close to zero over the entire periods. On the other hand, a large fraction of the fuel mass was loss. This indicates that non oxidative pyrolysis was taking place in

cases where no ignition was observed. At the end of these experiments the inside of the sample holder was covered with a thin layer of solid black material. This was likely the remnants of the liquid material that formed during the pyrolysis of the polyurethane foam.

Due to the complex reaction behavior of the foam that led to the formation of a liquid and that left a hard-to-remove residue, the decision was made to not risk testing this material on the heated plate.

5. Summary and Discussion

The purpose of this investigation was to provide experimental findings that can be used to better estimate the potential for ignition associated with the heated exhaust surfaces present during the operation of OPE. Due to the application, emphasis was placed on natural fuels often found in the outdoor environment. Scenarios involving direct contact of fuel with a heated surface and radiative heating of fuel placed near a heated surface have been considered. A number of important parameters have been identified and varied during the investigation, including fuel type, heated surface temperature and intensity of applied radiative heat flux, and the absence or present of an imposed wind.

An important characteristic of most of the fuels considered is the ability to smolder. The primary source of information on smoldering behavior of the fuels used in this investigation is derived from the heated plate experiments. While for a limited number of experiments non glowing smoldering without a transition to glowing was observed (based on blackening of the fuel), it was far more common for glowing combustion to develop. As discussed earlier, the development of glowing appears to be a requirement for the ignition of flames in these fuel beds. The times required for the appearances of glowing and flaming are the primary data for the experiments reported here.

As for all experiments, there are uncertainties associated with the measurements that need to be assessed. As discussed in Section 4.1, some uncertainty in ignition times was introduced during visual observation of glowing combustion. In some cases the initial glowing was hidden within the fuel bed and glowing was not observed until a later time. It is believed in these cases that the time periods between initial glowing and the detection of combustion (either glowing or flaming) were relatively short and have little or no effect on the general conclusions drawn from the experiments.

Due to the stochastic nature of the fuel beds and the natural variation in the tendency of individual fuel elements to ignite, uncertainties in measured ignition times for a given heated plate temperature or radiative heat flux are inevitable. The only effective way to quantitatively characterize these variations would be to perform sufficient experiments to allow statistical analysis. It was not possible to perform the large number of experiments required within the scope of the current effort. In the absence of such data, a qualitative approach was adopted in which the degree of collapse of experimental data onto well defined curves is used as a qualitative basis for assessing uncertainty.

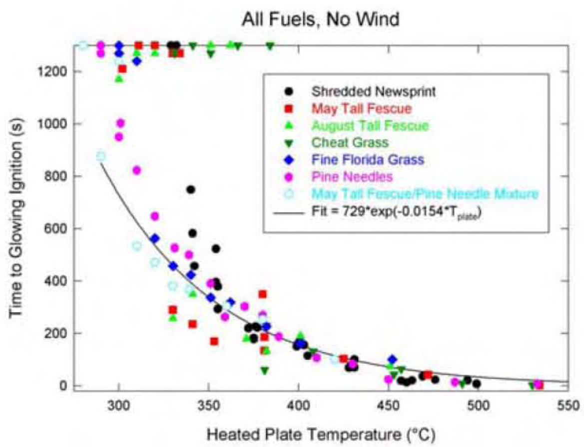

Figure 73. Data for time to glowing ignition with no applied wind are plotted as a function of heated plate temperature for seven fuels. Data near the upper temperature axis represent experiments for which ignition did not take place. The solid curve is the result of a least squares fit assuming an exponential dependence on heated plate temperature for all data where ignition was observed.

Similar considerations apply to determinations of the minimum heated plate temperatures or radiative heat fluxes required to ignite a given type of fuel bed. A detailed study would be expected to reveal an ignition probability curve in which the probability of ignition would increase from near zero to near one as temperature was increased over some range. Mapping out such a probability curve would have required far too many experiments. For this work an approach was adopted in which heated plate temperatures or radiative heat fluxes were reduced in discrete steps. Usually, but not in all cases, the step sizes were such that well defined demarcations between experiments with and without ignition were identified. Lower temperature ignition limits can be identified from these experiments, but due to the stochastic nature of the processes it is prudent to assign an uncertainty of at least one step size to the results.

Results for individual fuels have been discussed in Section 4. In order to assess the roles of fuel type, heated plate temperature, and wind for the surface ignition experiments, ignition time data (the shorter of glowing or flaming) for all of the fuels tested have been plotted together on a single plot. Figure 73 shows the result for experiments without an applied wind. For comparison purposes, a least squares curve fit assuming the fall off of ignition times with increasing plate temperature has an exponential dependence was fit to all of the data for which ignition was observed. The result of the fit,

$$t_{glowing,fit,none} = 729 \times e^{-0.0154 T_{heated\ plate}}, \qquad \textbf{(2)}$$

where $t_{glowing,fit,none}$ is the calculated time to ignition and $T_{heated\ \mathrm{plate}}$ is the heated plate temperature is shown as a solid curve in Figure 73 . The experimental data fall on a wide band on either side of the curve fit.

Data for each fuel shows a similar dependence on plate temperature, with the ignition time increasing with decreasing plate temperature and the rate of increase accelerating. Comparison with the exponential curve fit included in Figure 73 shows that an exponential dependence on plate temperature provides a good approximation for the temperature dependence.

Closer inspection of Figure 73 shows that data for individual fuels lie on well defined curves that show much smaller variations than the consolidated data. These relatively small variations show that variations in measurements for individual fuels are much smaller than those due to variations between fuels. Interestingly, data for all of the fuels seem to lie close together for plate temperatures above 400 °C, with larger relative differences between fuels appearing for lower heated plate temperatures.

Results for the May and August tall fescue grasses fall close together and lie well below the curve fit, data for fine Florida grass and the May tall fescue/pine needle mixture fall close to the curve fit, and the shredded newsprint and pine needle data appear well above the curve. It is difficult to assess the behavior of cheat grass because it did not ignite for temperatures below 380 °C. Recall that transition to flaming in the absence of a wind was unlikely for May tall fescue, August tall fescue, and cheat grass, while the May tall fescue/pine needle mixture transitioned to flaming in over half of the tests, and the pine needles and shredded newsprint were likely to flame for all wind conditions. The probability of transition to flaming in the absence of wind seems partially correlated with the time-to-ignition variations observed between fuels, with a shorter time to ignition correlating with a lowered probability of transition to flaming.

The data at the top of the plot in Figure 73 represents experiments for which glowing or flaming ignition was not observed. Minimum ignition temperatures show distinct fuel-type dependencies. The highest minimum ignition temperature (380 °C) was for cheat grass. This was followed by the August tall fescue (371 °C) and May tall fescue (340 °C). Recall that even though glowing combustion was not observed just below the transition temperature for these two grasses, non glowing smoldering was observed down to temperatures around 300 °C. The minimum heated plate ignition temperature (340 °C) for shredded newsprint was similar to that for May tall fescue. Next was the fine Florida grass with a minimum ignition temperature of around 320 °C. The minimum ignition temperatures were 300 °C for pine needles and 290 °C for the May tall fescue/ pine needle mixture. In general, the four grasses seem to have the highest minimum ignition temperatures, but there is no clear correlation between the minimum ignition temperatures and the relative ordering of the ignition time curves.

Results of the heated plate ignition experiments with a low wind for the seven fuels are plotted in Figure 74. The data fall within a band and have a similar temperature dependence to those for the no wind case shown in Figure 73. A least squares curve fit to an exponential gave

$$t_{glowing,fit,low} = 106{,}000 \times e^{-0.0176 T_{heated\ plate}}, \qquad (3)$$

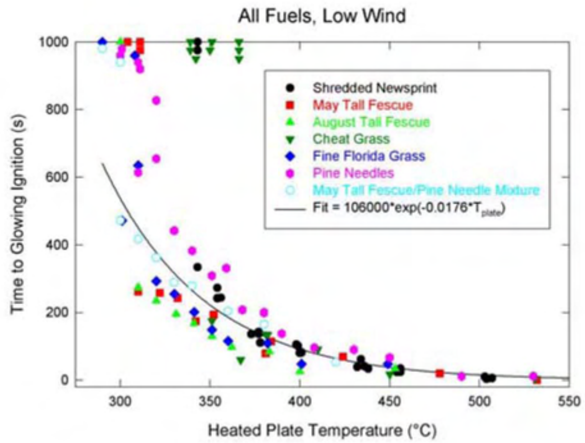

Figure 74. Data for time to glowing ignition with a low applied wind are plotted as a function of heated plate temperature for seven fuels. Data near the upper temperature axis represent experiments for which ignition did not take place. The solid curve is the result of a least squares fit assuming an exponential dependence on heated plate temperature for all data where ignition was observed.

and is shown as a solid curve in Figure 74. Similar to the no wind case, the data for individual fuels fall on bands with fluctuations that are smaller than the differences between the fuels.

As for the no wind case, the data lie fairly close together for heated plate temperatures greater than 400 °C and begin to diverge at lower temperatures. The data for May tall fescue, August tall fescue, and fine Florida grass are close together and lie below the curve fit. The results for the May tall fescue/pine needle mixture lie close to the calculated curve, while those for shredded newsprint and pine needles fall above. As for the no wind case, it is difficult to assess cheat grass because it did not ignite below 380 °C. The locations of the curves for the different fuels relative to the curve fit are similar to those for the no wind experiments, with the exception that the data for fine Florida grass lies somewhat closer to those for May tall fescue and August tall fescue.

Minimum heated plate ignition temperatures for cheat grass (380 °C), shredded newsprint (340 °C) pine needles (310 °C), and the May tall fescue/pine needle mixture (300 °C) were similar to those observed without an applied wind. May tall fescue, August tall fescue, and fine Florida grass each ignited for plate temperatures as low as 310 °C. For all three grasses this value is lower than observed without a wind present.

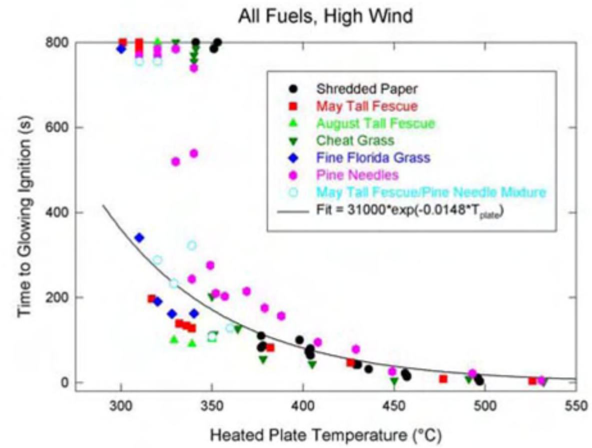

Figure 75. Data for time to glowing ignition with a high applied wind are plotted as a function of heated plate temperature for seven fuels. Data near the upper temperature axis represent experiments for which ignition did not take place. The solid curve is the result of a least squares fit assuming an exponential dependence on heated plate temperature for all data where ignition was observed.

A similar plot of ignition times versus heated plate temperature is shown in Figure 75 for experiments with a high wind. For some of the fuels fewer measurements were done than for the no and low wind cases, but the results follow similar trends. The variations with plate temperature are similar, and a least squares curve fit to an exponential for all of the data with ignition yields

$$t_{glowing,fit,high} = 310{,}000 \times e^{-0.0148 T_{heated\ plate}}, \tag{4}$$

which is shown in the figure as the solid curve.

As for the no wind and low wind cases, the data for individual fuels fall on well defined curves having smaller fluctuations than the variations between different fuels. The results for May tall fescue, August tall fescue, and fine Florida grass fall close together and lie below the curve. Unlike earlier experiments where the cheat grass did not ignite with a plate temperature below 380 °C, the lowest ignition temperature with a high wind was 350 °C. The data for the cheat grass fall close to the curve fit for all of the data, as do the measurements for the May tall fescue/pine needle mixture. As observed for the other two wind cases, longer ignition times were required for pine needles than indicated by the curve fit. It is not possible to assess the behavior of the shredded newsprint due to the gap of 30 °C between the lowest plate temperature where ignition was observed at 380 °C and the plate temperature where ignition did not occur.

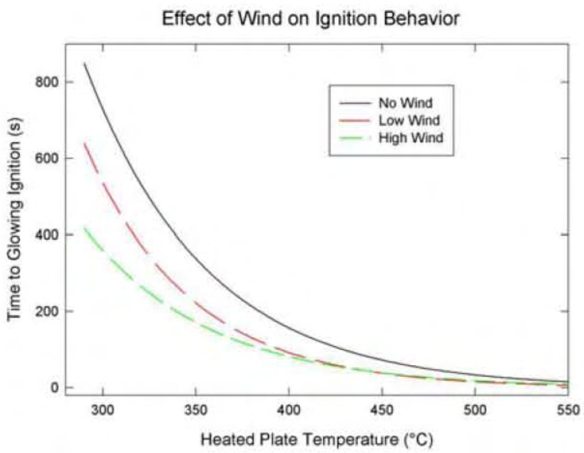

Figure 76. Results of exponential least squares curve fits of experimental ignition times as a function of heated plate temperature for seven fuels are shown for no wind, low wind, and high wind cases.

The highest value of minimum heated plate ignition temperature for these fuels was found for the shredded newsprint, lying between 380 °C and 360 °C. The next was the cheat grass with a minimum ignition temperature of 350 °C, which is about 30 °C lower than observed for this fuel with the other two wind conditions. The minimum ignition temperature for pine needles was 340 °C, but note that this material failed to ignite for some experiments at both 340 °C and 350 °C. The lowest minimum ignition temperatures for the three remaining grasses and the May tall fescue/pine needle mixture fell between 310 °C and 330 °C, with the fine Florida grass having the lowest value.

The data plotted in Figure 73 to Figure 75 show how ignition behaviors depend on the heated plate temperature and fuel for the porous beds studied here. Additional insights into the effects of wind are obtained by plotting the curve fits given by Equation (2) to Equation (4) on a common plot, as shown in Figure 76. It should be kept in mind that these curve fits are for seven fuels and that there were systematic variations in the data with fuel. Nonetheless, given the similarities in the spreads of data and the similar effects of fuel for the three wind cases, it seems appropirate to use these fits to characterize the effects of wind on surface ignition.

The feature that stands out in Figure 76 is the substantial reduction in ignition times with increasing wind speed for a given heated plate temperature. This effect is particularly pronounced over the lower portions of the temperature range. The dependence on wind is monotonic for the three conditions tested, suggesting that further reductions in ignition times would be likely at higher wind speeds. It should be noted that the two wind velocities used,

1.1 m/s and 2.5 m/s, correspond to 2.5 mph and 5.6 mph. These velocities are comparable to speeds at which OPE operate, and could be induced by equipment motion in still air. Outdoor winds are frequently considerably higher than these levels, so substantial additional reductions in ignition times might be possible for conditions typically encountered in outdoor environments.

The reductions in ignition time with increasing wind as well as qualitative observations concerning the ignition behavior such as initial ignition location and glowing intensity indicate that the primary effect of wind is to increase the amount of oxygen reaching the fuel surface. Since surface oxidation rates for temperatures high enough to generate meaningful reaction rates are generally limited by the rate at which oxygen reaches the surface, the effect is to accelerate the surface reaction rate and decrease the ignition times for both glowing and flaming ignition.

A wind effect that is not revealed by the results plotted in Figure 76 is the potential to convectively cool the fuel and thus slow or prevent ignition. Observed changes in the minimum plate temperatures required for ignition with wind speed and the distributions of blackening on the bottom of fuel beds that did not ignite in the presence of a wind provide evidence that convective cooling affected the surface reaction behavior of the porous fuel beds studied here. Presumably, the observed ignition behavior is determined by a balance of the competing effects of increased oxygen availability and convective cooling. The need to consider these competing effects should be kept in mind when extending the results of this study to wind conditions that were not investigated.

The non piloted thermal radiation ignition behaviors for four of the seven fuels investigated in detail using the heated plate were also studied with the cone calorimeter. Figure 77 shows plots of glowing or flaming ignition time versus AHF for shredded newsprint, May tall fescue, cheat grass, and pine needles. The data plotted near the upper axis represent experiments for which ignition was not observed.

The data for the different fuels fall on well defined curves which have a similar dependence on AHF to the ignition time variations observed with heated plated temperature (see Figure 73 to Figure 76). For the highest AHFs ignition occurs within a few seconds. As the AHF is reduced from the highest values there is a range where the ignition times increase slowly with decreasing AHF. With further reductions in AHF, a point is reached where the measured ignition times begin to rise rapidly. For pine needles the rapid rise begins around 30 kW/m^2 and for the remaining three fuels around 20 kW/m^2. The rate of increase with decreasing AHF is much higher for the three remaining fuels than for pine needles.

The data for the shredded newsprint, May tall fescue, and cheat grass fall close together. These three sets of data were combined, and a least squares fit to an exponential was obtained. The result,

$$t_{ignition,\,fit} = 5540 \times e^{-0.260\,AHF}, \qquad (5)$$

is shown in Figure 77 as a solid line. The measurements for the three fuels fall close to the calculated curve.

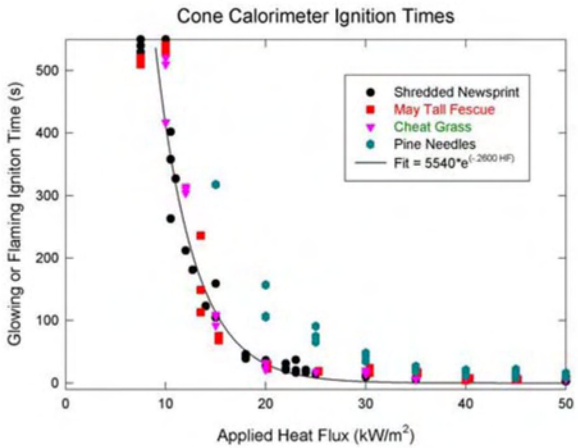

Figure 77. Ignition times due to non piloted radiative heating in the cone calorimeter are plotted as a function of applied heat flux for the four fuels indicated. The solid line shows the results of a least squares exponential curve fit to the combined data for shredded newsprint, May tall fescue, and cheat grass.

Due to the similarities in the response curves, it is worthwhile to consider whether the radiative ignition results can be related to those for the heated plate in some way. One approach is to compare effective temperatures for the radiant heat flux, determined by assuming the thermal radiation is generated by a black body, with corresponding heated plate temperatures. The radiative heat flux (RHF) from an ideal black body is given by

$$RHF = 5.67 \times 10^{-13} * T_{BB}^4, \qquad (6)$$

where the *RHF* has units of kW/m^2 and T_{BB} is the black body temperature in K. Values of temperature derived from Equation (6) are plotted as a function of RHF in Figure 78.

The results in Figure 77 indicate that ignition did not occur for AHFs of 7.5 kW/m^2 and that the minimum AHF required to ignite smoldering was around 10 kW/m^2 for shredded newsprint, May tall fescue, and cheat grass. The corresponding black body temperatures for these AHFs are 330 °C and 375 °C. The minimum observed heated plate ignition temperatures for these fuels with no applied wind were 340 °C, 340 °C, and 380 °C. The close agreement between the minimum heated plate ignition temperatures and the black body temperature range over which radiative ignition no longer occurred suggests that the processes determining the minimum ignition conditions are similar for the two types of heating and that the fuel surfaces are being heated to comparable temperatures.

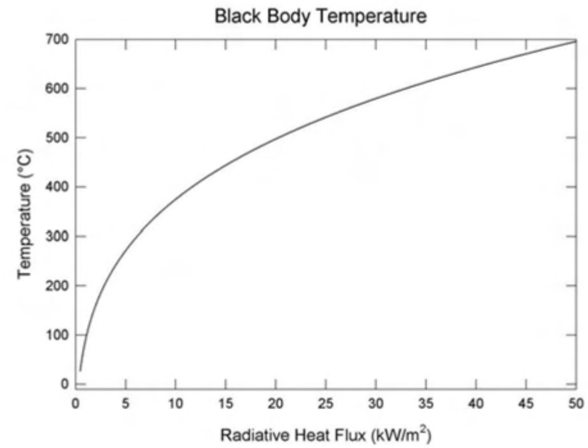

Figure 78. Temperatures are plotted as a function of radiative heat flux assuming that the flux is generated by an ideal black body.

The results in Figure 73 show that ignition times increased slowly with decreasing plate temperature between 550 °C and 450 °C and then began to increase more rapidly with an increasing slope as heated plate temperatures were lowered further. A similar change in slope occurs around 20 kW/m^2 for the time to ignition data in Figure 77. The black body temperature for 20 kW/m^2 is 498 °C. This temperature is somewhat higher than the 450 °C estimate from the heated plate experiments, but is close enough to support the conclusion that the response of these fuels to the two heating types is similar. This is particularly so when it is noted that differences in response should be expected based on configurational differences between the two experiments. The heated plate applied heat at the bottom of the fuel bed, and a buoyant plume, which entrained air through the sides of the fuel bed, was generated. This plume both heats fuel above the plate and provides additional oxygen for surface oxidation. On the other hand, in the cone calorimeter experiment the radiative heating was applied to the top of a fuel bed that was closed on the sides. In this case buoyancy-induced flow by heating near the top surface of the bed is expected to remove heat from the fuel bed, and the absence of air flow into the fuel bed from the sides results in a reduced surface oxidation rate compared to the heated plate experiments. Both of these effects are expected to lengthen ignition times.

The above discussion refers to the ignition behaviors of shredded newsprint, May tall fescue, and cheat grass. The agreement between experiments with the two types of heating is not as good when pine needles are considered. The radiative ignition times for this fuel began to increase around 30 kW/m^2. This corresponds to a black body temperature of 580 °C. Corresponding increases in ignition times for heated plate ignition did not appear until the plate temperature was reduced to around 450 °C. It has not been possible to provide an explanation for this difference.

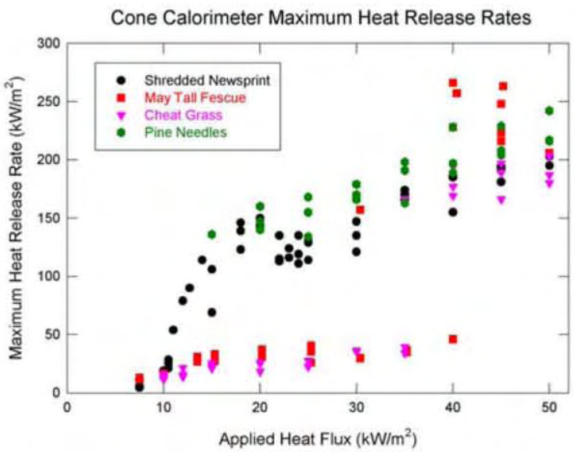

Figure 79. Values of maximum heat release rate are plotted as a function of applied heat flux for the four fuels indicated.

The behavior of maximum HRRs determined in the cone calorimeter experiments provide additional information concerning ignition behavior, particularly with respect to transition to flaming. Figure 79 shows combined plots of maximum HRRs versus AHF for shredded newsprint, May tall fescue, cheat grass, and pine needles. The high maximum HRRs indicate that flaming was ignited for all of these fuels with AHFs of 40 kW/m^2 and higher. At these high AHFs the maximum HRRs were around 200 kW/m^2 for each of the fuels.

As the AHF was reduced below 40 kW/m^2 the two grasses no longer flamed, and the observed HRRs dropped precipitously to values characteristic of smoldering. The corresponding black body temperature for an AHF of 40 kW/m^2 is 643 °C. This temperature is much higher than the highest heated plate temperatures used, thus the cone calorimeter results are consistent with the fact that transition to flaming was not observed on the heated plate for these two grasses when no wind was applied. Since smoldering was present at lower temperatures for both grasses, these results suggest that flammable mixtures of pyrolysis gases for these grasses are only generated when the fuels are subjected to high heating fluxes and/or high fuel surface temperatures.

In contrast to the grass behavior, transition to flaming was observed for the shredded newsprint and pine needles for AHFs as low 10 kW/m^2. This is consistent with the observations for the heated plate experiments, which showed that these two fuels transitioned to flaming in the absence of a wind whenever glowing was observed.

The transition to flaming behaviors of May tall fescue and cheat grass were very different in the presence of a wind, with transition observed for the cheat grass and not for the May tall fescue.

The cone calorimeter results provide no indication of this difference since the observed ignition behaviors and maximum HRRs were similar for both. This suggests that while radiative heat flux measurements can provide insights into smoldering and flaming behaviors for fuels placed on a heated surface when no wind is present, they do not differentiate ignition differences that appear due to the presence of a wind.

It is significant that similar differences in transition to flaming behavior were observed for the May tall fescue (did not flame) and August tall fescue (flamed) with wind present. These two samples were collected from the same location and likely consisted of the same type of grass (there is a possibility that more than one type of grass was present and grew at different rates, depending on conditions). Even so, the results indicate that ignition characteristics for grass samples from a given location can vary with seasonal changes.

The fact that flaming is observed for the May tall fescue and cheat grass with similar AHFs in the cone calorimeter does provide a clue as to the reason for their different flaming behaviors when placed on the heated plate in the presence of wind. The observations suggest that the temperatures developed on the fuel surfaces as a result of oxidation are higher for the cheat grass than for the May tall fescue.

The cone calorimeter results for polyurethane foam were different from those observed for the cellulosic fuels. No smoldering was observed, and the material either flamed or did not ignite. For AHFs of 30 kW/m^2 or greater the ignition times were less than 50 s, increasing to several hundred seconds for AHFs between 23 kW/m^2 and 25 kW/m^2. No ignition was observed with APHs of 22 kW/m^2. This value is much higher than the minimum AHFs that ignited smoldering in the cellulosic fuels. Two distinct burning periods with different HRR behaviors were observed in the HRR time histories for the polyurethane foam that were not characteristic of the other fuels. This was attributed to the formation of a liquid component during the foam burning followed by pool burning. The higher AHFs required for ignition and the burning behavior suggest that polyurethane foam placed in contact with or near a heated surface may not ignite as easily as shredded newsprint or the natural fuels that can smolder at lower temperatures.

As discussed in Section 2, only limited information is available in the literature for comparison with the results of this investigation. The most similar studies were those of Harrison [17] and Kaminski [18], who reported limited measurements of ignition times for natural fuels when placed in contact with variable temperature heated surfaces. Harrison reported that pine needles and grass ignited in about four minutes with surface temperatures of 400 °C and 350 °C, respectively. The effect of a light wind was to reduce the ignition time. With the exception of punky wood, which ignited in several hundred seconds for a surface temperature of 270 °C, Kaminski found that most of the fuels he investigated would ignite with surface temperatures between 300 °C and 330 °C. These results are comparable to those reported here. Cheat grass was reported as requiring 120 s for ignition at 330 °C. The current measurements (see Figure 51) indicated that cheat grass did not ignite at temperatures below 380 °C when a wind was not present.

Stockstad has reported the ignition behavior of small pieces of cheat grass [20], pine needles [21], and rotten wood [19] when exposed to heated air in an oven. Cheat grass ignition was observed to require 7 s for a temperature of 380 °C, while pine needles required about 15 s for temperatures as low as 300 °C. These minimum ignition temperatures are in good agreement with values for the same fuels determined in the current study, but the observed ignition times are much shorter than those measured with the heated plate.

No previous experiments were identified in the literature with which the radiative heating results could be directly compared. White and coworkers have employed the cone calorimeter to investigate piloted ignition for a variety of natural fuels including cheat grass, but measurements have been made using only one or two AHFs. [24,25,26]

Manzello et al. investigated the ignition behavior of similar fuel beds, including shredded newsprint, grass, and pine needles, in the presence of light winds due to contact with one or more glowing fire brands placed on the top surface. [22,23] Their results indicated that shredded newsprint developed smoldering, grass did not smolder or flame, and pine needles developed smoldering and transitioned to flaming only with four large glowing brands applied and with the highest wind (1 m/s) used. These results suggest that glowing fire brands placed on top of a fuel bed are less likely to ignite smoldering or flaming than when similar fuels are placed on top of a heated plate. This is the case even though heated plate temperatures were likely much lower than the surface of a glowing fire brand.

The ignition behaviors of the cellulosic fuels investigated can be classified into two broad groups: pine needles and shredded newsprint which developed smoldering and transitioned to flaming when no wind was present and the grass samples which developed smoldering, but did not transition to flaming without an imposed wind. Note that the May tall fescue/pine needle mixture had ignition behaviors intermediate between these two extremes. It is not possible to definitely identify the reasons for these differences without careful characterization of the fuels and their response to heating. However, it is possible to provide a plausible explanation. Newsprint is known to consist primarily of cellulose, while the natural fuels contain varying proportions of cellulose and lignin (see the discussion in Section 2). As discussed earlier, fuels with high percentages of cellulose are more likely to flame, while fuels with higher percentages of lignin tend to smolder. This suggests that the shredded newsprint and pine needles investigated here tend to flame because they contain higher percentages of cellulose relative to lignin than the grasses that were studied.

It is possible that the different ignition behaviors of May tall fescue (limited transition to flaming) and August tall fescue (transitioned to flaming) in the presence of a wind are due to differences in the cellulose/lignin ratios for the two grasses, with a higher ratio of lignin in the rapidly growing spring grass, or to some other type of seasonal compositional difference.

The results of this investigation have demonstrated that smoldering and flaming ignition of cellulosic fuel beds exposed to conditions chosen to be representative of those generated on OPE heated exhausts vary with surface temperature, fuel type, wind, and season. In addition to these parameters, there are a number of others that would be expected to affect ignition behavior but were not varied in this study. One of these parameters is fuel moisture. The grasses and pine needles used in this investigation had measured fuel moisture percentages ranging from 10 % to 14 %. This narrow range is consistent with the expected values for these types of dry fuels

stored in a general purpose laboratory maintained near 20 °C. Such small variations are not expected to significantly affect ignition behavior. Much wider variations in fuel moisture are observed in nature, with higher values often present in living and recently cut vegetation and lower values found for dried vegetation located in higher temperature or low-humidity environments.

Babrauskas provides good reviews of the effects of moisture content on ignition behavior in general and for outdoor fuels in particular. [5] The primary effect of moisture content on cellulosic fuels is expected to be a lengthening of ignition times since a fraction of the heat applied to the fuel will be used to remove fuel moisture at the expense of heating the fuel. Once the fuel moisture has been removed, the fuel will begin to heat and eventually surface oxidation can become self sustaining.

Other important parameters not varied in the current investigation include fuel bed exposed surface area, fuel bed thickness, fuel bed porosity, spatial orientation of the heat source and the fuel bed, and the accessibility of the interior of a fuel bed to an applied wind. The potential for changes in ignition behavior due to these fuel bed properties must be kept in mind when using the findings of this investigation to assess the potential for ignition of fuels by heated surfaces.

Even though the findings of this investigation are subject to the limitations discussed above, it is possible to derive some guidance with regard to ignition behaviors expected for heated exhaust surfaces of OPE. The results indicate that ignition of natural fuels can occur for heated surface temperatures as low as 290 °C. All of the cellulosic fuels studied had lower limit ignition temperatures for some wind conditions that were within 50 °C of this value. In general, these lower limits are in good agreement with the value of 320 °C recommended by Ford as being representative of the lower ignition temperature for natural fuels. [15]

The temperature-ignition time curves observed in this study are likely to be important when considering potential scenarios involving ignition of fuels by contact with or radiation from heated surfaces. Several minutes were required for ignition (either glowing or flaming) near the lower limit temperatures for all of the fuels investigated. However, when temperatures were increased by 100 °C or AHFs by 10 kW/m^2, these times dropped to tens of seconds and became very short when heated plate temperatures or AHFs were increased further.

While clearly not representative of the worst possible cases, the ignition time curve fits to heated plate temperatures given by Equation (2) to Equation (4) should be useful for estimating times to ignition for general cellulosic porous fuel beds brought into contact with heated surfaces having a temperature range of 290 °C to 550 °C. In order to provide a safety factor, the calculated ignition times for a given surface temperature could be reduced by a factor of 2. It would also be appropriate to consider the calculated ignition times to be the periods required for flaming to develop, even though in many cases only glowing combustion would occur. Additional reductions in calculated ignition times would be prudent if winds higher than 2.5 m/s are considered likely.

The experimental findings suggest there is a correlation between the temperature dependence of ignition on the heated plate and black body temperatures corresponding to AHFs used for the

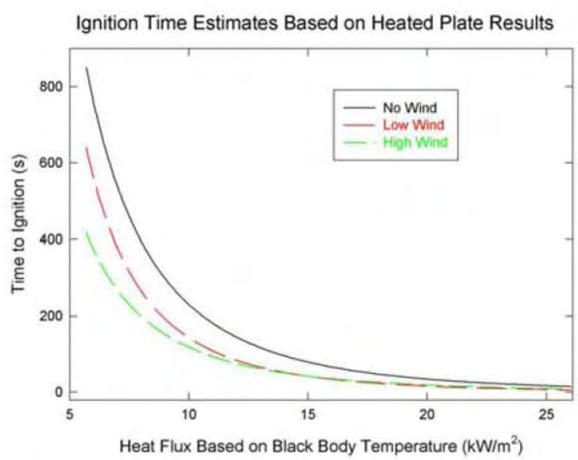

Figure 80. The curve fit times to ignition for no wind, low wind, and high wind shown in Figure 76 are plotted as a function of the AHF calculated for the radiative heat flux from a black body held at the heated plate temperature.

radiative ignition experiments. For the fuel beds and heating configurations studied, the calculated black body temperatures were slightly higher for the lowest ignition temperature and the locations of the knees in plots of ignition time versus heated plate temperature and AHF. As noted, these differences are in the direction expected based on the different fuel bed holders and directions of heat application for the two experiments.

A reasonable approach for estimating ignition times for cellulosic fuels subjected to a radiative heat flux is to use the time/temperature curves for heated surface ignition, and convert the heated plate temperatures to AHFs assuming black body thermal radiation. Figure 80 shows the results. The curve for the no wind case has a similar appearance to those determined in the radiative ignition experiments. There are no experimental data for the effects of wind on the ignition of radiatively heated fuel beds. However, given the similarities of the no wind cases, it is reasonable to expect that the effects of applying winds are captured correctly.

The determination of the ignition time/temperature and ignition time/applied heat flux relationships for cellulosic fuels was time consuming due to the large number of measurements required. It should be possible to learn a great deal concerning fuel effects with many less experiments at a single temperature. Based on the results of the experiments reported here, an appropriate plate temperatures for such tests would be 380 °C, with experiments run with and without an applied wind. Such experiments would provide relative indications for the propensity of fuels to smolder and flame in the absence of a wind along with an indication of the effects of wind on these ignition behaviors.

The experimental systems developed for this investigation have proven useful for the purpose of characterizing the ignition of cellulosic fuels. There are a number of improvements that could be made to the heated plate system. Perhaps the most important would be the use of a computer controlled system for maintaining a constant plate temperature while automatically recording the plate temperature. It would also be possible to record the currents required to maintain a constant temperature. Qualitative observations indicate that this measurement would provide insights into whether or not endothermic or exothermic processes were taking place as well as an indication for the amounts of heat generated during surface oxidation. The development of such a system should be straight forward and would alleviate the need to carefully review video tapes in order to record the temperatures.

The current findings show that HRRs from the cone calorimeter provide information concerning smoldering and flaming of these fuels when subjected to radiative heat fluxes. The time behavior of the HRR provides a good indication for when ignition occurs. Due to the configuration, it is difficult to visually observe when glowing combustion develops within the fuel bed. It would be useful to modify the cone calorimeter in a way that would allow improved detection of the onset of glowing combustion.

In order to provide higher confidence in the findings of this investigation it would be useful to make similar measurements for a wider variety of fuels. In particular it would be useful to consider a wider variety of grasses and to include various types of leaves. It would also be important to characterize the role of such parameters as fuel moisture and fuel bed density, porosity, and thickness that were not varied.

The types of studies reported here could serve as the basis for a much improved understanding of the ignition behaviors of cellulosic fuels. It should be possible to correlate fuel composition (e.g., cellulose to lignin ratio) with ignition behavior. It would be also worthwhile to examine the possibility that small scale heating experiments such as differential scanning calorimetry (DSC) and thermogravimetric analysis (TGA), which record the response of small samples to heating, correlate with the fuel bed ignition behaviors since surface reactions appear to play such large roles.

6. Acknowledgements

Many people contributed to the success of this effort. Funding was provided by The International Consortium for Fire Safety, Health, and the Environment (ICFSHE) with financial oversight by Karen Suhr. Technical oversight was provided by Petra Andersson and Margaret Simonson of SP Technical Research Institute of Sweden.

Cheat grass was harvested and forwarded to NIST by Tye Morgan working under the direction of Bob Blank, both with the United States Department of Agriculture Agricultural Research Service Laboratory in Reno, NV. Arrangements for acquisition of the fine Florida grass were made by James McNew of the Outdoor Power Equipment Institute. Sam Manzello of BFRL/NIST provided the pine needles that were tested.

The heated plate was designed and assembled at BFRL/NIST. Bill Grosshandler provided the design and Mike Selepak, Michael Smith, and Ed Hnetkovsky ordered parts, did required machining, and assembled the plate.

All experiments in the cone calorimeter were performed at BFRL/NIST by Michael Smith, who did an excellent job.

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BELL BOEING
THE TILTROTOR TEAM
INTEROFFICE MEMO

9 December 2008
IOM 81:ATC:atc:3770

To: R. Slaughter
Copies to: BHTI: R. Bryson, J. Narramore, B. Roberts, T. Trept
BH: J. Liu

From: A. Cummings

Re: Hover Outwash Profile Comparison of V-22, CH-46A, CH-53E

References: (1) NAWCADPAX--98-88-RTR “V-22 ROTOR DOWNWASH SURVEY” R. E. Lake and W. J. Clark.
(2) Boeing-Vertol Memo 8-7442-1-103 Rev A”Horizontal Component of Downwash from a CH46A Helicopter in Hover” D.L. Bierly, 23 Jan 1968.
(3) V-22 NATOPS Manual.

A request from NAVFAC was received from the ILS Group at Bell Helicopter regarding downwash and outwash from the rotor of the V-22 in hover. This request supports an environmental impact trade study of deploying the V-22 to the California area. Temperature information was provided by D. Loe in the Propulsions group. This memo borrows information from several sources and compares several other aircraft outwash profiles.

An example of NATOPS data is shown below in Figure 1. The data is primarily focused on a 45,000 lb aircraft hovering at 20 ft AGL. Data collected in 1998 on the V-22 by NAVAIR is plotted in detail in the 98-88 report. The focus of this report concerned impact to personnel near the aircraft. The V-22 data was compared to the CH-53K. The plots are shown below Figure 2.

Historical data of the CH-46A is presented in Memo 8-7442-1-103 for a 19,000 lb aircraft hovering at 40 ft AGL. This data was scaled according to the plots in the memo from 40 ft AGL to 20 ft AGL based on momentum theory. The nose and tail dynamic pressure at 20 ft AGL is 80% of the value of the dynamic pressure at the nose and tail at 40 ft AGL. The complete map of dynamic pressure at 40 ft AGL was scaled by 80% in order to compare to the V-22. The resultant velocity comparison for the V-22 and the CH-46A is shown below in Figure 3. The V-22 contours were traced from figures in the 98-88 report.

BELL BOEING
THE TILTROTOR TEAM
INTEROFFICE MEMO

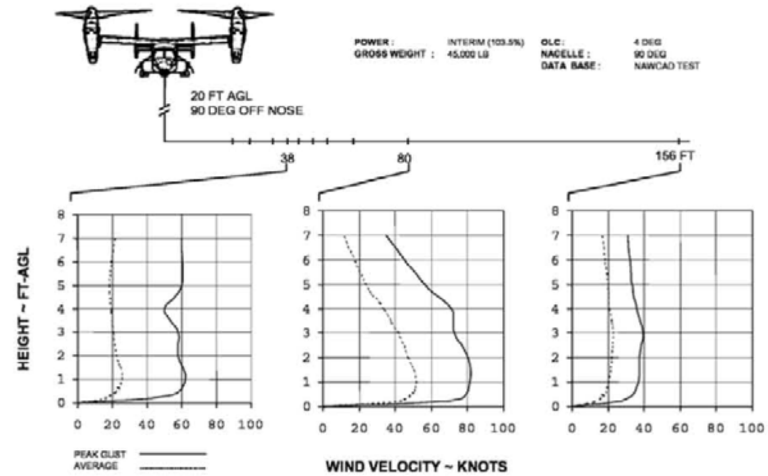


Figure 1. A selection of data from Figure 11-6 in the MV-22 NATOPS manual for downwash profile.

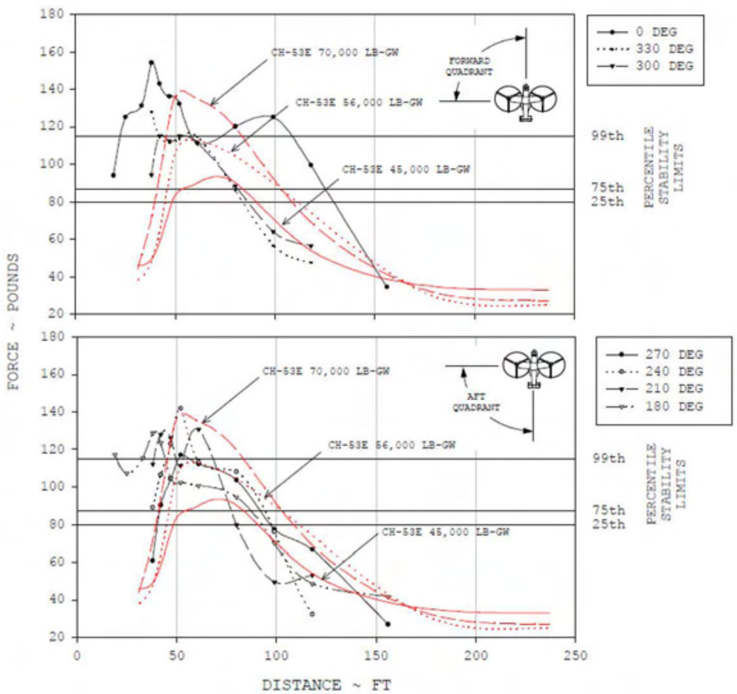


Figure 2. Comparison of CH-53E helicopter and the V-22 tiltrotor aircraft peak downwash wind forces plotted as a function of distance.

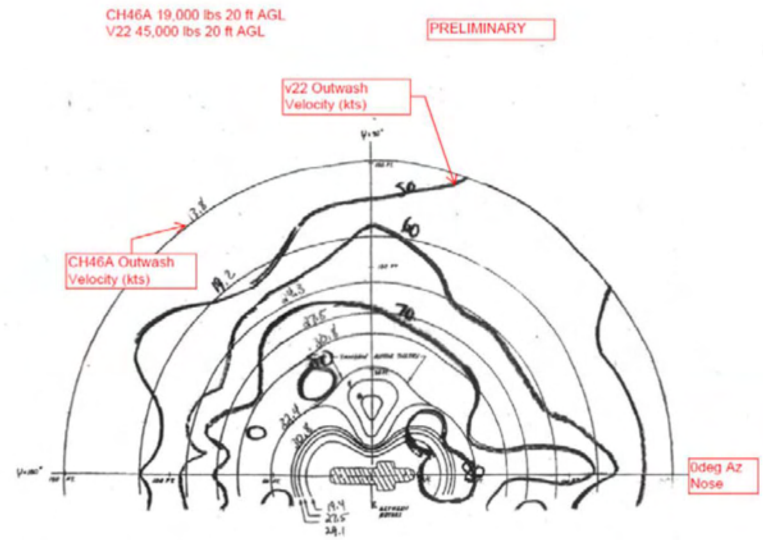


Figure 3. Outwash velocity comparison for scaled CH-46A and V-22 at 20 ft AGL.

Please direct any questions to the undersigned.

Antonette T. Cummings
V-22 Aerodynamics
817-280-8397
Bell Helicopter, Ft Worth

DOWNWASH

BOEING-VERTOL INTER-OFFICE MEMORANDUM

REVISED: 23 January 1968
Date: ~~10 May 1967~~
Ref: 8-7442-1-103
From: C. E. Kolesar
REVISION A - From: D. L. Bierly

To: D. Brandt P32-76

Subject: Horizontal Component of Downwash From a CH-46A Helicopter in Hover.

Reference: (a) Hiller Aircraft Corporation Report #60-15

(b) Dynasciences TRECOM Report No. DCR-39, dated August 1964.

Enclosures: (1) CH-46A Hovering Downwash Dynamic Pressure Map.

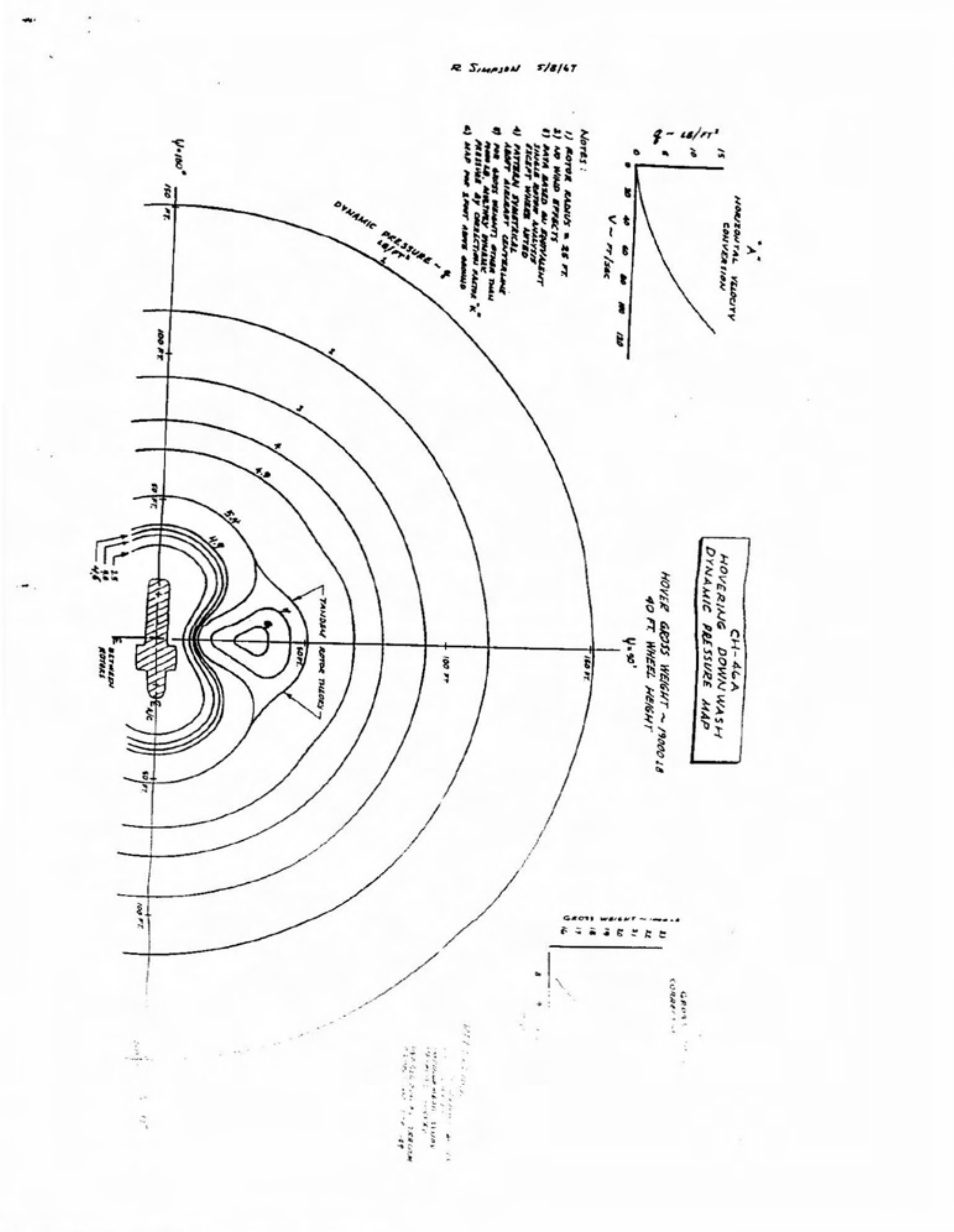
(2) CH-46A Downwash Distribution (wheel height = 20 ft.)

(3) CH-46A Downwash Distribution (wheel height = 40 ft.)

(4) CH-46A Downwash Distribution (wheel height = 87 ft.)

Enclosure 1 presents the horizontal component of downwash dynamic pressure, "q", for a CH-46A helicopter, gross weight = 19000 lbs. in a hover at 40 foot wheel height. The dynamic pressure shown is the maximum; i.e. at one foot above the ground. At 5 feet above the ground, the dynamic pressure is approximately 50% of the values shown. The conversion from "q", pounds per square foot, to V, horizontal velocity in feet per second, is found in Curve "A". A correction factor to be applied to the "q" values on the contour plot when operating at gross weights other than 19000 lbs. is found in Curve "B". The shape and position of the contours remain the same for different gross weights, only the value of "q" changes.

Enclosures 2, 3 and 4 present the horizontal component of downwash dynamic pressure for azimuth positions of $\Psi = 0°$, 90°, 180° and 270° for wheel heights of 20, 40 and 50 feet respectively. The tandem rotor theory portion of each curve was derived from test data presented in Reference (a). Single rotor theory is valid for downwash ... at radial distances in excess of one rotor diameter from



and consists of replacing the tandem rotor with an equivalent single rotor with the same disc loading and area. For Ψ = 90° and 270° a transition region exists between tandem and single rotor theory. To date, this region is relatively undefined and at best can only be approximately as shown. The dynamic pressures shown are for 1 foot above the ground. At 5 feet above the ground, the values of "q" are about 50% of those shown. Curves "A" and "B" of enclosure 1 also apply to enclosures 2, 3 and 4.

C. E. Kolesar
Prod. Aero. Unit Chief
X 2252

R.A.S./bvd

NOTE:

The enclosures contained herein are intended to give approximate values of the maximum dynamic pressure, and as such are not to be used for the placement of either personnel or equipment.

D. L. Bierly
CH-46/107 Projects Aerodynamics
Ext. 2250

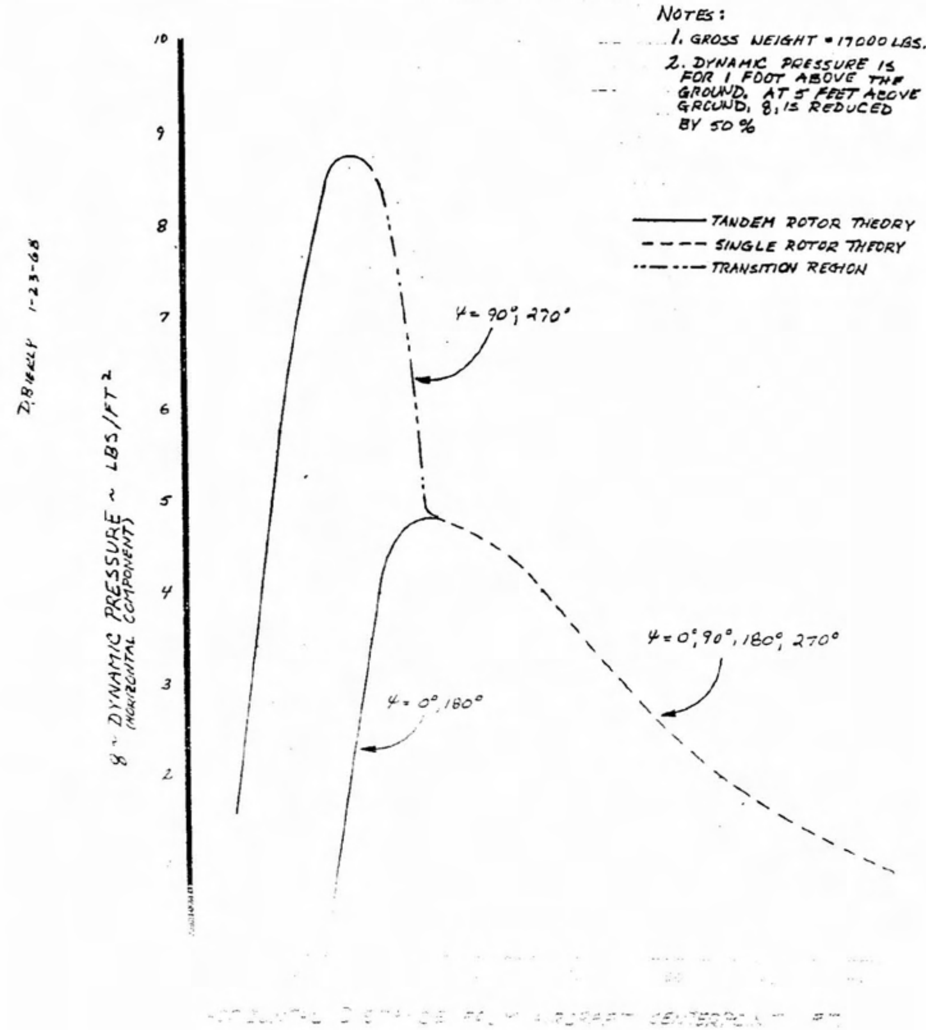
THE BOEING COMPANY

NUMBER
REV LTR

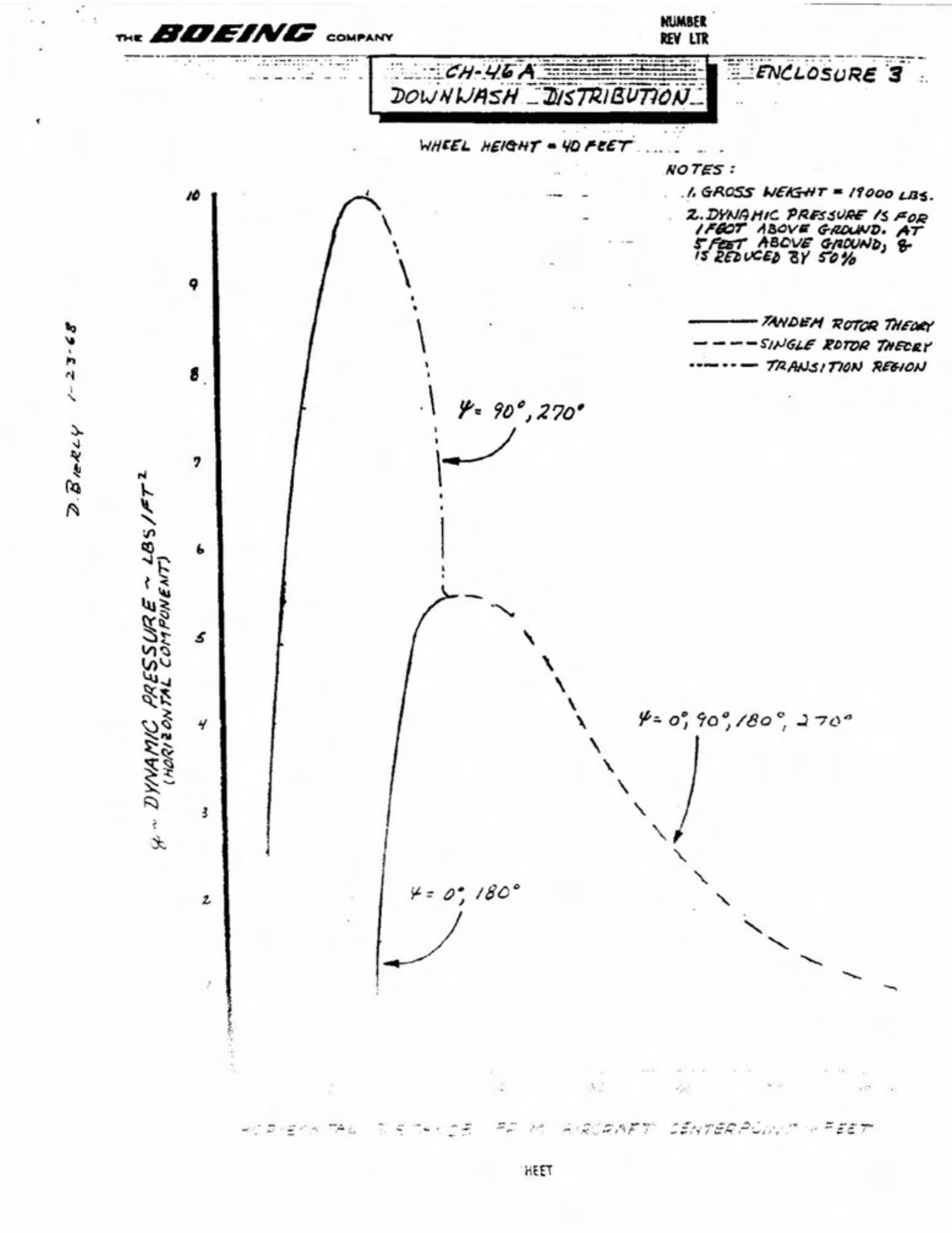
CH-46A
DOWNWASH DISTRIBUTION

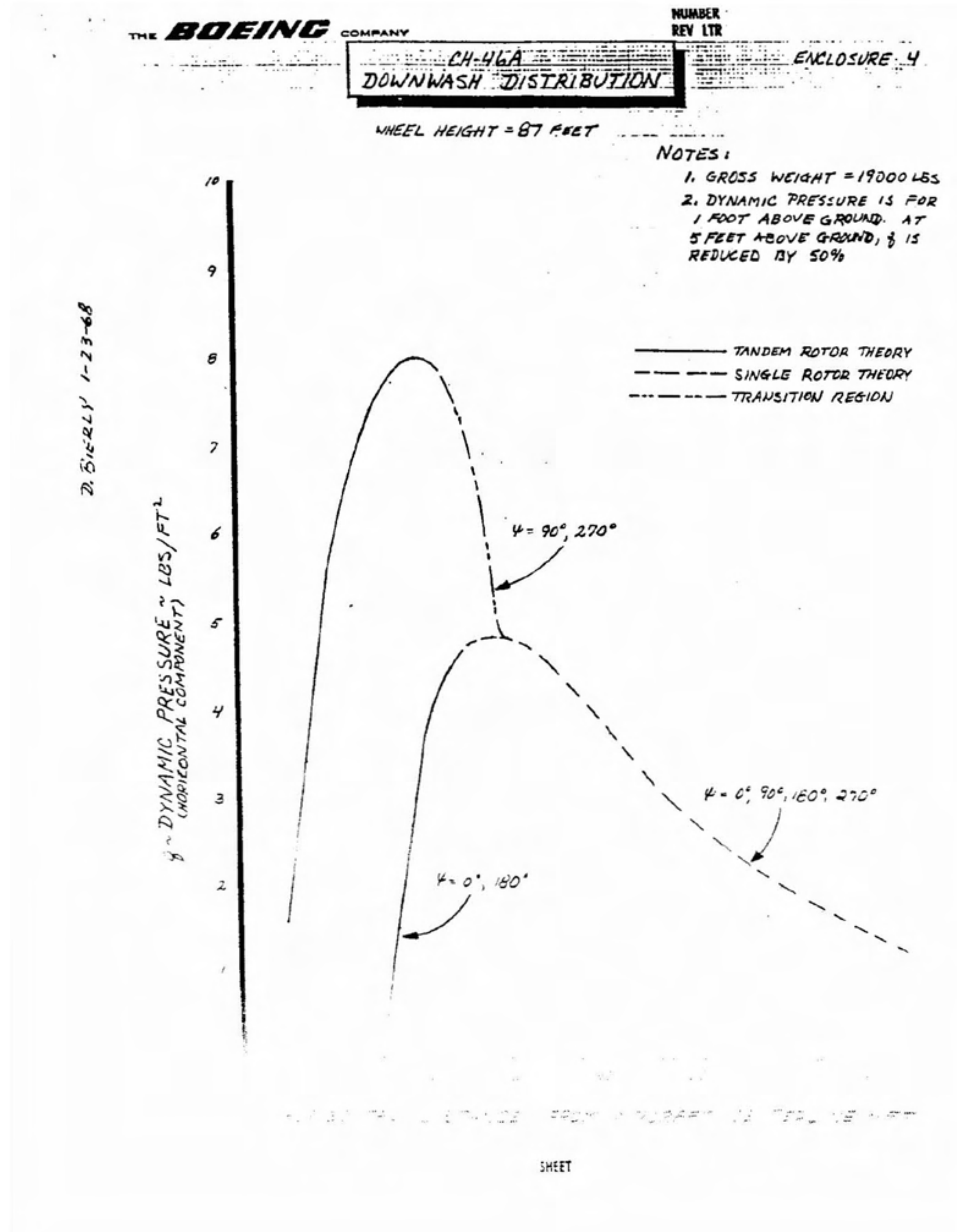
ENCLOSURE 2

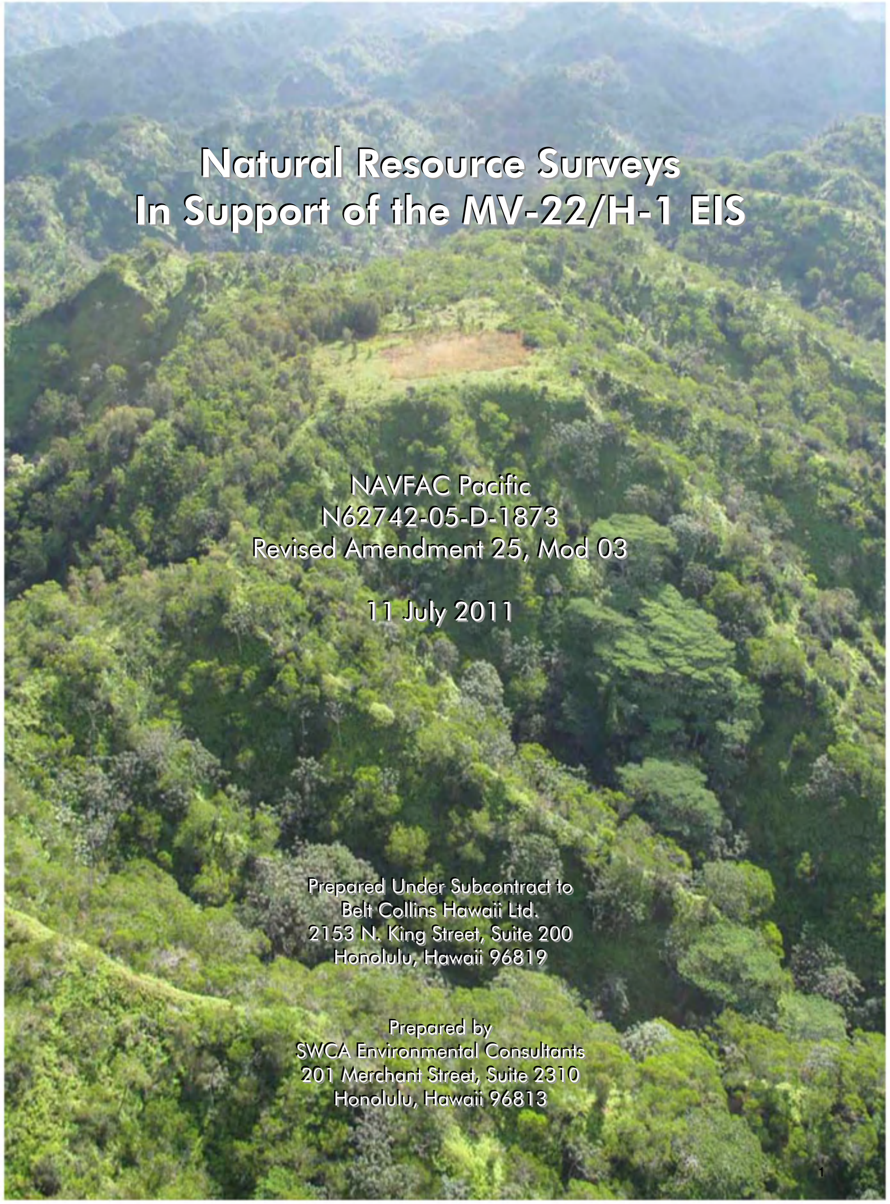
WHEEL HEIGHT = 20 FEET



SHEET


THE BOEING COMPANY
NUMBER
REV LTR
CH-46A
DOWNWASH DISTRIBUTION
ENCLOSURE 3
WHEEL HEIGHT = 40 FEET
NOTES:
1. GROSS WEIGHT = 19000 LBS.
2. DYNAMIC PRESSURE IS FOR 1 FOOT ABOVE GROUND. AT 5 FEET ABOVE GROUND, q IS REDUCED BY 50%
TANDEM ROTOR THEORY
SINGLE ROTOR THEORY
TRANSITION REGION
Ψ = 90°, 270°
Ψ = 0°, 90°, 180°, 270°
Ψ = 0°, 180°
q ~ DYNAMIC PRESSURE ~ LBS/FT²
(HORIZONTAL COMPONENT)
D. BIERLY 1-23-68
HORIZONTAL DISTANCE FROM AIRCRAFT CENTERPOINT ~ FEET
SHEET


THE BOEING COMPANY
NUMBER
REV LTR
CH-46A
DOWNWASH DISTRIBUTION
ENCLOSURE 4
WHEEL HEIGHT = 87 FEET
NOTES:
1. GROSS WEIGHT = 19000 LBS
2. DYNAMIC PRESSURE IS FOR 1 FOOT ABOVE GROUND. AT 5 FEET ABOVE GROUND, q IS REDUCED BY 50%
TANDEM ROTOR THEORY
SINGLE ROTOR THEORY
TRANSITION REGION
Ψ = 90°, 270°
Ψ = 0°, 90°, 180°, 270°
Ψ = 0°, 180°
q ~ DYNAMIC PRESSURE ~ LBS/FT²
(HORIZONTAL COMPONENT)
D. BIERLY 1-23-68
SHEET



EXECUTIVE SUMMARY

SWCA Environmental Consultants was tasked by Belt Collins Hawaii Ltd to conduct resource surveys focused on species protected under the U.S. Endangered Species Act (ESA) and Migratory Bird Treaty Act (MBTA) at selected landing zones (LZ) and drop zones (DZ) within the Pōhakuloa Training Area (PTA) on the Island of Hawaiʻi (Bell/Boeing 2011a). Additional studies specifically limited to the Hawaiian hoary bat (*Lasiurus cinereus semotus*) were conducted within the Kawailoa and Kahuku Terrain Following Terrain Avoidance Areas (TFTA) on the Island of Oʻahu (Bell/Boeing 2011b). These natural resources surveys conducted at 18 landing zones (LZ) within the PTA, and six (6) LZs within the TFTA

The 18 LZs at PTA support ruderal vegetation and/or bare ground with remnant patches of native vegetation. Most of the native habitats observed in and around the LZs have been disturbed by military operations or on-going ungulate browsing. The ongoing disturbances have greatly reduced the LZs potential to support rare plant and wildlife species. However, one occurrence of ESA-listed endangered creeping mint (*Stenogyne angustifolia*) was observed approximately 300 feet from the edge of LZ XRay. This was the only occurrence of a listed endangered plant species found at PTA during these surveys.

Twenty-two of 45 species of birds known from PTA were observed during the survey period. Endangered species were encountered at only one of the 18 areas surveyed, near LZ Boogie, where a pair of nēnē (*Branta sandvicensis*) were heard calling beyond the survey perimeter. In-depth monitoring of nēnē has been conducted at Range 1 since early 2009, documenting seasonal use patterns and on-site behavior. Arrival and departure vectors for nēnē to and from Range 1 are known to cross over or near LZ Boogie.

Bird species protected under the Migratory Bird Treaty Act (MBTA) that were observed at PTA included the apapane (*Himatione sanguinea*), Hawaiʻi amakihi (*Hemignathus virens*), house finch (*Carpodacus mexicanus*), Northern cardinal (*Cardinalis cardinalis*), Northern mockingbird (*Mimus polyglottus*), sky lark (*Alauda arvensis*), and Pacific golden plover (*Pluvalis fulva*). Pacific golden plover were observed at most of the LZs (12 of 18 surveyed). Several groups were observed, and based on the timing of this survey it is likely that they utilize the flat, open expanses of these LZs as staging areas for their annual migration to Alaska.

The presence of bats was confirmed at twelve LZs at PTA on Hawaiʻi Island (i.e. those LZs with activity rates greater than zero passes/night), with the highest level of activity recorded at DZ Mikilua. Based on the proximity of the LZs to one another, it can generally be inferred that bats frequent the entire area.

The presence of the Hawaiian hoary bat was only confirmed at LZ Elephant's Foot within the TFTA on Oʻahu. A bat call detected at LZ Ku Tree indicates the probable, though unconfirmed, presence of the Hawaiian hoary bat in that area. No bat calls or passes were detected at the remaining four LZs. However, since the vegetation at these four LZs is very similar to the vegetation present at LZ Elephant's Foot and LZ Ku Tree, it is probable that a longer survey period would have detected bats in these areas. The vegetation present around all six surveyed LZs appears to be suitable bat habitat. Bats have also been detected at the lower elevations of the Kawailoa area (CH2M Hill 2011) and are also present in the lower elevations of the Kahuku area (SWCA 2010).

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1.0 PURPOSE AND NEED OF THE SURVEYS

SWCA was retained to conduct natural resource surveys at selected sites at Pōhakuloa Training Area (PTA) on the island of Hawai‘i and at the U.S. Army's East Range, Kahuku and Kawailoa Terrain Following Terrain Avoidance Areas (TFTA) on O‘ahu. The work performed was described in the statement of work dated March 8, 2011, and as clarified in subsequent communications with NAVFAC Pacific. The work is being performed in support of the pending Environmental Impact Statement (EIS) for the introduction and operation of the MV-22 Osprey and AH/UH-1 attack helicopters to Marine Aircraft Group 24 (MAG 24) at Marine Corps Base Hawaii.

The MV-22 is being introduced to Hawaii/MAG-24 to provide new and transformational, tilt-rotor medium lift assault support aircraft to support MAGTF training and war-fighting requirements. The MV-22 is part of a modernized Aviation Combat Element (ACE) that will provide balanced assault support capability for the war-fighter. A Marine Light Attack Helicopter (HMLA) squadron comprised of AH/UH-1 attack helicopters is being introduced to Hawaii/MAG-24 to balance combat power more effectively throughout the MARFORs. Introduction of these new elements will encompass aircraft operations, training, new construction and/or replacement or renovation of facilities, including buildings, utilities and infrastructure. Environmental issues associated with the proposed action include potential impacts related to noise, threatened and endangered species, soils and geology, ground or surface waters, air quality during facility construction and aircraft operation, and natural and cultural resources.

2.0 DESCRIPTION OF THE PROJECT AREA

The Pōhakuloa Training Area (PTA) occupies an area of 53,340 ha in the north central portion of the Island of Hawai‘i between Mauna Loa and Mauna Kea between 800 and 3000 meters in elevation. It is the principal tactical training area for military Mission Essential Task (METL) training, and is actively used by the 25th Infantry Division, Hawaii Army National Guard, U.S. Marine Corps, and other allied forces. PTA has 22 live-fire and 4 non live-fire ranges, 23 training areas, a centrally located live fire impact area, 1 airfield, 25 landing or drop zones, and 113 surveyed field artillery and mortar firing points (U.S. Army Garrison, Hawai‘i 2010a). PTA provides live-fire range training, maneuver live fire (e.g., moving and shooting at targets, including combined arms live-fire exercise) on ranges, dismounted maneuver training outside live-fire ranges, mounted fire maneuver, and artillery live fire training opportunities.

There are some 33 distinct plant communities described at Pōhakuloa, including those on the Ke‘āmuku Parcel (U.S. Army Garrison, Hawai‘i 2010a, Shaw and Castillo 1997). Close to 300 plant taxa have been identified, representing 74 families and nearly 200 genera. Fifteen endemic plant species are listed as endangered (Table 1), and two are candidate endangered species. Ground cover at PTA ranges from little to no plant cover (e.g., barren ‘a‘ā lava flows) to species-rich kīpukas. The Hawaiian hoary bat (*Lasiurus cinereus semotus*) is the only native land mammal, and it is a listed endangered species. Other mammals (eight or more) known from PTA are non-native and considered nuisance species (e.g. ungulates, feral dogs and cats, and rodents). Twelve native bird species have been observed at PTA, along with some 33 non-native birds (U.S. Army Garrison, Hawai‘i 2010a), 10 of which are non-native game birds. Five species of endemic birds known from PTA are listed endangered species (Table 1). Twelve bird species are protected by the Migratory Bird Treaty Act (MBTA), half of which are non-native species yet must be considered under the MBTA. There are at least 90 species of arthropods and six other invertebrates found in the Pōhakuloa caves and lava tubes.

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Table 1. Federally-listed endangered and threatened species known to occur within the Pohakuloa Training Area (PTA), Island of Hawaii. Table taken from U.S. Army Garrison Command (2003). In addition to the listed species of plants below, *Festuca hawaiiensis* and *Schiedea pubescens* are candidate species for listing (U.S. Army Garrison Command 2010).

Scientific Name	Common Name	Estimated/Known Populations		Estimated/Known Individuals	
		State of Hawaii*	PTA**	State of Hawaii*	PTA**
Plants:					
Asplenium fragile var. insulare (E)	fragile fern	24-29	20-25	255-350	205-300
Haplostachys haplostachya (E)	honohono, Hawaiian mint	5-6	5-6	34,000-39,000	25,150-30,200
Hedyotis coriacea (E)	kioele, leatherleaf sweet ear	6	5	82	81
Isodendrion hosakae (E)	aupaka	3	2	<900	871
Lipochaeta venosa (E)	(no common name)	3	1	3,405	3,345
Neraudia ovata (E)	maaloa, maoloa, oloa	4	2	~21	6
Portulaca sclerocarpa (E)	ihi, poe, ihi mākole	24	5	<1025	<25
Silene hawaiiensis (T)	Hawaiian catchfly	12-15	9-12	18,000-24,000	13,000-18,000
Silene lanceolata (E)	lanceleaf catchfly	7-12	5-10	610-1,110	500-1,000
Solanum incompletum (E)	popolo ku mai, popolo	1	1	36	36
Spermolepis hawaiiensis (E)	Hawaiian parsley	17	5	500-1,800	100-150
Stenogyne angustifolia (E)	creeping mint	10-15	10-15	5,00-7,500	5,000-7,500
Tetramolopium arenarium var. arenarium (E)	Mauna Kea pamakani	1	1	266	266
Vigna o-wahuensis (E)	(no common name)	10	3	86+	74
Zanthoxylum hawaiiense (E)	heae, ae, Hawaiian yellow wood	10-13	7-10	262-312	251-301

		Individuals	Breeding Individuals		Sightings	
		State of Hawaii	PTA	Keamuku	PTA	Keamuku
Mammals:						
Lasiurus cinereus semotus (E)	opeapea, Hawaiian hoary bat	100s-1,000s*	unknown	unknown	Yes	unknown
Birds:						
Branta sandvicensis (E)	nene, Hawaiian goose	900-1,000*	unknown	unknown	Yes	unknown
Buteo solitarius (E)	io, Hawaiian hawk	1,400-2,500**	unknown	unknown	Yes	unknown
Hemignathus munroi (E)	akiapolaau	1,500 ± 400***	0	unknown	Yes	unknown
Loxioides bailleui (E)	palila	2,957 ± 278****	0	unknown	Yes	unknown
Pterodroma phaeopygia sandwichensis (E)	Hawaiian dark-rumped petrel	1,000s to 34,000*****	unknown	unknown	Yes	unknown

* M. Bruegmann, FWS (pers. com. 2003)
**PTA NR database (2003)

* FWS 1998c, 1999b, respectively
** Klavitter and Marzluff 1998, cited in the PTA Legacy BA 2002
*** Gon et al. 1993
**** Banko et al. 2001
***** Simons and Hodges 1998

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The LZs within the TFTA on Oʻahu identified for surveys of Hawaiian hoary bats are located within either the Kawailoa Training Area (KLOA) or the Kahuku Training Area (KTA). The KLOA encompasses 9,312 hectares (23,010 acres) in north-central Oʻahu. It is characterized by deep, meandering ravines, dense vegetation, and tropical rainforest. KLOA has four native vegetation community types: Montane Wet, Lowland Wet, Lowland Mesic, and Aquatic Natural within the Wet Summit Crest and Lowland Forest ecological zones (U.S. Army Garrison, Hawaiʻi 2010b). An estimated 98 percent of KLOA is wooded, and its higher elevations are covered with native *Metrosideros/Acacia/Dicranopteris* Forest (U.S. Army Garrison, Hawaiʻi 2010b). KTA encompasses 1,849 hectares (4,596 acres) above Kahuku Point in north-central Oʻahu, and consists mostly of former sugar cane lands now covered in rolling grasslands and shrublands. Four native vegetation communities are known from KTA: Montane Wet, Lowland Wet, Lowland Mesic, and Aquatic Natural. These characterize the Wet Summit Crest and Lowland Forest ecological zones. An estimated 60 percent of the forest types in KTA are *Casuarina* and *Schinus* forests (U.S. Army Garrison, Hawaiʻi 2010b).

3.0 SURVEY METHODS

To account for MV-22 rotor wash during hovering, landing, and take-offs, the area of potential effect defined by the Scope of Work includes a 350 foot (107 meter) buffer area around a 100 foot x 100 foot (31 m x 31 m) square box centered on the landing point. Illustrations of sampling areas at each LZ appear in Appendix B. Prior to conducting field surveys, SWCA developed GIS shape files and maps illustrating the extent of study areas at each drop and landing zone (LZ) identified for study in the Scope of Work, including a 350-foot buffer surrounding each landing point.

A modified one-dimensional line transect method of plotless sampling (Mueller-Dombois and Ellenberg 1974, Barbour et al. 1987) was employed. The advantages of plotless sampling are: 1) individual sample plots do not need to be established, saving time; and 2) elimination of subjective error associated with the sample plot boundaries. To facilitate comprehensive surveys, a 20 meter transect grid was created for each study area. GIS shape files for these grids were uploaded into Trimble GeoXT Global Positioning System (GPS) units capable of sub-meter accuracy. Utilizing the pre-programmed GPS units for guidance, SWCA biologists walked the 20 meters transects throughout the LZs and associated buffer zones. Table 2 identifies the location of required sampling sites at PTA. Table 3 identifies required sampling sites within the Oʻahu TFTA.

In order to meet the schedule allotted for the field work, some latitude was allowed depending upon the density of vegetation in the specific survey areas. For example, in areas supporting little or no vegetation, SWCA biologists walked transects at or greater than 40-meter intervals. In areas supporting moderate vegetative coverage, the biologists walked transects at 20 meter intervals. In areas supporting dense vegetative cover, the biologists walked transects at or less than 10 meter intervals. This approach allowed the biologists to adjust survey intensity based on an area's potential to support ESA-listed plant species and ground visibility. Unavoidable limitations to this approach include the possibility of missing some vegetation across transects at 40-meter intervals and during this single point-in-time survey. To the extent possible within the Scope of Work, this issue was addressed through a careful review of existing literature from previous studies.

SWCA based its habitat descriptions upon the *Manual of Flowering Plants of Hawaii* (Wagner, et al. 1999) and *Plant Communities of Pōhakuloa Training Area* (Shaw and Castillo 1997). When ESA-listed plant species were identified, the location of the individual(s) was mapped with

the Trimble GeoXT GPS unit. The species and number of individuals observed were also documented. Photographs of the survey areas and observed rare plants were obtained with a Cannon Power Shot G10, Cannon EOS Rebel XTi, and Sony DSC-S2100 digital cameras. Comprehensive photo documentation of the survey areas and plants will be provided in an appendix to the Draft and Final Reports.

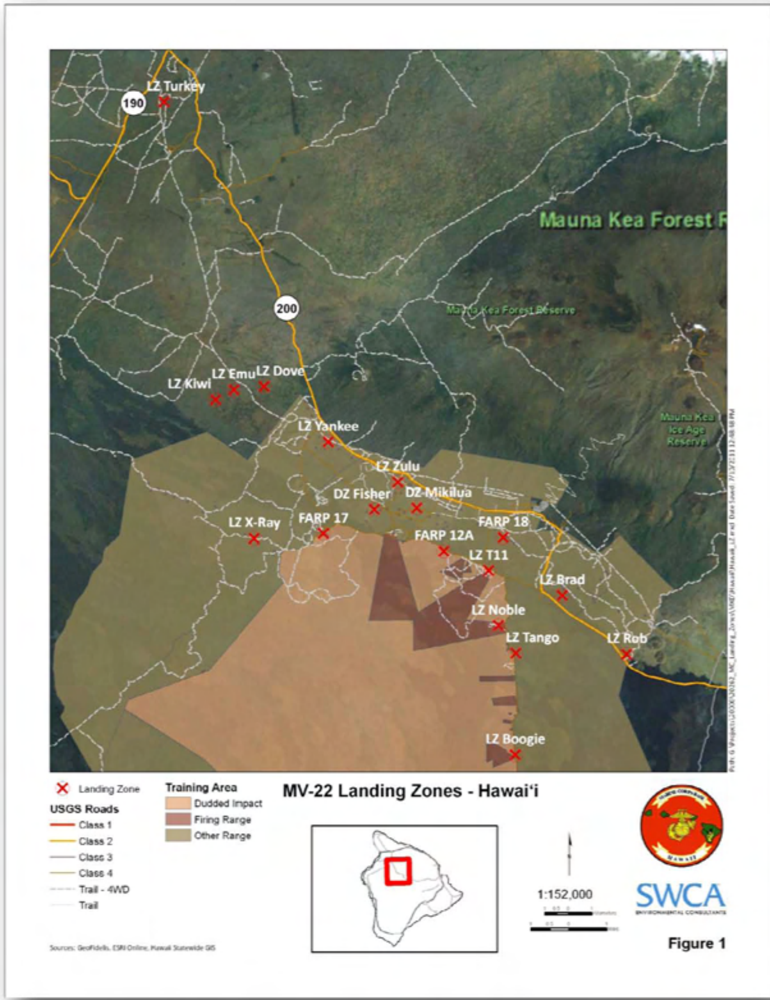
In their 2010 annual report, CEMML lists a total of 37 avian species recorded at PTA. Four species, akiapolaʻau (*Hemignathus munroi*), Hawaiian petrel (*Pterodrama sandwichensis*), i'iwi (*Vestiaria coccinea*) and palila (*Loxioides bailleui*) have not been recorded at PTA for more than 15 years. Of the remaining 33 species recorded from recent years, five (5) are protected by the Endangered Species Act of 1973 (ESA), while another eight (8) are protected by the Migratory Bird Treaty Act of 1918 (MBTA).

The remaining 20 species include introduced passerine and gallinaceous species with no formal level of protection. Table 1 lists all historically recoded species from PTA and their corresponding levels of protection.

Table 2. Designated Study Sites at Pōhakuloa Training Area, Island of Hawaiʻi. Surveys at all sites were completed as planned. See Figure 1.

LZ_Name	Lat_Long	Elev (meters)	LZ_Group
DZ Fisher	N19°45'24.63" W155°36'11.93"	1761	PTA Drop Zone
DZ Mikilua	N19°45'26.70" W155°35'9.24"	1803	PTA Drop Zone
FARP 12A	N19°44'27.36" W155°34'29.36"	1827	PTA FARP
FARP 17	N19°44'51.06" W155°37'26.52"	1731	PTA FARP
FARP 18	N19°44'45.84" W155°33'2.34"	1908	PTA FARP
LZ Boogie	N19°39'44.28" W155°32'44.70"	2023	PTA Landing Zone
LZ Brad	N19°43'26.16" W155°31'35.76"	1967	PTA Landing Zone
LZ Rob	N19°42'3.96" W155°30'0.48"	2024	PTA Landing Zone
LZ Noble	N19°42'43.92" W155°33'9.42"	1926	PTA Landing Zone
LZ T11	N19°44'0.60" W155°33'23.76"	1896	PTA Landing Zone
LZ X-Ray	N19°44'44.64" W155°39'7.86"	1614	PTA Landing Zone
LZ Yankee	N19°46'58.80" W155°37'19.38"	1701	PTA Landing Zone
LZ Zulu	N19°46"2.64" W155°35'37.14"	1786	PTA Landing Zone
LZ Turkey	N19°54'52.02" W155°41'21.66"	870	Keamuku Landing Zone
LZ Dove	N19°48'15.78" W155°38'53.82"	1759	Keamuku Landing Zone
LZ Kiwi	N19°47'57.36" W155°40'5.76"	1419	Keamuku Landing Zone
LZ Emu	N19°48'11.34" W155°39'38.76"	1473	Keamuku Landing Zone
LZ Tango	N19°42'5.76" W155°32'43.86"	1947	PTA Landing Zone

Avian point counts were conducted at 18 designated LZs from 6-12 April 2011. The number of points for each LZ was determined based on the topography, available habitat and general conditions at each site. Points were located at least 200m apart, recorded using a Garmin handheld model GPS Map78S, and subsequently mapped. Visual and auditory observations for all avian species were conducted at each point for 10 minutes.



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Distance estimates were made to the closest five (5) meter increment (up to 200 meters) with the aid of a Bushnell Yardage Pro 800 range finder. Distance estimates were not recorded for the sky lark. All point counts were conducted between 0700 and 1130 each day.

Surveys for Hawaiian hoary bats on Hawai‘i Island and O‘ahu were conducted at each specified landing zone (LZ) with Wildlife Acoustics Song Meter 192 MHz stereo SM2 ultrasonic detectors (Figure 2). Each LZ was passively monitored for bat echolocation calls with a SM2 detector for a period of three nights. Each detector began recording at 1800 hrs in the evening continuously up until 0630 hrs the following morning. Each bat detector was mounted on a tree or a metal fence post at the edge of the LZ, at a height of 1-2 m above ground (Figure 3). Ultrasonic noises recorded by the detectors were subsequently analyzed using AnalookW and visually scanned for the presence of bat echolocation calls. Access to Oahu Island LZs was facilitated through the use of a commercial helicopter (Hughes 300E) of Paradise Helicopters, Inc. (Figure 4).

Table 3. Designated Study Sites at the Terrain Following Training Area, Island of O‘ahu. Some sites were withdrawn from the Scope of Work by the government (dates indicated below). See Figure 2.

LZ_Name	Lat_Long	Elev (meters)	LZ Group	Survey Status
Black	N21°34.034' W157°59.951'	457	TFTA	Completed
Dragon-X	N21°30.234' W158°04.611'	277	TFTA	Withdrawn 3/7/11
Elephant's Foot	N21°36.759' W157°59.602'	293	TFTA	Completed
Hill 904C	N21°39.786' W157°59.180'	238	TFTA	Withdrawn 4/22/11
Italy	N21°29.619' W157°58.539'	364	TFTA	Completed
Kahuku Range Ctrl	N21°39.879' W158°00.166'	317	TFTA	Withdrawn 4/22/11
Kahuku Split Rock	N21°39.281' W157°58.135'	158	TFTA	Withdrawn 3/7/11
Kanes DZ	N21°40.819' W157°59.724'	105	TFTA	Withdrawn 3/7/11
Ku Tree	N21°29.984' W157°58.947'	360	TFTA	Completed
Lightning DZ	N21°30.080' W157°59.480'	354	TFTA	Withdrawn 3/7/11
Maxwell	N21°31.984' W157°58.847'	469	TFTA	Withdrawn 4/22/11
Nixon	N21°37.150' W157°59.808'	326	TFTA	Completed
Red	N21°33.818' W157°59.193'	495	TFTA	Completed

Bat detections are divided into two categories: bat calls and bat passes. A bat call is defined as a single ultrasonic pulse characteristic of a bat, while a bat pass is defined as two or more characteristic ultrasonic pulses separated by less than one second (Baerwald and Barclay 2009, Kunz et al. 2007). The number of bat calls and bat passes are reported for each LZ.

Recordings of bat calls indicate the probable presence of Hawaiian hoary bats, but these single ultrasonic pulses alone don't confirm the presence of bats since there are other sources of ultrasonic sounds that can occasionally mimic a bat pulse. A bat pass which consists of multiple ultrasonic pulses is used to confirm the presence of the Hawaiian hoary bat at an LZ. Bat activity at each LZ was measured as the number of bat passes per detector night (the number of bat passes divided by the number of nights the bat detector was present at the LZ).

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Figure 3. Typical deployment of a Wildlife Acoustics SM2 ultrasonic bat detector, in this case at LZ Red within the TFTA on O‘ahu.

Figure 4. A Hughes 500E operated by Paradise Helicopters, Inc. provided access to LZs within the TFTA on O‘ahu. SWCA staff members Adam Miyamoto and Dr. Ling Ong can be seen at left foreground installing a bat detector on a koa tree at LZ Elephant’s Foot.

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4.0 SURVEY RESULTS FOR PŌHAKULOA TRAINING AREA (PTA)

4.1 Vegetation

The 18 LZs at PTA support ruderal vegetation and/or bare ground with remnant patches of native vegetation. Most of the native habitats observed in and around the LZs have been disturbed by military operations or on-going ungulate browsing. The ongoing disturbances have greatly reduced the LZs potential to support rare plant and wildlife species. However, one occurrence of the listed endangered creeping mint (*Stenogyne angustifolia*) was observed approximately 300 feet from the edge of LZ XRay.

A list of plant species observed at each site is provided in Appendix A. Table 4 provides a summary of the various habitats and ESA-listed plant species observed in the LZs and associated buffer areas. It is followed by descriptions of existing conditions observed at each LZ.

4.1.1 PTA Site Descriptions

Site 1: DZ Fisher

Drop Zone (DZ) Fisher is located in Training Area 13 just northwest of Pu'u Ahi. The survey area included 31.9 acres of the existing DZ Fisher Drop Zone and 49.8 acres of buffer area. The drop zone consists of barren ground covered in ashy soil with sporadic patches of ʻaʻā lava. Vegetation in the drop zone is sparse and consists of ruderal species. The surrounding buffer area includes barren ground as described above, a sparsely vegetated ʻaʻā flow, and disturbed *Chenopodium* shrubland. The sparsely vegetated ʻaʻā flow is located along the northern perimeter of the site. This area supports sparse *Myoporum* shrubland that is heavily browsed by ungulates and has been disturbed by military training maneuvers. Numerous dead and one live ʻakoko (*Chamaesyce olowaluana*) were observed in the lava flow. ʻAkoko (*Chamaesyce olowaluana*) is considered by the United States Fish and Wildlife Service (USFWS) to be a Species of Concern. A small portion of the eastern buffer area surrounding DZ Fisher crosses the conservation fence (Appendix B-3).

A disturbed patch of *Chenopodium* shrubland occurs in the eastern corner of the buffer area. This habitat is located within the *Haplostachys* Conservation Area and is fenced and maintained by PTA Environmental staff. No ESA-listed species were observed within this portion of the buffer area; however, the conservation area is known to support Hawaiian mint (*Haplostachys haplostachya).*

Site 2: DZ Mikilua

Drop Zone (DZ) Mikilua is located in Training Area 9 approximately one mile north of Pu'u Ahi. The survey area included the 7.3 acre drop zone and a 27.4 acre buffer area. The drop zone consists of bare ground with ashy soil and sparse ruderal vegetation. The buffer area surrounding DZ Mikilua supports disturbed *Eragrostis* grassland on ashy soil with rocky outcrops.

Table 4. Summary of Vegetation Types and ESA-listed Plants observed in the MV-22 LZ Study Areas at PTA

Vegetation Type	DZ Fisher	DZ Mikilua	LZ Boogie	LZ Brad	LZ Dove	LZ Emu	LZ Kiwi	LZ Noble	LZ Rob	LZ Tango	LZ Turkey	LZ T11	LZ X-Ray	LZ Yankee	LZ Zulu	LZ Farp 12A	LZ Farp 17	LZ Farp 18
Bare ground: Areas consisting of barren lava, bare soil, crushed rock, concrete or other un-vegetated substrates.	x	x	x	x				x	x	x		x			x	x	x	x
Ruderal vegetation: Typically occurs in fallow agricultural fields, along roadsides, near developments, and other areas experiencing severe ground disturbance. This vegetation type is dominated by weedy species such as fountain grass (*Pennisetum setaceum*), golden crown beard (*Verbesina encelioides*), stork's bill (*Erodium cicutarium*), black mustard (*Brassica nigra*), needle grass (*Nassella cernua*), and others.		x			x	x	x							x	x		x	x
Metrosideros treeland: Occurs in the saddle region between Mauna Loa and Mauna Kea, and is dominated by open canopies of ʻōhiʻa (*Metrosideros polymorpha*) up to 20m in height. Substrate is deeply weathered and the understory can support native trees and shrubs. Component species may include, *Chamaesyce* spp., ʻaʻaliʻi (*Dodonaea viscosa*), *Myrsine lanaiensis*, mamane (*Sophora chrysophylla*), and *Wikstroemia* spp.																	x	
Chenopodium shrubland: *Chenopodium* shrubs up to 3m tall dominate the vegetation in these shrublands. Found on dry, ashy substrate at Pōhakuloa, other shrub types are rare scattered throughout including, mamane (*Sophora chrysophylla*) and naio (*Myoporum sandwicense*). Grasses have invaded this shrubland including *Bromus rigidus*, and *Stipa cernua*.	x																	

Vegetation Type	DZ Fisher	DZ Mikilua	LZ Boogie	LZ Brad	LZ Dove	LZ Emu	LZ Kiwi	LZ Noble	LZ Rob	LZ Tango	LZ Turkey	LZ T11	LZ X-Ray	LZ Yankee	LZ Zulu	LZ Farp 12A	LZ Farp 17	LZ Farp 18
Dodonaea shrubland: Occurs on older Mauna Kea substrate, pahoehoe, ash, and cinder. *Dodonaea viscosa* is the most common shrub along with *Sida fallax*, *Chenopodium oahuense*, and *Eragrostis atropoides. Pennisetum setaceum* can be found invading this shrubland type.					X	X	X				X		X					
Myoporum shrubland: Large naio (*Myoporum sandwicensis*) shrubs are the characteristic overstory species; with smaller shrubs including *Dodonaea viscosa*, *Chenopodium oahuense*, and herbaceous species such as, *Nassella cernua*, *Tagetes minuta*, *Heterotheca grandiflora*, and *Pennisetum setaceum*. Occurs on ‘a‘ā and pahoehoe substrates.	X							X	X					X		X	X	
Myoporum-Chamaesyce treeland: Occurs on Mauna Kea flows at the northern part of the installation. Canopy dominated by naio and ‘akoko (*Chamaesyce olowaluana)* trees. If intact, the shrub layer supports *Chenopodium oahuense* and the ground layer is sparse.												X						
Leptecophylla-Dodonaea shrubland: **O**pen shrubland of mixed species with dominant natives including `a`ali`i (*Dodonaea viscosa*), `ōhelo (*Vaccinium reticulatum*), and pukiawe (*Leptecophylla tameiameiae*) on ‘a‘ā and pahoehoe. Usually dominated by native species, rich in shrubs and usually lacking tree species. Includes *Agrostis sandwicensis*, *Coprosma montana*, *Pallaea ternifolia, Sophora chrysophylla*, and *Tetramolopium humile*.			X															

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Vegetation Type	DZ Fisher	DZ Mikilua	LZ Boogie	LZ Brad	LZ Dove	LZ Emu	LZ Kiwi	LZ Noble	LZ Rob	LZ Tango	LZ Turkey	LZ T11	LZ X-Ray	LZ Yankee	LZ Zulu	LZ Farp 12A	LZ Farp 17	LZ Farp 18
Eragrostis grassland: Grassland that is dominated by *Eragrostis* spp. occurring on the western slopes of Mauna Kea and in the adjacent saddle area. The *Eragrostis* forms a dense cover with scattered shrubs such as Chenopodium oahuense, *Dodonaea viscosa*, *Myoporum sandwicense*, and *Osteomeles anthyllidifolia*.		X													X			
Pennisetum grassland: This is monotypic grassland dominated by fountain grass (*Pennisetum setaceum*), an aggressive pest plant that has become established in dry areas on most of the Hawaiian Islands.											X		X			X		
ESA-listed Plant Species																		
Stenogyne angustifolia													**X**					

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The *Eragrostis* grassland includes a mix of *Eragrostis atropiodes*, needle grass (*Nassella cernua*), and weedy forbs. DZ Mikilua and its surrounding buffer area are subject to routine disturbance by military training and ungulate browsing; therefore, these areas do not support or have the potential to support ESA-listed plant species. No ESA-listed plant species were observed in or around DZ Mikilua.

Site 3: LZ Boogie

Landing Zone (LZ) Boogie is located in Training Area 21, just east of the improved Conventional Munitions (ICM) Impact Area. The LZ Boogie survey area included the 0.46 acre landing zone and a 13.50 acre buffer area surrounding the landing zone. The landing zone consists of crushed rock and lacks any significant vegetation. Sporadic occurrences of weedy forbs were noted growing among the crushed rock. The surrounding buffer area is a mix of unvegetated ʻaʻā lava, vegetated pahoehoe lava, and a firing range. The vegetated pahoehoe supports relatively intact *Leptecophylla-Dodonaea* shrubland and the firing range includes crushed rock and disturbed *Leptecophylla-Dodonaea* shrubland. The *Leptecophylla-Dodonaea* shrubland provides suitable habitat for Hawaiian catchfly (*Silene hawaiiensis*); however, Hawaiian catchfly was not observed in the LZ Boogie survey area. A portion of the buffer area surrounding the LZ lies across the conservation fence at this site.

Site 4: LZ Brad

LZ Brad is located in Training Area 3, just northeast of old Saddle Road. The LZ Brad survey area included the 4.5 acre landing zone and 23.5 acre buffer zone surrounding the landing zone. The landing zone consists of crushed rock; the only vegetation observed in the landing zone included weedy forbs at the base of a water tank. The buffer area consists of a young ʻaʻā lava flow with little vegetation. Few pioneering ohia saplings were observed in the ʻaʻā flow. The crushed rock and young ʻaʻā lava at LZ Brad and associated buffer do not provide suitable habitat for ESA-listed plant species; ESA-listed plants were not observed in the LZ Brad survey area.

Site 5: LZ Dove

LZ Dove is located in the southern portion of the Keamuku Training Area and within a saddle between to ridges. The LZ Dove survey area included the 4.8 acre landing zone and a 28.04 acre buffer area. Both the landing zone and the buffer area were historically managed for cattle grazing. Due to the past grazing, the landing zone supports ruderal vegetation dominated by annual grasses and forbs including ripgut brome (*Bromus diandrus*), wild oat (*Avena fatua*), Kikuyu grass (*Pennisetum clandestinum*), *Senecio madagascariensis*, and other weedy species indicative of grazing land. The LZ Dove buffer area included the slopes of the surrounding ridges and the upper portion of an eroded drainage.

Due to the moderately sloping topography of the buffer area and drainage, past cattle grazing appeared to be less intensive than that of the landing zone. This is evident by the presence of a remnant *Dodonaea* shrubland and other native perennial species on the ridge slopes. The remnant *Dodonaea* shrubland in the buffer area is sparse and includes ʻaʻaliʻi (*Dodonaea viscosa*), ʻulei (*Osteomeles anthyllidifolia*), and aweoweo (*Chenopodium oahuense*). Due to the past management and existing conditions of the area, LZ Dove has a low potential to support ESA-listed plant species. ESA-listed plant species were not observed in the survey area.

Site 6: LZ Emu

LZ Emu is located in the southern portion of the Keamuku Training Area, approximately 0.76 mile west of LZ Dove. The LZ Emu survey area included the 2.5 acre landing zone and a 20.5 acre buffer area. The landing zone is characterized by flat grazing land; the buffer area included flat grazing land and sporadic rock outcrops. The flat grazing land supported dense coverage of non-native forbs such as stork's bill, *Senecio madagascariensis*, common groundsel (*Senecio vulgaris*), sow thistle (*Sonchus oleraceus*), and narrow-leafed plantain (*Plantago lanceolata*). The rock-outcrops support remnant patches of *Dodonaea* shrubland with non-native forbs growing in the understory. Due to the past cattle grazing and extensive coverage of non-native forbs in the area, LZ Emu has a low potential to support ESA-listed plant species. ESA-listed plant species were not observed in the LZ Emu survey area.

Site 7: LZ Kiwi

LZ Kiwi is located in the southern portion of the Keamuku Training Area, approximately 0.57 mile west of LZ Emu. The LZ Kiwi survey area included the 2.3 acre landing zone and a 20.2 acre buffer area. Due to similar past management practices as LZ Emu, the LZ Kiwi survey area maintains similar habitat conditions as LZ Emu. The vegetation type at LZ Kiwi is dominated by ruderal forbs and the perimeter of the buffer area supports disturbed *Dodonaea* shrubland. Due to past land uses and extensive coverage of non-native forbs in the area, LZ Kiwi does not support ESA-listed plant species. ESA-listed plant species were not observed in the LZ Kiwi survey area.

Site 8: LZ Noble

LZ Noble is located in ICM Impact Area directly adjacent to Redleg Trail and Training Area 21. The LZ Noble survey area included the 3.5 acre landing zone and a 22.6 acre buffer area. The landing zone consists of barren ground covered in crushed rock and lacks any significant vegetation. The surrounding buffer area supports a highly degraded *Myoporum* shrubland. Numerous improved military roads traverse the *Myoporum* shrubland and the area is heavily browsed by ungulates. Due to the on-going military operations and ungulate browsing in the area, there is minimal vegetation in the understory of the *Myoporum* shrubland. The understory includes sparse coverage of stinging nettle (*Urtica urens*) and fountain grass. The existing conditions at LZ Noble and the associated buffer area are not suitable for ESA-listed species and no ESA-listed species were observed in the survey area.

Site 9: LZ Rob

LZ Rob is located at the eastern end of Training Area 3 and approximately 328 feet (100 meters) southwest of the Palila Critical Habitat boundary. The LZ Rob survey area included the 5.8 acre landing zone and a 22.6 acre buffer surrounding the landing zone. The landing zone consists of crushed rock and lacks any significant vegetation. Most of the buffer area is a young a'a lava flow with few pioneering ʻōhiʻa trees. The edge of a dense *Myoporum* shrubland occurs in the northern corner of the buffer zone. The *Myoporum* shrubland includes a mix of large naio shrubs, ʻōhiʻa trees, and *Coprosma montana* shrubs in the canopy. Due to intense ungulate browsing, the understory in this shrubland is dominated by non-native forbs including cape ivy (*Delaria odorata*) and stinging nettle. The crushed rock and a'a lava at LZ Rob do not support suitable habitat for ESA-listed plant species. The *Myoporum* shrubland may support suitable habitat for ESA-listed plants; however, no ESA-listed plants were observed in the area.

Site 10: LZ Tango

LZ Tango is located in Training Area 21 and just east of Redleg Trail. The LZ Tango survey area included the 2.1 acre landing zone and an 18.52 acre buffer area surrounding the landing zone. A small portion of the western buffer area around the LZ lies across the conservation fence. The landing zone consists of crushed rock and does not support any significant vegetation. Some ruderal forbs exist at the base of a water tank located in the landing zone. The surrounding buffer area consists of a young ʻaʻā lava flow that supports sporadic occurrences of ʻōhiʻa, pukiawe (*Leptecophylla tameiameiae*), and ʻohelo (*Vaccinium reticulatum*). The LZ Tango survey area does not support suitable habitat for ESA-listed plants; no ESA-listed plant species were observed in the survey area.

Site 11: LZ Turkey

LZ Turkey is located at the northern corner of the Keamuku Training Area and just west of Puʻu Nohonaohae. The survey area included the 2.0 acre landing zone and an 18.5 acre buffer surrounding the landing zone. Both the landing zone and buffer area were managed for cattle grazing prior to the Army's acquisition of the area. Due to the past cattle grazing the LZ Turkey survey area is dominated by non-native species; however, a remnant *Dodonaea* shrubland occurs in the buffer area. The landing zone supports a mixed non-native grassland that supports fountain grass, buffelgrass (*Cenchrus ciliaris*), Australian blue stem (*Dichantium sericeum*), Natal redtop (*Melinis repens*), and other non-native grasses. The surrounding buffer area supports *Pennisetum* grassland within a remnant *Dodonaea* shrubland. The LZ Turkey survey area provides disturbed but suitable habitat for *Vigna o-wahuensis*, a federally endangered species. *Vigna o-wahuensis* or other ESA-listed plant species were not observed in or around LZ Turkey.

Site 12: LZ T11

LZ T11 is located in Training Area 5 just east of the intersection between Lava Road and Menehune Road. The LZ T11 survey area included the 4.8 acre landing zone and a 24.9 acre buffer area. LZ T11 is characterized by a graded landing zone at the base of a vegetated cinder cone. The landing zone consists of crushed rock and lacks any significant vegetation. The base of the cinder cone supports several naio and mamane shrubs. The slope of the cinder cone is heavily disturbed, sparsely vegetated and supports few naio, fountain grass, stinging nettle, and other non-native forbs. A barren ʻaʻā lava flow located to the north of the landing zone separates the landing zone from a *Myoporum-Chamaesyce* tree land. A pioneering ʻōhiʻa is located in the ʻaʻā flow. The kipuka supports several ʻakoko (*Chamaesyce olowaluana*) trees that are located at the boundary of the LZ T11 survey area. The understory in the kipuka is heavily disturbed by ungulate browsing, therefore only supports non-native forbs.

Site 13: LZ XRay

LZ XRay is located in Training Area 19 and directly adjacent to the Kipuka Kalawamauna East Conservation Area. A portion of the buffer area around the LZ lies within the conservation area (Appendix B-18). The LZ XRay survey area included the 2.5 acre landing zone and a 19.0 acre buffer area surrounding the landing zone. The landing zone and buffer area to the west of the landing zone supports a moderately dense *Dodonaea* shrubland with a *Pennisetum* grassland understory. The *Dodonaea* shrubland supports several native species including but not limited to ʻulei, *Eragrostis atropioides*, ʻilima (*Sida fallax*), and pua kala (*Argemone glauca*). The portion of the buffer area located east of the landing zone is within the Kipuka Kalawamauna East Conservation Area.

This area also supports *Dodonaea* shrubland. Due to the conservation management in this area, there is lesser coverage of *Pennisetum* grassland and greater coverage of *Dodonaea* shrubland. The *Dodonaea* shrubland in the conservation area supports greater native plant diversity than that of the landing zone and western buffer area. In addition to the native species found west of the landing zone, koʻokoʻolau (*Bidens menziesii* subsp. *filiformis*) and naʻenaʻe (*Dubautia ciliolate*)provide significant coverage in the conservation area.
The LZ XRay survey area provides suitable habitat for creeping mint, Hawaiian mint, lanceleaf catchfly (*Silene lanceolata*), and Mauna Keas pamakani (*Tetromolopium arenarium* var. *arenarium*) all of which are protected under the Federal Endangered Species Act. Two creeping mint individuals were observed approximately 300 feet from the eastern edge of LZ XRay. The two individuals were within one meter of each other; therefore, they are both mapped with one point.

During this survey, SWCA biologists found a historical plant monitoring transect in the buffer area of LZ XRay. Although we did not observe any rare plants along the historic transect, its presence suggests that some rare plants were previously found at this site. PTA environmental staff provided GIS data for the historical rare plant occurrences in the vicinity.

Site 14: LZ Yankee

LZ Yankee is located in Training Area 15 just east of Puʻu Kekeʻe. The LZ Yankee survey area included the 14.0 acre landing zone and a 37.9 acre buffer area. The entire survey area is routinely disturbed by military training maneuvers and intense ungulate browsing therefore, is dominated by ruderal vegetation. Most of the survey area is flat and has shallow ashy soils; however, the southern edge of the buffer area includes an older ʻaʻā flow that supports a remnant *Myoporum* shrubland. The *Myoporum* shrubland is sparse and most of the shrubs are in poor condition or dead. The understory in the shrubland is dominated by ruderal species. Due to the ongoing disturbance in the survey area, LZ Yankee does not support suitable habitat for ESA-listed plant species; ESA-listed plants were not observed in or around LZ Yankee.

Site 15: LZ Zulu

LZ Zulu is located in Training Area 12 just west of Ahi Road. The LZ Zulu survey area included the 4.2 acre landing zone and a 24.0 acre buffer surrounding the landing zone. The landing zone has been graded for military training and largely consists of bare ground with sporadically occurring ruderal plants. The buffer has not been graded and includes an older ʻaʻā lava flow with rocky substrate and ashy soils. The buffer area supports disturbed *Eragrostis* grassland that is heavily browsed by ungulates. The *Eragrostis* grassland includes numerous non-native species including needle grass and other weedy forbs. Due to the on-going ungulate browsing and military training maneuvers, the LZ Zulu survey area does not support suitable habitat for ESA-listed plant species; no ESA-listed plants were observed in or around LZ Zulu.

Site 16: Farp 12a

Farp 12a is located at the impact area boundary and adjacent to Training Area 7. The Farp 12a survey area included the 11.4 acre landing zone and a 29.8 acre buffer area surrounding the landing zone. The landing zone consists of crushed rock and lacks any significant vegetation. Fountain grass and other ruderal species have started colonizing the edges of the landing zone. The surrounding buffer area largely consists of barren ʻaʻā lava. Fountain grass has started colonizing portions of the ʻaʻā lava.

Three small kipuka are sporadically located in the ʻaʻā flow. The kipuka support disturbed Myoporum shrubland that is subject to on-going ungulate browsing. Due to the browsing the understory in the kipuka is sparse and consists of stinging nettle and other weedy forbs. The crushed rock and barren lava do not support suitable habitat for ESA-listed plant species. The *Myoporum* kipuka could support ESA-listed plants; however, no ESA-listed plants were observed in the kipuka.

Site 17: Farp 17

LZ Farp 17 is located at the western boundary of Training Area 18. The Farp 17 survey area included the 13.0 acre landing zone and a 31.7 acre buffer area surrounding the landing zone. The Farp 17 landing zone consists of crushed rock and ʻaʻā lava. Both the landing zone and the buffer area are disturbed by ungulate browsing and military maneuvers. Fountain grass and other ruderal species have begun colonizing the landing zone, but provide minimal vegetative cover. The surrounding buffer area supports a mix of ʻaʻā and pahoehoe lava. The ʻaʻā lava is mostly barren; however, fountain grass and few occurrences of naio and ohia were noted in the ʻaʻā.

A small finger of pahoehoe lava that supports sparse *Metrosideros* tree land is located along the eastern edge of the buffer area. The understory in the tree land is disturbed and mostly consists of non-native forbs, however, some native forbs and shrubs are present. The pahoehoe and *Metrosideros* tree land does support suitable habitat for ESA-listed species; however, no ESA-listed species were observed in the Farp 17 survey area.

Site 18: Farp 18

LZ Farp 18 is located in Training Area 5 just east of Menehune Road and south of Armor Road. The Farp 18 survey area included the 13.1 acre landing zone and a 31.8 acre buffer area. The landing zone consists of crushed rock and ʻaʻā with sparse coverage of fountain grass and other ruderal species. The buffer zone largely consists of ʻaʻā with minimal vegetation; sporadic occurrences of naio were observed in the ʻaʻā.

The southern boundary of the buffer zone consists of ashy soil deposits and supports ruderal species such as fountain grass and stork's bill. Both the landing zone and buffer area are subject to ungulate browsing; therefore, the vegetation in the area is disturbed. Due to the ungulate browsing, ESA-listed plant species are not expected to occur in the Farp 18 survey area. No ESA-listed plants were observed in or around the Farp 18 landing zone.

5.0 SURVEY RESULTS FOR AVIFAUNA AT PTA

Twenty-two (22) of 37 species of birds known from PTA were observed during the survey period. A list of species known from PTA appears in Table 5. An introduced species from PTA, the Ring-necked pheasant (*Phasianus colchicus*), was observed at several LZs on the western side of the installation. Endangered species were encountered at only one of the 18 areas surveyed, near LZ Boogie, where a pair of nēnē (*Branta sandvicensis*) was heard calling approximately 1500 feet from LZ Boogie.

MBTA protected species observed included apapane (*Himatione sanguinea*), Hawaii amakihi (*Hemignathus virens*), house finch (*Carpodacus mexicanus*), Northern cardinal (*Cardinalis cardinalis*), Northern mockingbird (*Mimus polyglottus*), sky lark (*Alauda arvensis*), and Pacific golden plover (*Pluvalis fulva*). Species detections, along with a brief description of the habitat, are listed in Appendix B for each LZ in the order they were surveyed.

Details of observations at each LZ and maps of each LZ, showing all point count locations and reference points are included (Appendix B). In some cases, the reference points were used as point count locations.

Table 5. The complete avian species list for Pōhakuloa Training Area (CEMML 2010).

Common Name	Species	Origin	Status	Federal List
African Silverbill	*Lonchura cantans*	Introduced	None	
ʻAkiāpōlaʻau+	*Hemignathus munroi*	Endemic	Protected/Endangered	MBTA/ESA
ʻApapane	*Himatione sanguinea*	Endemic	Protected	MBTA
Barn Owl	*Tyto alba*	Introduced	Protected	MBTA
Black Francolin	*Francolinus francolinus*	Introduced	None	
California Quail	*Callipela californica*	Introduced	None	
Chukar	*Alectoris chukar*	Introduced	None	
Common Myna	*Acridotheres tristis*	Introduced	None	
Erckel's Francolin	*Francolinus erckelli*	Introduced	None	
Gray Francolin	*Francolinus pondicerianus*	Introduced	None	
Hawaii ʻAmakihi	*Hemignathus virens*	Endemic	Protected	MBTA
Hawaii ʻElepaio	*Chasiempis sandwichensis*	Endemic	Protected	MBTA
Hawaiian Goose-Nēnē	*Branta sandvicensis*	Endemic	Protected/Endangered	MBTA/ESA
Hawaiian Hawk-ʻIo	*Buteo solitarius*	Endemic	Protected/Endangered	MBTA/ESA
Hawaiian Petrel-ʻUaʻu+	*Pterodroma sandwichensis*	Endemic	Protected/Endangered	MBTA/ESA
Hawaiian Short-eared Owl-Pueo	*Asio flammeus sandwichensis*	Endemic	Protected	MBTA
Hawaiian Thrush-ʻŌmaʻo	*Myadestes obscurus*	Endemic	Protected	MBTA
House Finch	*Carpodacus mexicanus*	Introduced	Protected	MBTA
House Sparrow	*Passer domesticus*	Introduced	None	
Japanese White-eye	*Zosterops japonicus*	Introduced	None	
ʻIʻiwi+	*Vestiaria coccinea*	Endemic	Protected	MBTA
Kalij Pheasant	*Lophura leucomelanos*	Introduced	None	
Lavender Waxbill	*Estrilda caerulescens*	Introduced	None	
Melodious Laughing Thrush	*Garrulax canorus*	Introduced	None	
Northern Cardinal	*Cardinalis cardinalis*	Introduced	Protected	MBTA
Northern Mockingbird	*Mimus polyglottus*	Introduced	Protected	MBTA
Nutmeg Mannikin	*Lonchura punctulata*	Introduced	None	
Pacific Golden-Plover	*Pluvialis fulva**	Visitor	Protected	MBTA
Palila+	*Loxioides bailleui*	Endemic	Protected/Endangered	MBTA/ESA
Red-billed Leiothrix	*Leiothrix lutea*	Introduced	None	
Rock Pigeon	*Columba livia*	Introduced	None	
Saffron Finch	*Sicalis flaveola*	Introduced	None	
Sky Lark	*Alauda arvensis*	Introduced	Protected	MBTA
Spotted Dove	*Streptopelia chinensis*	Introduced	None	
Wild Turkey	*Meleagris gallopavo*	Introduced	None	
Yellow-fronted Canary	*Serinus mozambicus*	Introduced	None	
Zebra Dove	*Geopelia striata*	Introduced	None	

+Species historically recorded from PTA, but have not been recorded at PTA for 15 or more years.

With the exception of the four LZ located in the Keamuku section of PTA (Turkey, Dove, Emu and Kiwi), all LZ surveyed appear to have been in use for some time. As such, their usefulness as wildlife habitat has been severely degraded. PTA has also been under severe drought conditions for several years now, leaving much of the vegetation (and potential habitat) either dead or severely stressed. In-depth monitoring of nēnē has been conducted at Range 1 since early 2009, documenting seasonal use patterns and on-site behavior. Arrival and departure vectors for nēnē to and from Range 1 are known to cross over or near LZ Boogie.

Pacific golden plover were observed and most of the LZs (12 of 18 surveyed). Several groups of this species were observed, and based on the timing of this survey it is likely that they utilize the flat, open expanses of these LZs as staging areas for their annual migration to Alaska.

Possible Barn owl roost sites were noted at two LZs (T11 and Noble). No birds were actually observed, and it is not known whether these roost holes were currently occupied or in use at the time of the survey. Barn owls have been recorded previously at PTA and their size could pose a bird strike hazard to aircraft.

With very few exceptions, avian detections for this survey were limited to the periphery of each survey area. Only small passerine species were noted in flight over or across actual LZs. Appendix C contains detailed observations of avifauna at each of the LZs surveyed at PTA.

6.0 SURVEY RESULTS FOR HAWAIIAN HOARY BATS AT PTA

Hawaiian hoary bat surveys at PTA were conducted to ensure a minimum sampling period of three detector nights (Table 6). Minor difficulties with detector unit malfunctions led us to re-monitor selected LZs so as to ensure a full three-night sampling effort at each location. Inconsistencies in sampling periods were generally due to either technical issues or site access restrictions due to ongoing training activities.

Table 6. Bat Activity at Landing Zones at PTA on Hawaiʻi Island.

LZ Name	Deployment	Retrieval	Calls	Passes	Nights	Activity Rate
DZ Fisher	5/12/2011	5/16/2011	2	2	4	0.50
DZ Mikilua[1]	5/9/2011	5/12/2011	11	7	4.5	1.56
FARP 12A	5/9/2011	5/12/2011	2	1	3	0.33
FARP 17	5/12/2011	5/16/2011	2	2	4	0.50
FARP 18	5/9/2011	5/12/2011	3	2	3	0.67
LZ Boogie	5/3/2011	5/6/2011	1	1	3	0.33
LZ Brad	5/6/2011	5/9/2011	3	2	3	0.67
LZ Dove[2]	5/16/2011	5/19/2011	1	1	3.5	0.29
LZ Emu[3]	5/16/2011	5/19/2011	1	0	3.5	0.00
LZ Kiwi[4]	5/16/2011	5/19/2011	7	2	3.5	0.57
LZ Noble	5/3/2011	5/9/2011	2	0	6	0.00
LZ Rob	5/6/2011	5/9/2011	0	0	3	0.00
LZ T11	5/3/2011	5/9/2011	5	3	6	0.50
LZ Tango	5/3/2011	5/6/2011	2	0	3	0.00
LZ Turkey[1]	5/16/2011	5/19/2011	0	0	3	0.00
LZ XRay	5/12/2011	5/16/2011	0	0	4	0.00
LZ Yankee	5/12/2011	5/16/2011	3	2	4	0.50
LZ ZULU	5/9/2011	5/12/2011	2	2	3	0.67

Footnotes: 1. 2nd deployment 21 May-24 May 2011; 2. 2nd deployment 23 May-24 May 2011; 3. 2nd deployment 22 May-23 May 2011; 4. 2nd deployment 21 May-22 May 2011

The presence of bats was confirmed at twelve LZs (i.e. those with activity rates greater than zero passes/night). Bat calls were detected at three LZs (LZ Emu, LZ Noble, and LZ Tango) however; no bat passes were recorded there. Three LZs (LZ Rob, LZ Turkey, and LZ XRay) did

not have detections of either bat calls or bat passes. Based on the proximity of the LZs to one another, it can generally be inferred that bats frequent the entire area. Although there was a relatively high level of bat activity recorded at DZ Mikilua, it should be noted that the short sampling period tends to artificially magnify bat activity values. By the same token, the lack of bat recordings at LZs Rob, Turkey, and XRay) cannot be used to definitively conclude that bats are never found at these LZs. Supplemental sampling over a longer period of time would provide a more accurate picture of bat activity around the LZs. Although the vegetation surrounding the PTA LZs is relatively sparse compared to the Oʻahu TFTA, bats still utilize these areas for feeding. A map of bat activity observed at PTA during this study appears in Figure 5.

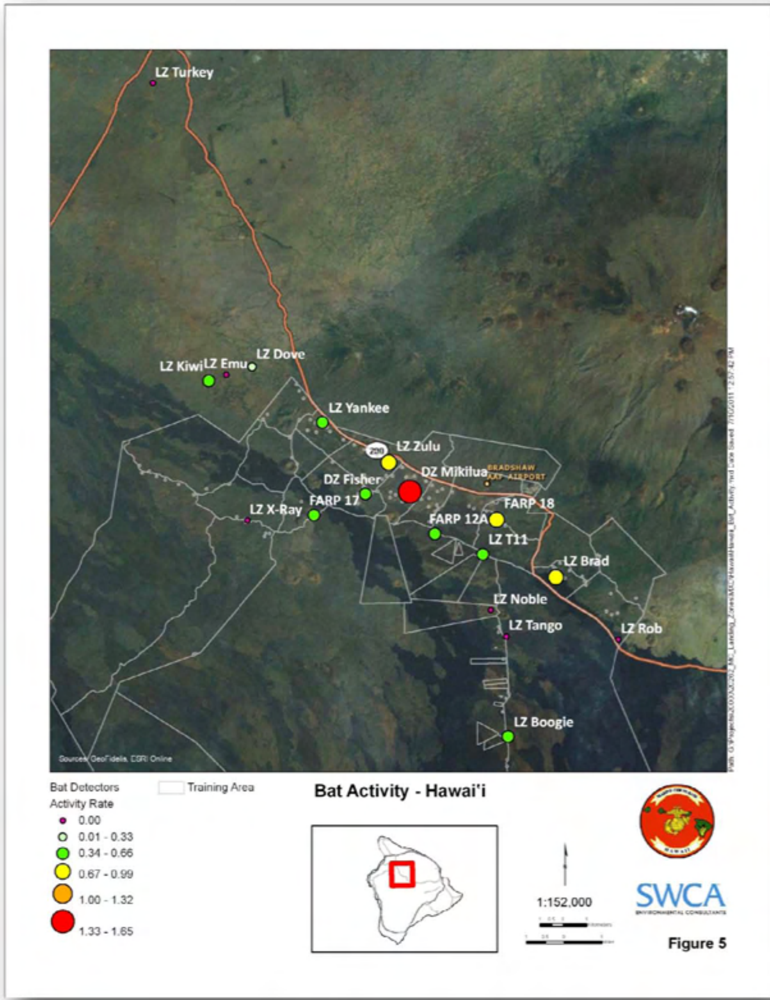
7.0 SURVEY RESULTS FOR HAWAIIAN HOARY BATS WITHIN THE OʻAHU TFTA

The presence of the Hawaiian hoary bat (*Lasiurus cinereus semotus*) was only confirmed at LZ Elephant's Foot (Table 7). A bat call detected at LZ Ku Tree indicated the probable, though unconfirmed, presence of the Hawaiian hoary bat in that area. No bat calls or passes were detected at the remaining four LZs. However, since the vegetation at these four LZs is very similar to the vegetation present at LZ Elephant's Foot and LZ Ku Tree, it is probable that a longer survey period would have detected bats in these areas. The vegetation surrounding the buffer areas at the six surveyed LZs consisted of dense forests, similar to habitats at lower elevations in the Kawailoa area where we found bat activity (CH2M Hill 2011). Bats are also present in the lower elevations of the Kahuku area (SWCA 2010).

Table 7. Bat Activity at Landing Zones within the Oʻahu TFTA.

LZ Name	Deployed	Retrieved	Calls	Passes	Nights	Activity Rate
Italy	4/15/11	4/18/11	0	0	3	0
Ku Tree	4/15/11	4/18/11	1	0	3	0
Black	4/22/11	4/25/11	0	0	3	0
Elephant's Foot	4/22/11	4/25/11	3	3	3	1
Nixon	4/22/11	4/25/11	0	0	3	0
Red	4/22/11	4/25/11	0	0	3	0

Because of the very short duration of sampling for this survey, little can be said about bat activity within the Oʻahu TFTA in a quantitative sense. For example, the activity at LZ Elephant's Foot (1 pass/detector night) is roughly 10 times higher than that measured at lower elevations in the Kawailoa area by SWCA, and is also higher than bat activity rates reported at Hakalau on Hawaiʻi Island. We are surprised that we were able to record any bat activity in only 3 nights of sampling since bats are generally believed to be rare and elusive on Oʻahu. This is an indicator that bats probably frequent the forests within the Oʻahu TFTA; however, additional long-term sampling would be necessary in order to develop an indication of the real level of bat activity. SWCA's recent studies at lower elevations within Kahuku and Kawailoa areas outside the Oʻahu TFTA (CH2M Hill 2011, SWCA 2010) suggest that Hawaiian hoary bats are found more frequently in the lowlands during the summer months. Since it is probable that bats could be present at any of the surveyed LZs, in order to prevent accidental take of the Hawaiian hoary bat, it is recommended that no trees above 15 feet in height be trimmed or removed between 1 July and August 15. This time period is within the Hawaiian hoary bat breeding season, and is the period when non-volant juveniles (juvenile bats that cannot fly) may be roosting in the trees and unable to fly away from danger.



These dates should be verified through communication with the U.S. Fish and Wildlife Service. Tree removal or trimming during any other time of the year is not expected to result in Hawaiian hoary bat take, as any roosting bat, if present, is expected to be able to fly away prior to the removal or trimming of the tree. A map of bat activity observed within the O‘ahu TFTA during this study appears in Figure 6.

8.0 RESOURCE MAPS

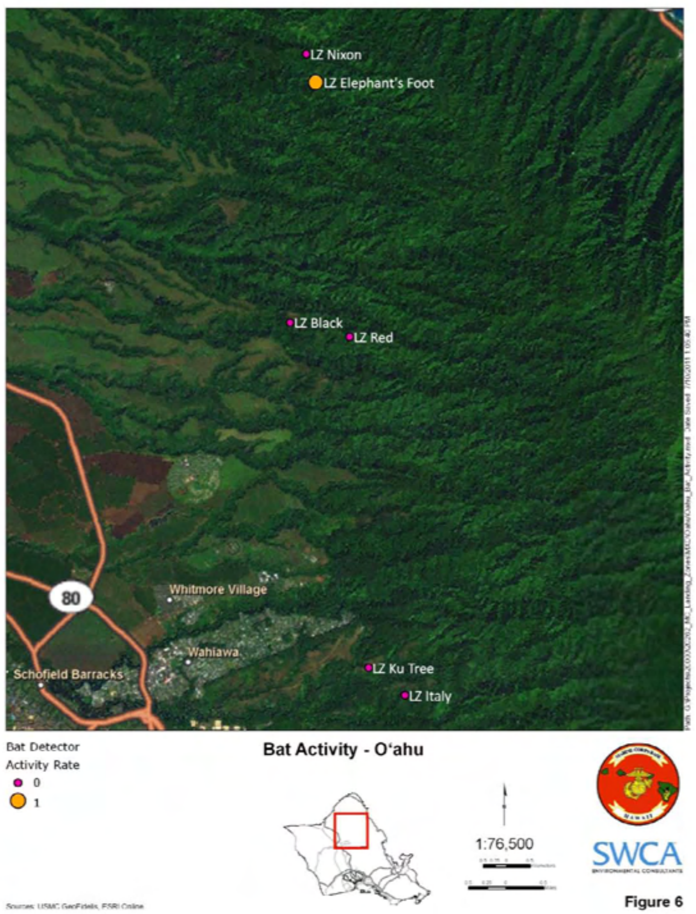
GIS data showing location of endangered/protected resources observed during the field study was joined with existing site maps created by SWCA for each LZ. Geospatial data is provided in the formats identified within the Scope of Work, and raw data and metadata are being provided with the report on a CDROM (attached to this report).

9.0 PHOTO ALBUM

A photo album of protected species observed during the field surveys conducted for this study has been compiled and appears in Appendix C.

10.0 STUDY PARTICIPANTS

SWCA and Belt Collins Hawaii fielded a team of nine environmental professionals between 4 April and May 23, 2011 to conduct the required field surveys of wildlife and vegetation at PTA and KTA. Art Whistler PhD, Travis Belt BS, David Cole MS (PhD candidate), and John Polhemus BS all possess extensive experience with native and endangered flora and fauna of Hawaii Island and PTA in particular. Ling Ong PhD and Adam Miyamoto BS are experienced with monitoring the presence of Hawaiian hoary bats, and have extensive knowledge of bats within the Kawailoa-Kahuku areas on Oahu. Jason Balmut BS, formerly with GeoCGI at MCB Hawaii, served as SWCA’s geographic information system (GIS) specialist for the surveys. Maya LeGrande MS provided support for botanical surveys, and John Ford MS served as Project Manager for the effort.



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APPENDIX A. LIST OF PLANT SPECIES OBSERVED AT THE POHAKULOA TRAINING AREA (PTA) BY SWCA BOTANISTS, APRIL 2011

Species	Common Names	Status[1]	DZ Fisher	DZ Mikilua	LZ Boogie	LZ Brad	LZ Dove	LZ Emu	LZ Kiwi	LZ Noble	LZ Rob	LZ Tango	LZ Turkey	LZ T11	LZ X-Ray	LZ Yankee	LZ Zulu	LZ Farp 12A	LZ Farp 17	LZ Farp 18
CHENOPODIACEAE (Goosefoot Family)																				
Atriplex semibaccata R. Br.	Australian salt bush	X	x														x			
Chenopodium album L.	goosefoot	X						x					x							
Chenopodium carinatum R. Br.		X					x	x	x									x	x	
Chenopodium murale L.	'aheahea	X					x		x				x			x				x
Chenopodium oahuense (Meyen) Aellen	'ena'ena	N	x	x			x	x	x						x	x	x	x	x	x
Salsola kali L.	Russian thistle	X					x						x	x		x				
CRASSULACEAE (Stonecrop Family)																				
Crassula sieberiana (Schult.) Druce		X			x		x	x							x	x		x	x	x
EUPHORBIACEAE (Spurge Family)																				
Chamaesyce olowaluana (Sherff) Croizat & O.Deg.	'akoko	N	x											x				x		x
Euphorbia peplus L.	petty surge									x	x									
EPACRIDACEAE (Epacris Family)																				
Leptecophylla tameiameiae (Cham. & Schlechtend.) C.M. Weiler	pukiawe	I			x							x								
ERICACEAE (Heather Family)																				
Vaccinium reticulatum Sm.	'ōhelo	N			x							x								
FABACEAE (Pea Family)																				
Glycine wightii (Wight & Arn.) Verdc.		X											x							
Indigofera suffruticosa Mill.	indigo, 'iniko	X											x							
Medicago lupulina L.	black medic	X						x	x			x	x					x		
Medicago polymorpha L.	bur clover	X	x				x	x				x	x		x		x		x	
Melilotus alba Medik.	white sweet clover	X											x						x	
Melilotus indica (L.) All.	sweet clover	X				x		x	x			x	x		x	x			x	
Sophora chrysophylla (Salisb.) Seem.	mamane	N	x		x	x	x			x	x			x				x	x	x
Vicia sativa L. subsp. *nigra* (L.) Ehrh.	garden veitch	X									x		x		x					
Vicia villosa Roth	hairy veitch	X					x	x	x											
GENTIANACEAE (Gentian family)																				
Centarium erythraea Raf.	European centaury	X		x							x		x							
GERANIACEAE (Geranium Family)																				
Erodium cicutarium (L.) L'Her.	stork's bill	X	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Geranium homeanum Turcz.		X									x									
LAMIACEAE (Mint Family)																				
Marrubium vulgare L.	common horehound	X								x				x				x		x
Stenogyne angustifolia A. Gray		E, N													x					
LYTHRACEAE (Loosestrife Family)																				
Lythrum maritimum Kunth	loosestrife	I					x													
MALVACEAE (Mallow Family)																				
Malva parviflora L.	cheeseweed	X	x	x			x	x	x			x	x			x	x	x		x
Sida fallax Walp.	'ilima	I						x	x				x		x					

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DICOTS																				
ASTERACEAE (Sunflower Family)																				
Achillea millefolium L.	yarrow	X									x									
Ambrosia artemisiifolia L.	common ragweed	X		x							x						x			
Bidens menziesii (A. Gray) Sherff subsp. filiformis (Sherff) Ganders & Nagata	ko'oko'olau	N													x					
Bidens pilosa L.	beggar's tick	X											x	x				x		x
Centaurea melitensis L.	Napa thistle	X	x								x		x			x	x			
Cirsium vulgare (Savi) Ten.	bull thistle	X						x										x		
Cotula australis (Sieber ex Spreng.) *Hook.*	Australian brass buttons	X					x											x		
Delairea odorata Lem.[2]	German ivy	X									x									
Dubautia ciliolata (DC.) D.D. Keck	na'ena'e	N													x					
Galinsoga parviflora Cav.		X	x	x							x		x		x	x	x	x	x	
Gamochaeta purpurea (L.) Cabrera	purple cudweed	X											x					x		x
Heterotheca grandiflora Nutt.	telegraph weed	X		x	x	x	x			x		x			x	x	x			x
Hypochoeris glabra L.	smooth cat's ear	X	x		x				x	x	x		x		x			x	x	x
Hypochoeris radicata L.	hairy cat's ear	X									x				x					
Osterspermum calendulaceum L. f.?		X					x		x											
Picris hieracioides L.	hawkweed	X													x					
Reichardia tingitana (L.) Roth		X													x					
Senecio madagascariensis Poir.		X	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Senecio vulgaris L.	common groundsel	X		x	x		x	x	x		x		x	x	x				x	
Sonchus oleraceus L.	sow thistle	X	x	x			x	x	x	x	x		x	x	x	x	x	x	x	x
Tagetes minuta L.	stink weed	X	x				x								x	x	x			
Verbesina encelioides (Cav.) Benth. & Hook.	golden crownbeard	X	x	x			x	x	x			x		x		x	x			x
BRASSICACEAE (Mustard Family)																				
Brassica nigra (L.) Koch	black mustard	X	x	x		x	x	x	x	x			x		x	x	x	x		
Coronopus didymus (L.) Sm.	swine cress	X					x	x	x											
Lepidium virginicum L.	wild peppergrass	X		x			x	x	x				x		x	x	x			
Sisymbrium irio L.	London rocket	X	x	x		x	x	x	x	x	x			x		x	x	x	x	x
Sisymbrium officinale (L.) Scop.	hedge mustard	X									x									
CAMPANULACEAE (Bellflower Family)																				
Triodanis biflora (Ruiz & Pav.) Greene		X					x				x									
Wahlenbergia gracilis (G. Forst.) A. DC.		X			x			x	x		x	x			x				x	x
CARYOPHYLLACEAE (Carnation Family)																				
Petrorhagia velutina (Guss.) P.W.Ball & Heywood	childing pink	X					x	x	x				x		x					
Polycarpon tetraphyllum (L.) L.		X			x		x	x	x	x			x		x			x	x	x
Silene gallica L.	small flower catchfly	X					x		x		x		x							
Cerastium fontanum Baumg. subsp. triviale (Link) Jalas	common mouse ear	X									x		x						x	
Stellaria media (L.) Villars	chickweed	X																	x	

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MONOCOTS																				
CYPERACEAE (Sedge Family)																				
Carex wahuensis C.A. Mey. subsp. *rubiginosa* (R.W. Krauss) T. Koyama		N			x															
Cyperus hildebrandii Boeckeler		X											x							
POACEAE (Grass Family)																				
Agrostis avenacea	heupueo	X													x					
Avena fatua L.	wild oat	X		x			x	x								x	x			
Bromus catharticus Vahl	rescue grass	X	x	x				x			x				x	x	x			
Bromus diandrus Roth	ripgut grass	X	x	x			x	x			x				x	x	x			
Cenchrus ciliaris L.[2]	buffel grass	X							x				x							
Dacytlis glomerata L.	cock's foot	X					x				x									
Dichantium sericeum (R. Br.) A. Camus[2]	Australian blue stem	X											x							
Digitaria ciliaris (Retz.) Koeler	large crabgrass	X											x							
Eragrostis atropioides Hillebr.		N	x												x	x	x			
Gastridium ventricosum (Gouan) Schinz & Thell.	nitgrass	X						x												
Hordeum murinum subsp. *leporinum* (Link) Arcang.	barley	X	x	x		x				x		x				x	x			x
Melinis repens (Willd.) Zizka	Natal redtop	X					x	x	x				x		x					
Nassella cernua (Stebbins & Á. Löve) Barkworth	needle grass	X	x	x		x					x						x			
Panicum pellitum Trin	kai'oi'o	N						x		x					x					
Panicum tenuifolium Hook. & Arn.	mountain pili grass	N													x					
Pennisetum clandestinum Chiov.	kikuyu grass	X		x			x	x	x				x				x		x	x
Pennisetum setaceum (Forssk.) Chiov.	fountain grass	X	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x
Vulpia bromoides (L.) S.F. Gray	brome fescue	X	x	x	x	x		x	x		x		x		x		x		x	
Poaceae indet.		X									x									
Poaceae indet.		X											x							
Poaceae indet.		X													x					
Poaceae indet.		X														x				
FERNS																				
ADIANTACEAE (Maiden's-hair Family)																				
Pellaea ternifolia (Cav.) Link	cliffbrake fern	I	x	x	x			x				x			x		x	x	x	x
ASPLENIACEAE (Bird's-Nest Fern Family)																				
Asplenium adiantum-nigrum L.	'iwa'iwa	I	x		x										x			x	x	
Asplenium aethiopicum (Burm.f.) Bech.[2]	'iwa'iwa a Kane	I			x					x										
Total plant species per location			29	24	19	13	41	39	37	18	36	17	43	19	44	26	26	30	33	36

[1]Status: E=endangered; N=endemic; I=indigenous, P=Polynesian introduction; X=alien

[2]New records for PTA

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MYOPORACEAE (False-sandalwood Family)																				
Myoporum sandwicense A. Gray	naio	I	x		x	x	x			x	x	x		x	x	x		x	x	x
MYRSINACEAE (Myrsine Family)																				
Myrsine lanaiensis Hillebr.	kolea	N																	x	
MYRTACEAE (Myrtle Family)																				
Corymbia citriodora (Hook.) K.D. Hill & L.A. S. Johnson	lemon-scented eucalyptus	X											x							
Metrosideros polymorpha Gaud.	'ohi'a lehua	N				x						x		x				x	x	
ONAGRACEAE (Evening-Primrose Family)																				
Oenothera stricta Ledeb. ex Link	evening primrose	X									x									
OXALIDACEAE (Wood-Sorrel Family)																				
Oxalis corniculata L.	wood sorrel	P?							x		x									
PAPAVERACEAE (Poppy Family)																				
Argemone glauca (Nutt. ex Prain) Pope	puakala	N	x				x		x		x			x	x			x	x	x
PLANTAGINACEAE (Plantain Family)																				
Plantago lanceolata L.	narrow-leafed plantain	X						x	x				x							
POLYGONACEAE (Buckwheat Family)																				
Emex spinosa (L.) Campd.		X					x	x	x				x			x				
PRIMULACEAE (Primrose Family)																				
Anagallis arvensis L.	scarlet pimpernel	X					x	x	x					x		x		x		
ROSACEAE (Rose Family)																				
Osteomeles anthyllidifolia (Sm.) Lindl.	'ulei	I					x								x	x			x	
RUBIACEAE (Coffee Family)																				
Coprosma montana A. Gray		N									x									
Sherardia arvensis L.[2]		X							x											
SAPINDACEAE (Soapberry Family)																				
Dodonaea viscosa Jacq.	'a'ali'i	I	x		x		x	x	x	x	x		x	x	x			x	x	
SCROPHULARIACEAE (Snapdragon Family)																				
Verbascum thapsus L.	wooly mullein	X		x			x				x			x		x			x	x
SOLANACEAE (Nightshade Family)																				
Solanum americanum Mill.	popolo	I?									x				x				x	
Solanum cf. capsicoides All.[2]	cockroach berry	X											x							
STERCULIACEAE (Cacao Family)																				
Waltheria indica L.	'uhaloa	I											x							
URTICACEAE (Nettle Family)																				
Urtica urens L.	dwarf nettle	X	x								x	x		x				x	x	x
VERBENACEAE (Verbena Family)																				
Verbena litoralis Kunth	ha'uoi	X							x	x										

APPENDIX B. AVIAN POINT COUNT DATA AND RELATED INFORMATION FOR PTA

Species Alpha Codes

Common Name	Alpha Code
African silverbill	AFSI
Apapane	APAP
Black francolin	BLFR
California quail	CAQU
Chukar	CHUK
Common Myna	COMY
Erckel's francolin	ERFR
Gray francolin	GRAF
Hawaii amakihi	HAAM
Hawaiian Goose	HAGO
House finch	HOFI
House sparrow	HOSP
Japanese white-eye	JAWE
Northern cardinal	NOCA
Northern Mockingbird	NOMO
Nutmeg manikin	NUMA
Pacific golden plover	PAGP
Ring-necked pheasant	RIPH
Rock pigeon	ROPI
Sky Lark	SKLA
Spotted dove	SPDO
Wild turkey	WITU
Zebra dove	ZEDO

DZ FISHER (81.6 acres) is a heavily degraded open dirt field with very little emergent vegetation. The site is approximately 0.5 miles from the PTA quarry, and has a mock POW camp on the northern end of the survey area. Four point counts were conducted between 1010-1102 on 6 April.

Point: 006
Lat/Long: N 19 45' 20.3"/ W 155 36' 12.4"
Date: 4/6/11 Time Start: 1010 Time Stop: 1020

Species	Total	Distance (m)	Notes
SKLA	6		
COMY	2	175, 175	FLYING E-W

Point: 007
Lat/Long: N 19 45' 25.7"/ W 155 36' 20.6"
Date: 4/6/11 Time Start:1024 Time Stop: 1034

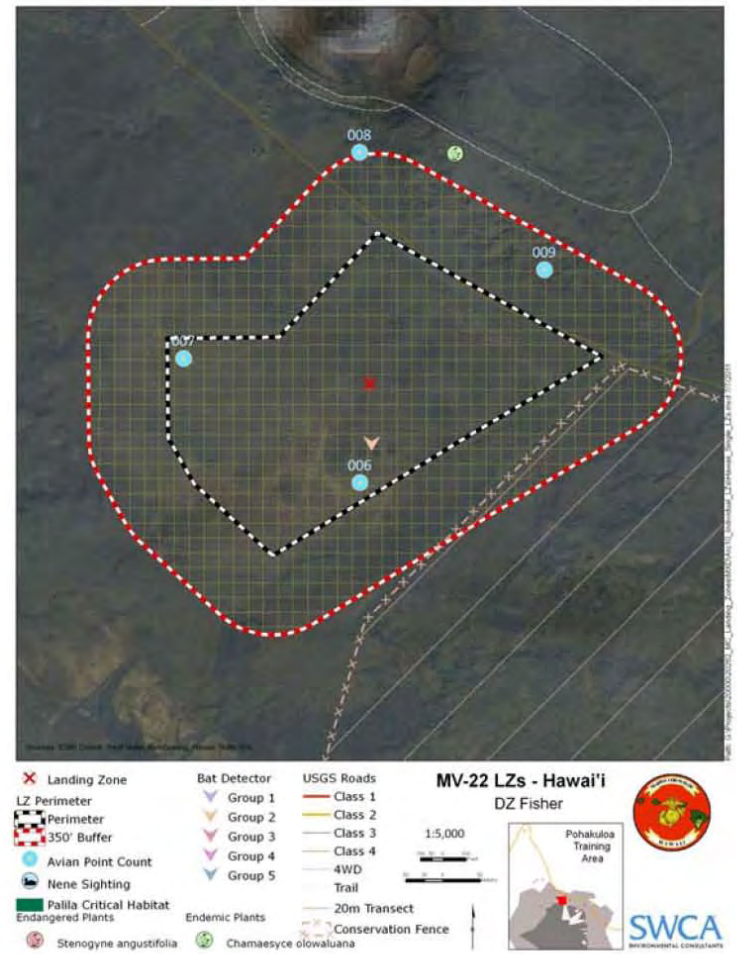
Species	Total	Distance (m)	Notes
SKLA	10		
PAGP	2	200+, 200+	

Point: 008
Lat/Long: N 19 45' 34.8"/ W 155 36' 12.4"
Date: 4/6/11 Time Start: 1038 Time Stop: 1048

Species	Total	Distance (m)	Notes
SKLA	6		
PAGP	2	200+, 200+	

Point: 009
Lat/Long: N 19 45' 29.6/ W 155 36' 03.9"
Date: 4/6/11 Time Start: 1052 Time Stop: 1102

Species	Total	Distance (m)	Notes
SKLA	8		
PAGP	1	200+	



DZ MIKILUA (34.6 acres) is an open grassy field with mixed fountain grass and *Eragrostis*, and a few dead *Chenopodium* shrubs. Three point counts were conducted at 0910-0945 on 7 April.

Point: 015
Lat/Long: N 19 45' 30.9"/ W 155 35' 09.9"
Date: 4/7/11 Time Start: 0910 Time Stop: 0920

Species	Total	Distance (m)	Notes
SKLA	8		
PAGP	13	125 (ALL)	E OF STATION

Point: DZ MIKILUA
Lat/Long: N 19 45' 26.7/ W 155 35' 29.4"
Date: 4/7/11 Time Start: 0922 Time Stop: 0932

Species	Total	Distance (m)	Notes
SKLA	8		
ROPI	1	85	FLYING W OF STATION (N-S)

Point: 016
Lat/Long: N 19 45' 21.0"/ W 155 35' 07.2"
Date: 4/7/11 Time Start: 0935 Time Stop: 0945

Species	Total	Distance (m)	Notes
SKLA	5		
PAGP	7	65 (ALL)	GROUP OF 7 SW OF STATION
CAQU	1	15	

LZ BOOGIE (13.9 acres) is an open crushed rock/gravel area with ʻaʻā on all sides. Few *Dodonaea* and pukiawe shrubs scattered in the ʻaʻā. Two point counts were conducted at 0845-0910.

Point: 046
Lat/Long: N 19 39' 43.5"/ W 155 32' 41.9"
Date: 4/12/11 Time Start: 0845 Time Stop: 0855

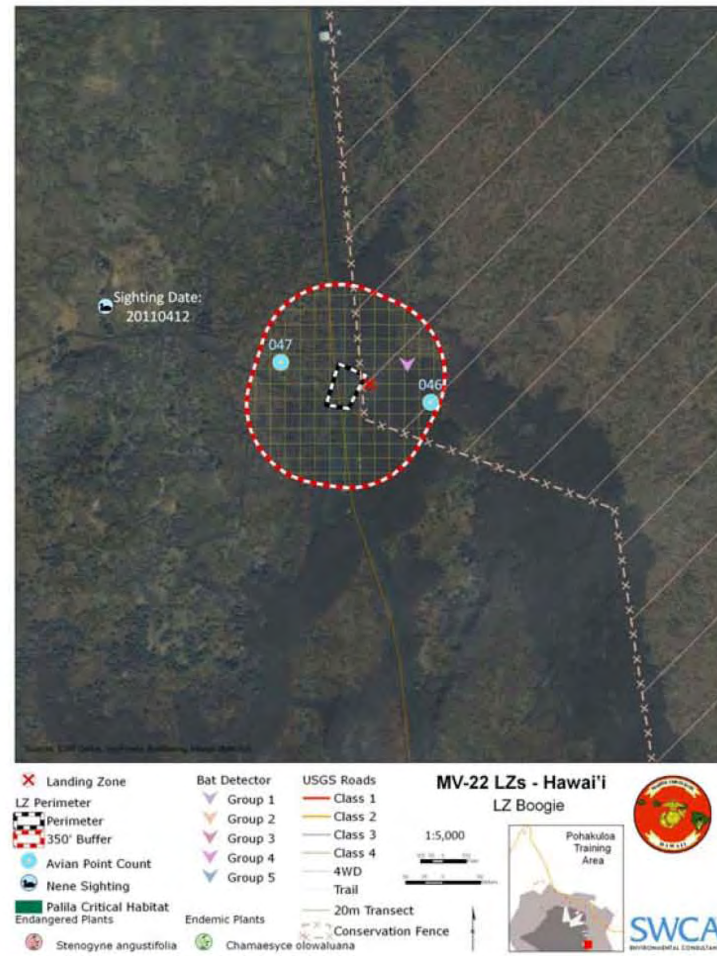
Species	Total	Distance (m)	Notes
SKLA	1		
CHUK	2	200+, 200+	
HOFI	1	45	

Point: 047
Lat/Long: N 19 39' 45.2"/ W 155 32' 48.8"
Date: 4/12/11 Time Start: 0900 Time Stop: 0910

Species	Total	Distance (m)	Notes
SKLA	1		
CHUK	1	200+	
HAGO	1	200+	CALLING FROM RANGE 1

Note: Range 1 is located approximately 500m to the west of this LZ. The nene detected were at point RNG1 (N 19 39' 47.7"/ W 155 32' 56.9"), taken for reference and shown on the LZ Boogie map attached.

NOTE: Counts were suspended for the remainder of the day on 10 April due to strong winds encountered at LZ Boogie



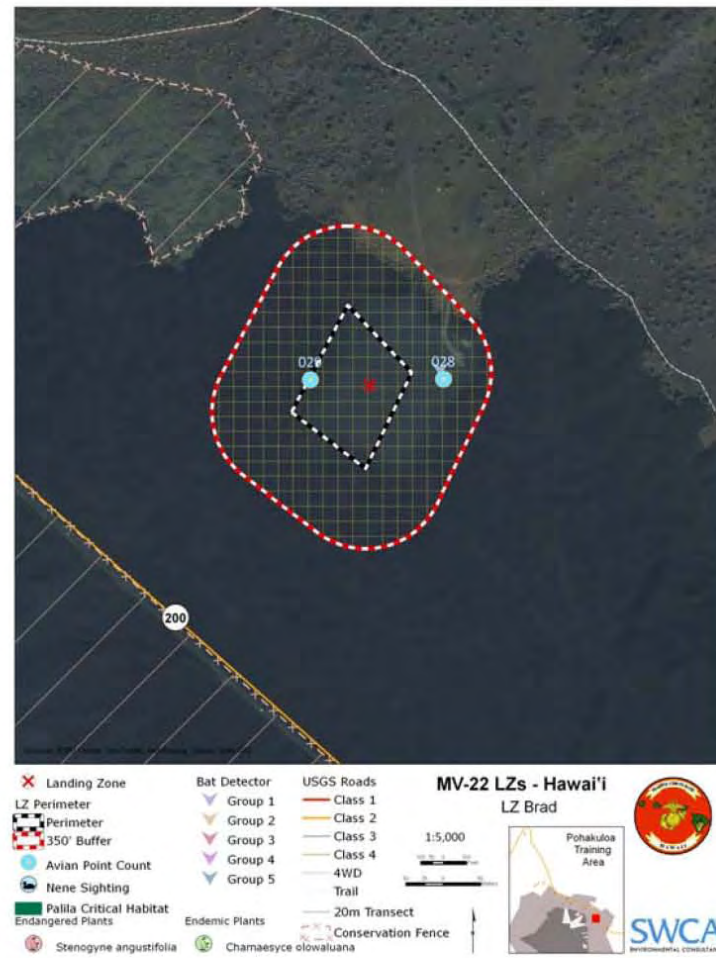
LZ BRAD (28.0 acres) consists of open gravel/crushed rock surrounded by ʻaʻā. A water tank sits on the NE corner of the LZ. No emergent vegetation was found. Two point counts were conducted at 0925-0947 on 9 April.

Point: 028
Lat/Long: N 19 43' 26.4"/ W 155 31' 32.4"
Date: 4/9/11 Time Start: 0925 Time Stop: 0935

Species	Total	Distance (m)	Notes
SKLA	5		
CHUK	1	200+	
HOFI	2	60, 60	FLYING NW OF STATION (S-N)

Point: 029
Lat/Long: N 19 43' 26.4"/ W 155 31' 38.5"
Date: 4/9/11 Time Start: 0937 Time Stop: 0947

Species	Total	Distance (m)	Notes
SKLA	4		



LZ DOVE (32.8 acres) sits in a small valley running SE-NW. Introduced grasses and weeds include *Pennisetum clandestinum* (kikuyu) and *Senecio*, with scattered *Dodonaea viscosa* shrub along the slopes of each low ridge. Three point counts were conducted at 0840-0920 on 8 April

Point: LZ DOVE
Lat/Long: N 19 48' 15.8"/ W 155 38' 53.8"
Date: 4/8/11 Time Start: 0840 Time Stop: 0850

Species	Total	Distance (m)	Notes
ERFR	2	200+, 200+	
BLFR	1	200+	
SKLA	16		
CAQU	2	125, 80	
PAGP	1	200+	

Point: 017
Lat/Long: N 19 48' 12.5"/ W 155 38' 48.4"
Date: 4/8/11 Time Start: 0855 Time Stop: 0905

Species	Total	Distance (m)	Notes
SKLA	9		
ERFR	1	200+	
WITU	6	175 (ALL)	
PAGP	2	200+, 200+	

Point: 018
Lat/Long: N 19 48' 20.1/ W 155 38' 58.8"
Date: 4/8/11 Time Start: 0910 Time Stop: 0920

Species	Total	Distance (m)	Notes
SKLA	12		
ERFR	1	200+	
PAGP	1	200+	

LZ EMU (22.9 acres) is an open Kikuyu field with *Senecio* throughout and scattered *Dodonaea* on the periphery. Three point counts were conducted at 1036-1115 on 8 April

Point: LZ EMU
Lat/Long: N 19 48' 11.3"/ W 155 39' 38.8"
Date: 4/8/11 Time Start: 1036 Time Stop: 1046

Species	Total	Distance (m)	Notes
SKLA	18		
ERFR	3	80, 200+, 200+	
RIPH	2	200+, 200+	
PAGP	2	200+, 200+	

Point: 021
Lat/Long: N 19 48' 17.5"/ W 155 39' 39.5"
Date: 4/8/11 Time Start: 1050 Time Stop: 1100

Species	Total	Distance (m)	Notes
SKLA	16		
ERFR	1	200+	
RIPH	1	200+	
CHUK	1	200+	
PAGP	1	200+	

Point: 022
Lat/Long: N 19 48' 06.9"/ W 155 39' 43.6"
Date: 4/8/11 Time Start: 1105 Time Stop: 1115

Species	Total	Distance (m)	Notes
SKLA	16		
PAGP	3	200+ (ALL)	
RIPH	1	200+	
ERFR	1	200+	

B-12

B-13

LZ KIWI (22.4 acres) is an open grassy field of Kikuyu with *Verbesina, Senecio* and fountain grass, and scattered *Dodonaea* shrub around the perimeter. Three point counts were conducted at 0945-1022 on 8 April

Point: 019
Lat/Long: N 19 48' 03.9"/ W 155 40' 05.3"
Date: 4/8/11 Time Start: 0945 Time Stop: 0955

Species	Total	Distance (m)	Notes
SKLA	13		
RIPH	2	200+, 200+	
ROPI	7	55 (ALL)	
BLFR	1	200+	
PAGP	1	200+	

Point: LZ KIWI
Lat/Long: N 19 47' 57.4"/ W 155 40' 05.8"
Date: 4/8/11 Time Start: 0958 Time Stop: 1008

Species	Total	Distance (m)	Notes
SKLA	9		
BLFR	1	200+	
ERFR	1	200+	
PAGP	2	200+, 200+	

Point: 020
Lat/Long: N 19 47' 51.3"/ W 155 40' 07.4"
Date: 4/8/11 Time Start: 1012 Time Stop: 1022

Species	Total	Distance (m)	Notes
SKLA	14		
BLFR	1	200+	
RIPH	2	200+, 200+	
ERFR	1	200+	
PAGP	1	200+	

LZ NOBLE (26.1 acres) sits in a small depression and consists primarily of open dirt and crushed rock/gravel substrate, with mamane/naio thickets around the perimeter. Three point counts were conducted at 0825-0903 on 10 April.

Point: 035
Lat/Long: N 19 42' 46.5"/ W 155 33' 11.1"
Date: 4/10/11 Time Start: 0825 Time Stop: 0835

Species	Total	Distance (m)	Notes
SKLA	2		
PAGP	1	200+	

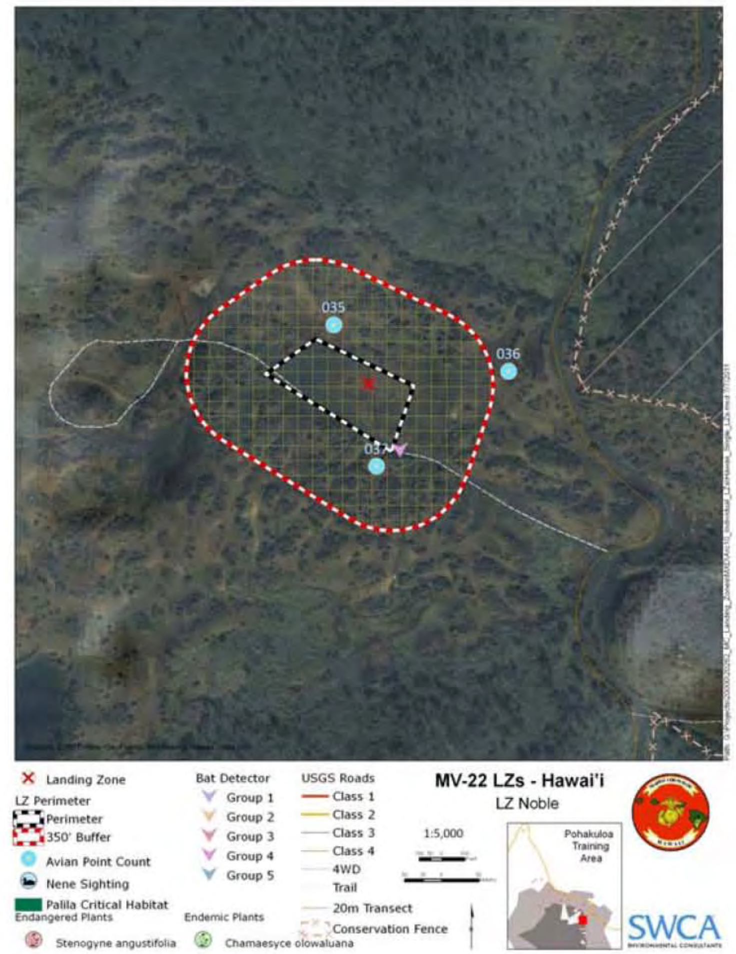
Point: 036
Lat/Long: N 19 42' 44.5"/W 155 33' 03.0"
Date: 4/10/11 Time Start: 0840 Time Stop: 0850

Species	Total	Distance (m)	Notes
SKLA	2		
HOFI	2	70, 70	

Point: 037
Lat/Long: N 19 42' 40.3"/ W 155 33' 09.1"
Date: 4/10/11 Time Start: 0853 Time Stop: 0903

Species	Total	Distance (m)	Notes
SKLA	3		

B-16



B-17

LZ ROB (30.9 acres) is an open crushed rock/gravel area surrounded on all sides by ʻaʻā. Fairly intact mamane/naio forest was found on the northern boundary of the survey area at the edge of the ʻaʻā flow. Two point counts were conducted at 1015-1038 on 9 April.

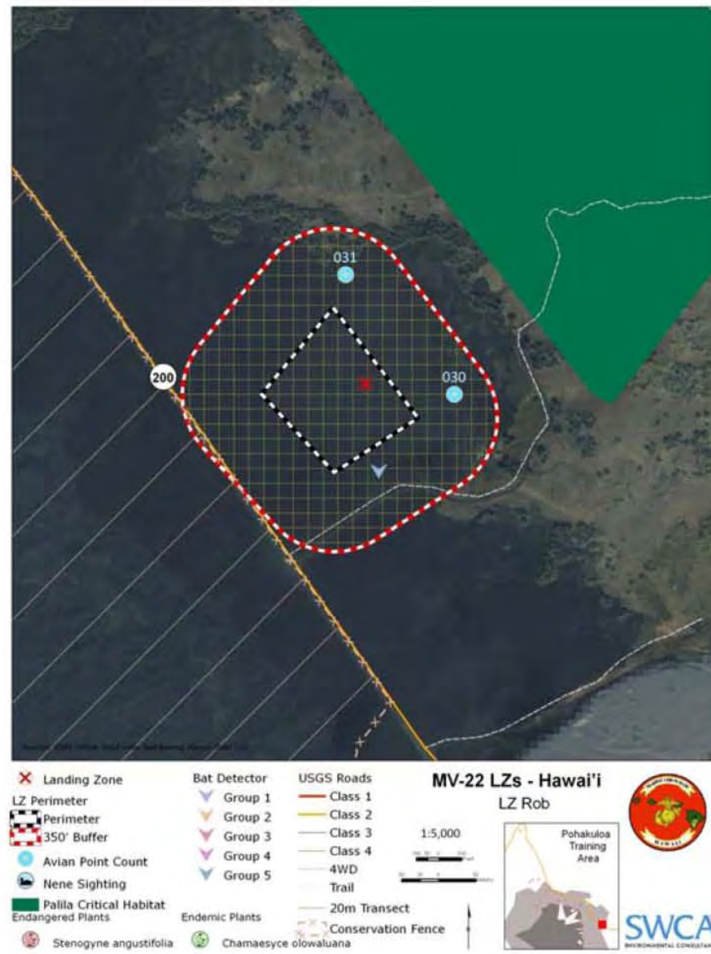
Point: 030
Lat/Long: N 19 42' 03.5"/ W 155 29' 56.4"
Date: 4/9/11 Time Start: 1015 Time Stop: 1025

Species	Total	Distance (m)	Notes
SKLA	4		
CHUK	1	200+	
NOCA	1	150	
NOMO	3	80, 80, 130	
ERFR	4	200+ (ALL)	
HAAM	1	175	
PAGP	2	110, 200+	

Point: 031
Lat/Long: N 19 42' 03.5"/ W 155 30' 01.4"
Date: 4/9/11 Time Start: 1028 Time Stop: 1038

Species	Total	Distance (m)	Notes
SKLA	3		
ERFR	3	200+ (ALL)	
HAAM	2	80, 120	
NOMO	1	200+	
HOFI	3	95, 130, 130	
CAQU	2	200+, 200+	
WITU	1	200+	
PAGP	2	200+, 200+	
APAP	2	40, 85	IN MAMANE N OF STATION
JAWE	7	45 (ALL)	

B-18



B-19

LZ TANGO (20.6 acres) consists of open crushed rock and gravel, with several large ʻōhia trees and scattered *Leptecophylla tameiameiae* (pukiawe) located on the perimeter of the LZ. Two point counts were conducted at 0805-0830 on 12 April.

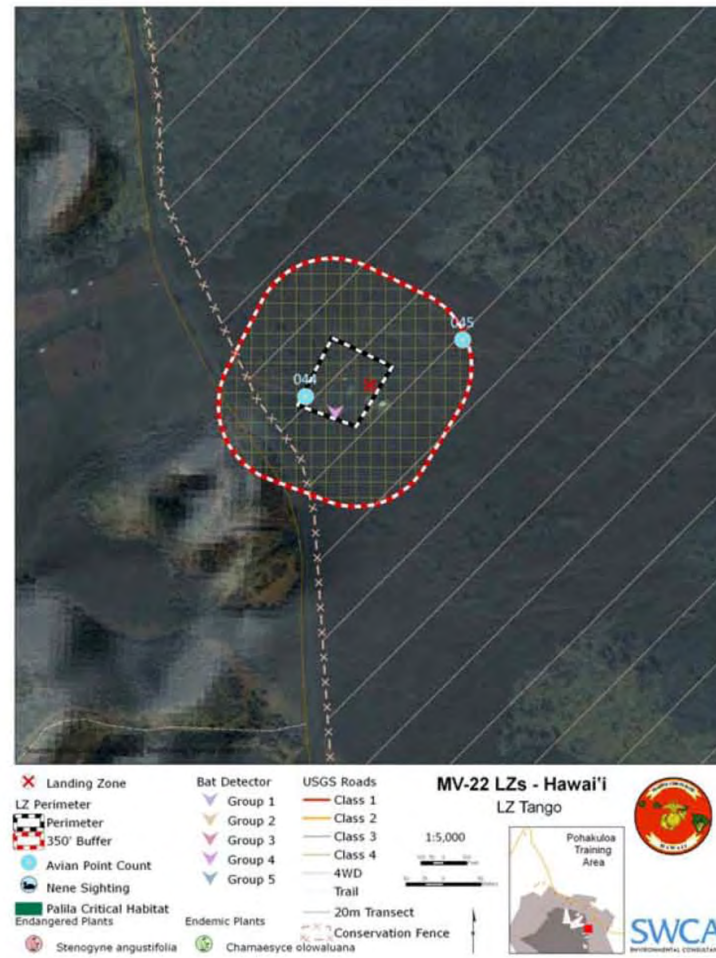
NOTE: Counts were suspended for the remainder of the day on 10 April due to strong winds encountered at LZ Tango.

Point: 044
Lat/Long: N 19 42' 05.3"/ W 155 32' 46.8"
Date: 4/12/11 Time Start: 0805 Time Stop: 0815

Species	Total	Distance (m)	Notes
HAAM	6	30, 30, 40, 55, 90, 125	
JAWE	7	45 (ALL)	
ERFR	1	200+	

Point: 045
Lat/Long: N 19 42' 07.8"/ W 155 32' 39.6"
Date: 4/12/11 Time Start: 0820 Time Stop: 0830

Species	Total	Distance (m)	Notes
HAAM	5	75, 75, 100, 130, 160	
CHUK	1	200+	
ERFR	1	200+	
HOFI	2	95, 115	



LZ TURKEY (20.5 acres) is an open grassy field with fountain grass and buffelgrass (*Cenchrus ciliaris*). A few *Eucalyptus* sp. were found around the periphery. Three point counts were conducted at 0715-0755 on 11 April.

Point: 038
Lat/Long: N 19 54' 52.6"/ W 155 41' 19.8"
Date: 4/11/11 Time Start: 0715 Time Stop: 0725

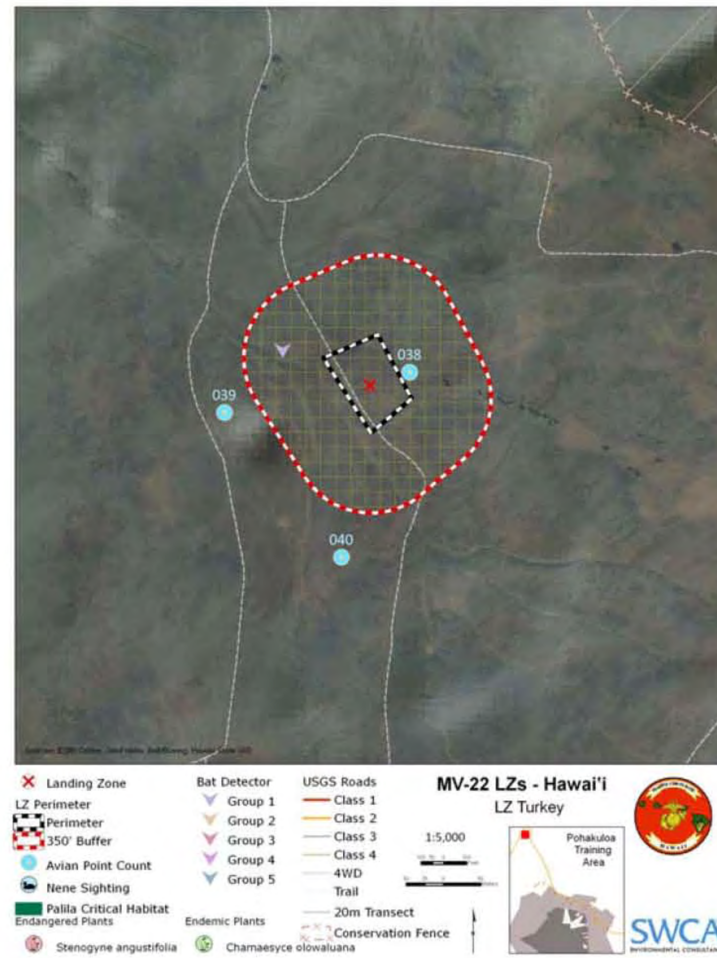
Species	Total	Distance (m)	Notes
SKLA	1		
BLFR	2	200+, 200+	
AFSI	30	75 (ALL)	
PAGP	1	200+	

Point: 039
Lat/Long: N 19 54' 50.8"/W 155 41' 28.4"
Date: 4/11/11 Time Start: 0730 Time Stop: 0740

Species	Total	Distance (m)	Notes
SKLA	3		
BLFR	1	200+	
GRFR	2	60, 60	
PAGP	7	80 (ALL)	GROUP OF 7 N OF STATION

Point: 040
Lat/Long: N 19 54' 44.5"/ W 155 41' 23.0"
Date: 4/11/11 Time Start: 0745 Time Stop: 0755

Species	Total	Distance (m)	Notes
SKLA	3		
BLFR	2	200+, 200+	
NUMA	80	60 (ALL)	LARGE FLOCK FLYING (S-N)
ZEDO	4	90 (ALL)	FLYING E-W
PAGP	1	200+	



LZ T11 (29.7 acres) has an open gravel/crushed rock area bordered by open ʻaʻā to the north, and a small cinder cone to the south. A small structure sits on the top of the cone. Scattered ohia, mamane (*Sophora chrysophylla)* and naio were found at the northern base of the cone. ʻakoko (*Chamaesyce olowaluana)* was also found in a small kipuka approximately 75m north of the LZ. Three point counts were conducted at 0806-0850 on 9 April.

Point: 025
Lat/Long: N 19 44' 03.5"/ W 155 33' 23.1"
Date: 4/9/11 Time Start: 0806 Time Stop: 0816

Species	Total	Distance (m)	Notes
HOFI	9	10(4), 20, 20, 55, 70, 125	
HAAM	2	75, 95	

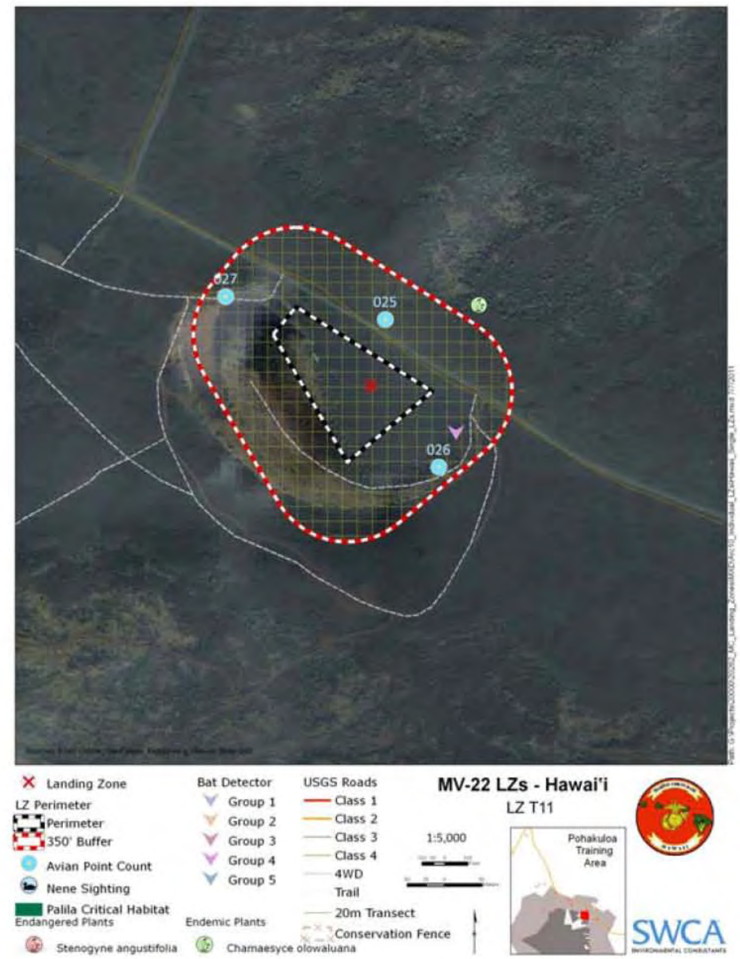
Point: 026
Lat/Long: N 19 43' 57.1"/ W 155 33' 20.7"
Date: 4/9/11 Time Start: 0822 Time Stop: 0832

Species	Total	Distance (m)	Notes
HOFI	5	5, 5, 5, 65, 150	
HAAM	1	30	

Point: 027
Lat/Long: N 19 44' 04.5/ W 155 33' 30.4"
Date: 4/9/11 Time Start: 0840 Time Stop: 0850

Species	Total	Distance (m)	Notes
HAAM	1	85	
HOSP	5	80 (ALL)	
AFSB	7	120 (ALL)	

NOTE: A large number of apparent Barn owls (*Tyto alba*) roost holes were located on the N and NW face of the cinder cone. No owls were observed, and it was not clear whether the holes were currently in use.



LZ XRAY (21.5 acres) is an open field of fountain grass and *Senecio*. The perimeter of the main LZ is fenced with a road running through part of the survey area. Fairly intact native shrubland exists beyond the fence, with *Chenopodium, Dubautia* sp., *Bidens* sp. present. Three point counts were conducted at 0900-0940 on 11 April.

Point: 041
Lat/Long: N 19 44' 47.2"/ W 155 39' 09.6"
Date: 4/11/11 Time Start: 0900 Time Stop: 0910

Species	Total	Distance (m)	Notes
SKLA	1		
BLFR	3	200+ (ALL)	

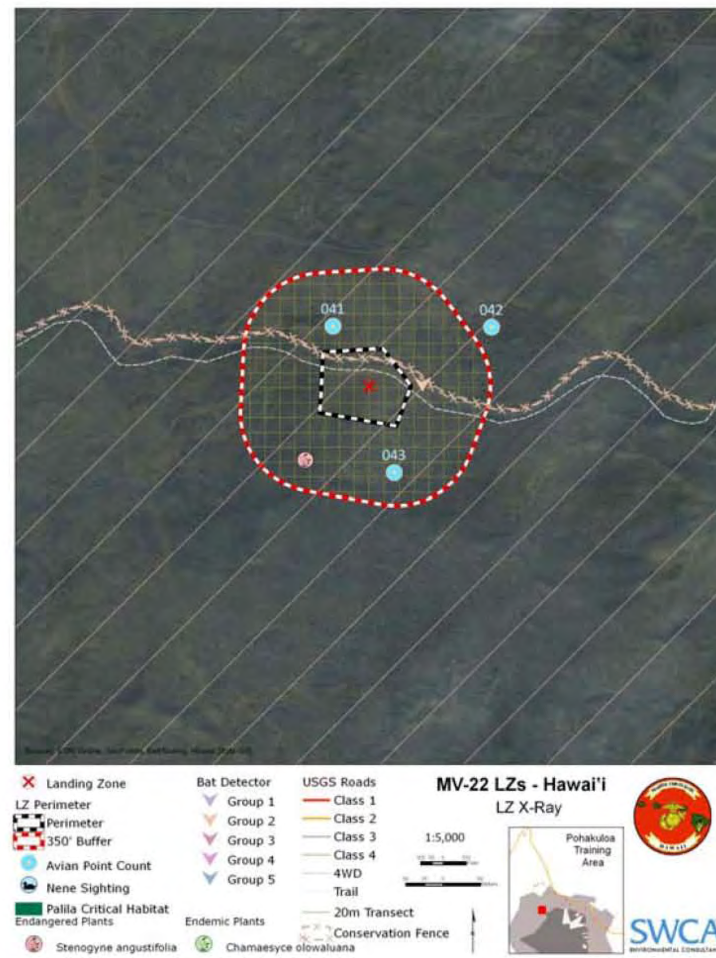
Point: 042
Lat/Long: N 19 44'47.2"/ W 155 39' 02.2"
Date: 4/11/11 Time Start: 0913 Time Stop: 0923

Species	Total	Distance (m)	Notes
BLFR	5	200+ (ALL)	

Point: 043
Lat/Long: N 19 44' 40.9"/ W 155 39' 06.7"
Date: 4/11/11 Time Start: 0930 Time Stop: 0940

Species	Total	Distance (m)	Notes
SKLA	2		
BLFR	4	200+ (ALL)	
ERFR	1	200+	
PAGP	2	200+, 200+	

B-26



B-27

LZ YANKEE (51.8 acres) is an open grass flat with a variety of introduced weed species throughout, including *Verbesina encelioides, Senecio madagascarensis and Pennesetum setaceum* (fountain grass). Drought-stressed *Chenopodium oahuense* shrub was found along the northern perimeter closest to Saddle Road. Five point counts were conducted at 0700-0810 on 7 April.

Point: LZ YANKEE
Lat/Long: N 19 46' 58.8"/ W 155 37' 37.1"
Date: 4/7/11 Time Start: 0700 Time Stop: 0710

Species	Total	Distance (m)	Notes
SKLA	6		
WITU	1	180	
ERFR	4	200+ (ALL)	
CAQU	1	200+	
BLFR	1	200+	
PAGP	1	80	

Point: 010
Lat/Long: N 19 46' 53.4"/ W 155 37' 19.1
Date: 4/7/11 Time Start: 0715 Time Stop: 0725

Species	Total	Distance (m)	Notes
SKLA	12		
PAGP	3	65, 65, 65	
CAQU	2	150, 200+	
WITU	1	200+	

Point: 011
Lat/Long: N 19 47' 0.2"/ W 155 37' 26.8"
Date: 4/7/11 Time Start: 0730 Time Stop: 0740

Species	Total	Distance (m)	Notes
SKLA	11		
PAGP	8	40 (7), 90	GROUP OF 7 W OF STATION
ERFR	1	200+	
BLFR	2	200+, 200+	

Point: 012
Lat/Long: N 19 47' 06.9"/ W 155 37'21.6"
Date: 4/7/11 Time Start: 0745 Time Stop: 0755

Species	Total	Distance (m)	Notes
SKLA	14		
COMY	3	70, 70, 70	IN FLIGHT TO W OF STATION
PAGP	1	200+	
ERFR	1	200+	

Point: 013
Lat/Long: N 19 46' 59.3"/ W 155 37' 10.1"

Date: 4/7/11 Time Start: 0800 Time Stop: 0810

Species	Total	Distance (m)	Notes
SKLA	7		
BLFR	1	200+	
ERFR	1	200+	


200
012
011
013
010
LZ Yankee
Landing Zone
LZ Perimeter
Perimeter
350' Buffer
Avian Point Count
Nene Sighting
Palila Critical Habitat
Endangered Plants
Stenogyne angustifolia
Bat Detector
Group 1
Group 2
Group 3
Group 4
Group 5
Endemic Plants
Chamaesyce olowaluana
USGS Roads
Class 1
Class 2
Class 3
Class 4
4WD
Trail
20m Transect
Conservation Fence
MV-22 LZs - Hawai'i
LZ Yankee
1:5,000
Pohakuloa Training Area
SWCA

B-30

LZ ZULU (28.2 acres) is a barren open field with very little live emergent vegetation. Two point counts were conducted at 0818-0845 on 7 April.

Point: LZ ZULU
Lat/Long: N 19 46' 02.6"/ W 155 35' 37.1"
Date: 4/7/11 Time Start: 0818 Time Stop: 0828

Species	Total	Distance (m)	Notes
SKLA	8		
PAGP	1	200+	W OF STATION

Point: 014
Lat/Long: N 19 45' 59.0"/ W 155 35' 37.2"
Date: 4/7/11 Time Start: 0835 Time Stop: 0845

Species	Total	Distance (m)	Notes
SKLA	13		
PAGP	2	90, 90	W OF STATION
ERFR	1	200+	

FARP 12A (41.2 acres) is an open crushed rock and gravel area with four concrete landing points oriented in a row from SE-NW. Scattered ohia and naio were noted in the ʻaʻā surrounding the main LZ area. Three point counts were conducted at 0700-0740 on 9 April.

Point: FARP 12A
Lat/Long: N 19 44' 27.4" W 155 34' 29.4
Date: 4/9/11 Time Start: 0700 Time Stop: 0710

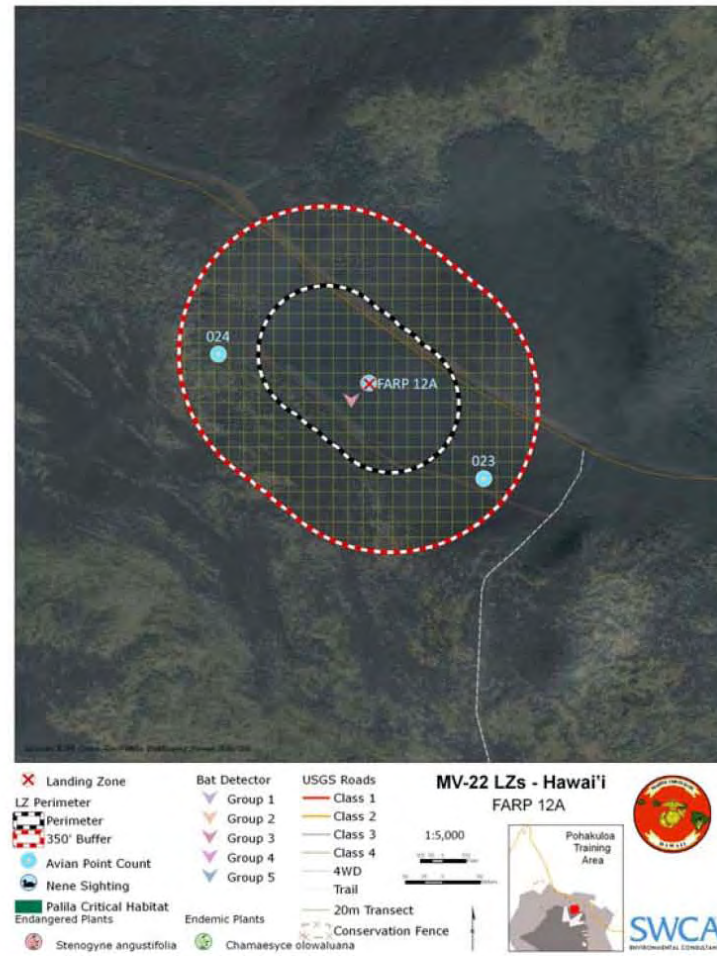
Species	Total	Distance (m)	Notes
CHUK	1	200+	
ROPI	5	150 (ALL)	FLYING N OF STATION (W-E)

Point: 023
Lat/Long: N 19 44' 23.2"/ W 155 34' 24.1"
Date: 4/9/11 Time Start: 0715 Time Stop: 0725

Species	Total	Distance (m)	Notes
CHUK	1	200+	
COMY	2	100, 100	FLYING S OF STATION (N-S)
HOFI	1	200+	

Point: 024
Lat/Long: N 19 44' 28.7"/ W 155 34' 36.4"
Date: 4/9/11 Time Start: 0730 Time Stop: 0740

Species	Total	Distance (m)	Notes
HOFI	2	80, 120	
CHUK	1	200+	
ERFR	1	200+	
BLFR	1	200+	



LZ FARP 17 (44.6 acres) consists primarily of crushed rock and gravel surrounding the four concrete landing pads. The perimeter of the LZ has sparse *Metrosideros polymorpha* (ohia) and *Myoporum sandwicense* (naio) to the east, and open ʻaʻā around the remainder of the survey area. Four point counts were conducted at 0822-0938 on 6 April.

Point: FARP 17
Lat/Long: N 19 44’51.1”/W 155 33’2.3”
Date: 4/6/11 Time Start: 0822 Time Stop: 0832

Species	Total	Distance (m)	Notes
ERFR	1	200+	
HOFI	7	40, 65, 85, 85, 130, 130, 130	
SKLA	1		
BLFR	1	200+	

Point: 003
Lat/Long: N 19 44’ 48.6”/ W 155 37’17.8”
Date: 4/6/11 Time Start: 0838 Time Stop: 0848

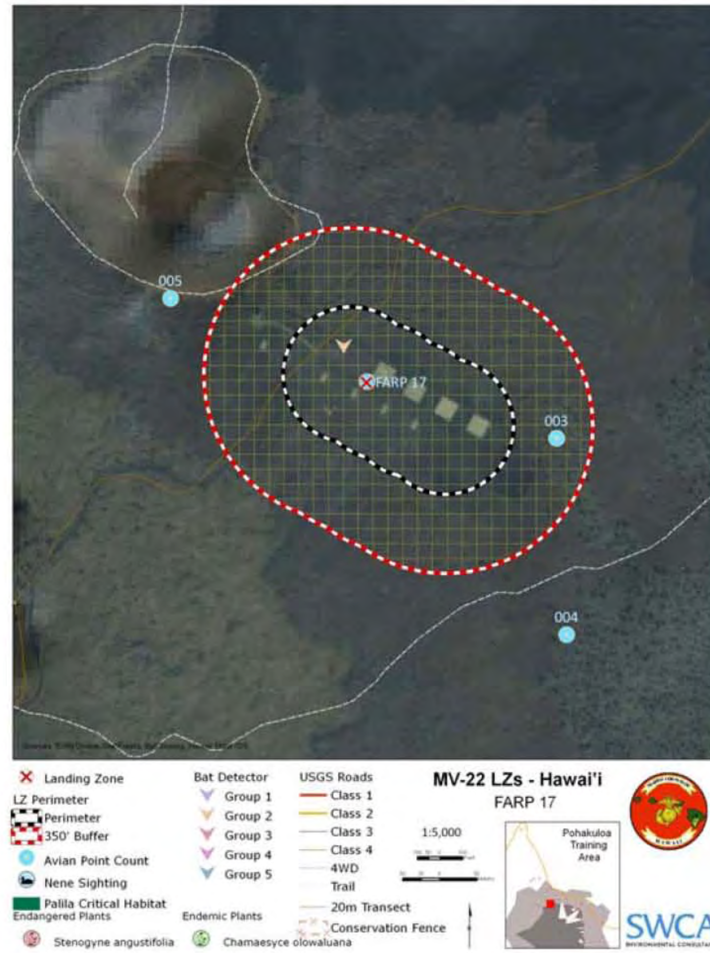
Species	Total	Distance (m)	Notes
HAAM	4	10, 10, 35, 50	
HOFI	9	5, 5, 5, 5, 20, 20, 35, 40, 65	
ERFR	1	200+	

Point: 004
Lat/Long: N 19 44’40.0”/ W 155 37’ 17.3”
Date: 4/6/11 Time Start: 0900 Time Stop: 0910

Species	Total	Distance (m)	Notes
HOFI	8	5, 5, 10, 10, 25, 35, 35, 45	
HAAM	4	10, 10, 25, 25	
SKLA	1		

Point: 005
Lat/Long: N 19 44’ 54.7”/ W 155 37’ 35.6”
Date: 4/6/11 Time Start: 0928 Time Stop: 0938

Species	Total	Distance (m)	Notes
HOFI	9	5, 5, 5, 5, 5, 20, 20, 30, 45	
NOMO	1	180	
SKYL	1		
CAQU	1	200+	



LZ FARP 18 (44.9 acres) consists of a constructed platform of crushed rock and gravel. Four concrete landing points sit in a row running E-W. Scattered mamane, naio and ‘akoko were found on the periphery. Three point counts were conducted at 0705-0745 on 10 April.

Point: 032
Lat/Long: N 19 44’ 43.6”/ W 155 32’ 52.7”
Date: 4/10/11 Time Start: 0705 Time Stop: 0715

Species	Total	Distance (m)	Notes
SKLA	5		
CHUK	1	200+	
ERFR	1	200+	
PAGP	2	200+	
HOFI	2	55, 55	

Point: 033
Lat/Long: N 19 44’ 41.3”/ W 155 32’ 59.2”
Date: 4/10/11 Time Start: 0720 Time Stop: 0730

Species	Total	Distance (m)	Notes
SKLA	3		
HOFI	2	150, 150	
HAAM	1	120	

Point: 034
Lat/Long: N 19 44’ 48.4”/ W 155 33’ 04.2”
Date: 4/10/11 Time Start: 0735 Time Stop: 0745

Species	Total	Distance (m)	Notes
SKLA	1		
HAAM	1	110	
ERFR	1	200+	

B-37

B-38

APPENDIX C

PHOTO ALBUM OF PROTECTED SPECIES OBSERVED AT PTA DURING THIS STUDY

Stenogyne angustifolia var. *angustifolia* A. Gray (Lamiaceae)

Common Name: Hawaiian Mint
Status: Endemic, Endangered

Ecological and Cultural Significance: In 1993, seven of the nine known populations of this species were located within Pohakuloa Training Area (PTA) (U.S. Fish and Wildlife Service 1993). A listed endangered species, its existence is threatened by military activity, alien plant competitors, introduced herbivores, fire, and pathogens. Additional information on this species can be found in U.S. Fish and Wildlife Service (1993) and U.S. Army Garrison, Hawai i (2010a).

Photo: *Stenogyne angustifolia* is an odorless, sprawling perennial herb with trailing stems. It is limited to xeric, upper forest zone habitat within the basaltic plain at PTA between 1500-1800 meters (5000 – 6000 feet) elevation. It may be found growing together at PTA with other listed species including *Chamaesyce olowaluana* and *Tetramolopium arenarium.* The photo, below left, was taken at LZ XRay during this survey.

Distribution and Density at Pōhakuloa Training Area: Two individual *Stenogyne angustifolia* were observed in the eastern portion of the LZ XRay buffer area. The two individuals were within one meter of each other; therefore, they are both mapped as a single point with GPS (represented by the pink circle in the lower left quarter of the 350-foot buffer at LZ XRay. This was the only listed endangered plant species found at PTA during surveys conducted in April-May 2011 by NAVFAC (under subcontract from Belt Collins Hawai i to SWCA Environmental Consultants). See also the full page map of LZ XRay (Site 13) in Section 4.1.1. Photo credit: SWCA.

Alauda arvensis

Common Name: skylark; Eurasian skylark
Status: Alien; protected by Migratory Bird Treaty Act (MBTA)

Ecological and Cultural Significance: This alien species occurs on all the main Hawaiian Islands. On Hawai i Island, it is frequently seen on grassy mountain slopes and along road sides. The skylark is insectivorous and can be seen running (rather than hopping) through grass to capture its prey.

Photos:

Photo credit: IanF birdforum.com

Distribution and Density at Pōhakuloa Training Area: Common to grassy areas at PTA. Males often have an elaborate flight display and can be seen hovering while delivering lengthy song composed of trills and warbles (Hawaii Audubon Society 2005; Pratt et al. 1987).

Common throughout most of PTA, skylarks were observed at all LZs during this study with the exception of LZ Farp 12A, LZ T11, and LZ Tango.

Natural Resources Surveys in Support of MV-22/UH-1 EIS

Branta sandvicensis

Common Name: Hawaiian goose, nēnē
Status: Endemic, Endangered

Ecological and Cultural Significance: The nēnē is the state bird of Hawai i. They can be found on rocky, sparsely vegetated volcanic slopes as well as grasslands, open lowlands, and golf courses (Hawaii Audubon Society 2005, Pratt et al 1987). They feed on both native and introduced plants. Their populations have been decimated due to predation by introduced mongoose and feral cats, though captive propagation efforts and reintroduction programs conducted by the Hawaii Division of Forestry and Wildlife are ongoing.

Photos:

Photo credit: JT Productions

Distribution and Density at Pōhakuloa Training Area: Nēnē were only observed at Range 1 adjacent to LZ Boogie at a distance of approximately 300-400 meters during this study. The photo above was taken of the birds observed at PTA during this study.

Cardinalis cardinalis

Common Name: Northern cardinal; Kentucky or red cardinal
Status: Alien; protected by Migratory Bird Treaty Act (MBTA)

Ecological and Cultural Significance: The male of this species is readily distinguishable by its thick red bill, black face, red topknot and body. Females also have red bills and black faces, but are a buffy tan with red streaks in topknot, wings and tail. This seed eating species is common to all the Hawaiian Islands.

Photos: A male northern cardinal, taken within the cantonment area at PTA.

Photo credit: JT Productions

Distribution and Density at Pōhakuloa Training Area: The northern cardinal can be found in from urban areas to native forests and is common to thickets and dense underbrush and forest understory (Hawaii Audubon Society 2005; Pratt et all 1987).

A single Northern cardinal was observed at LZ Rob during this study.

Natural Resources Surveys in Support of MV-22/UH-1 EIS

Carpodacus mexicanus

Common Name: House finch
Status: Alien; protected by Migratory Bird Treaty Act (MBTA)

Ecological and Cultural Significance: Male house finches can be distinguished from sparrows by bright red to orange to dull yellow plumage on its head, throat, and breast. It is a highly adaptable species common to urban and forested areas throughout the Hawaiian Islands.

Photos:

Photo credit: digishooter birdforum.com

Distribution and Density at Pōhakuloa Training Area: The house finch can be found throughout PTA wherever roosting trees are present, and is common in open groves. May be seen singly or in flocks, it is fond of soft fruits, insects, and seeds, especially cones in ironwood trees (Hawaii Audubon Society 2005; Pratt et al 1987).

Among the most common birds seen during this study, house finches were observed at LZ Farp 17, LZ Farp 12A, LZ T11, LZ Brad, LZ Rob, LZ Farp 18, LZ Noble, LZ Tango, and LZ Boogie.

Hemignathus virens virens

Common Name: Hawaii amakihi
Status: Endemic; protected by Migratory Bird Treaty Act (MBTA)

Ecological and Cultural Significance: This is the most common native forest bird above 600 meters elevation, though it may also be found at lower elevations in introduced forests of Hawai i Island. It forages for nectar, fruit, and insects on a variety of native and introduced plants, and can often been seen chipping bark in its search for insects. It prefers drier forest lands and may be seen in small flocks.

Photos:

Photo credit: JT Productions

Distribution and Density at Pōhakuloa Training Area: Amakihi were observed at LZ Farp 17, LZ Tango, LZ T11, LZ Rob, and LZ Farp 18 during this study.

Himatione sanguinea

Common Name: apapane
Status: Endemic; protected by Migratory Bird Treaty Act (MBTA)

Ecological and Cultural Significance: Apapane are common on all the main Hawaiian Islands and are easily identifiable with crimson-red bodies, white rumps, and black wings and tails. They actively forage for insects and nectar in forest canopies, and may be seen on outer branches of flowering trees with their tails characteristically cocked up.

Photos:

Photo credit: JT Productions

Distribution and Density at Pōhakuloa Training Area: Found in mountain forests above 600 meters and rarely in lowlands. More commonly seen on ōhi a trees, they also visit koa, mamane, and non-native eucalyptus and octopus trees.

Two individual apapane were observed at LZ Rob during this study.

Mimus polyglottos

Common Name: Northern mockingbird; mockingbird
Status: Alien; protected by Migratory Bird Treaty Act (MBTA)

Ecological and Cultural Significance: Uncommon on all Hawaiian Islands, this alien species is noted for its mimicry of other species. Its song is long, varied, and melodious. They feed on insects, fruits, and seeds.

Photos:

Photo credit: JT Productions

Distribution and Density at Pōhakuloa Training Area: Preferring drier scrub and parkland habitats, Mockingbirds commonly perch on fence posts, snags, or branches and sing to defend their territory (Hawaii Audubon Society 1987).

Northern mockingbirds were observed at LZ Farp 17 and LZ Rob during this study.

Natural Resources Surveys in Support of MV-22/UH-1 EIS

Pluvialis fulva

Common Name: Pacific golden plover, kolea
Status: Indigenous, migratory; protected by Migratory Bird Treaty Act (MBTA)

Ecological and Cultural Significance: This migratory species is a common visitor to Hawaii and breeds in the Arctic (Pratt, et al 1987). It prefers to loaf and feed in broad open areas including short-grass fields, roadsides, beaches, and mudflats. Many establish and defend winter foraging territories (Pratt et al 1987).

Photos:

Photo credit: (both) JT Productions

Distribution and Density at Pōhakuloa Training Area: Kolea are commonly found around many LZs between August-April. SWCA observed many birds that appeared to be flocking in the flat, open LZs during this study, perhaps in preparation for migration to the Arctic. They were found at LZ Fisher, LZ Yankee, LZ Zulu, DZ Mikilua, LZ Dove, LZ Kiwi, LZ Emu, LZ Rob, LZ Farp 18, LZ Noble, LZ Turkey, and LZ XRay during this study. Top photo illustrates a male kolea in breeding plumage.

Lasiurus cinereus semotus

Common Name: Hawaiian hoary bat, ope ape a
Status: Endemic (at subspecies level), Endangered

Ecological and Cultural Significance: The ope ape a is the only terrestrial mammal native to the Hawaiian Islands, although fossil evidence of another bat species once found in Hawai i exists. They roost in native and non-native trees, and is rarely known to use caves or man-made structures for roosting. Ope ape a feed on a variety of native and non-native flying insects at night and find their prey by echolocation.

Photos:

Photo credit: Honolulu Zoo

Distribution and Density at Pōhakuloa Training Area: The ultrasonic bat detectors deployed at LZs for three nights during this study found bat activity at most of the PTA LZs and two of the LZs within the O ahu TFTA. Given the level of activity found during this study, it is safe to assume that bats may forage within all LZs at PTA. They may be seen feeding at dusk, especially around lighted areas where flying insects may congregate.

Analysis of Species Proposed for Listing Under the Endangered Species Act

Based on the species' elevational range, *Cyanea calycina*, *Cyanea purpurellifolia*, *Platydesma cornuta* var. *cornuta*, and *Zanthoxylum oahuense* all exist near the summit of the north Koolau Mountains (Wagner et al 1999). No LZs are present near the summit and therefore it is likely that these species would not be impacted by the proposed action. *Cyrtandra gracilis*, *Cyrtandra kaulantha*, *Cyrtandra waiolani*, *Teraplasandra lydgatei* and *Zanthoxylum oahuense* occur on the windward or south Koolau Mountains. These areas are outside of the TFTA range and are not located in the action area of the LZs, therefore there would be no impact expected on these species. *Bidens amplectens*, *Doryopteris takeuchii*, *Korthalsella degeneri*, *Melicope christopherenii*, *Melicope makahae*, and *Platydesma cornuta* var. *decurrens* do not occur in the northern Koolau Mountain range or within the action area.

To evaluate the presence of species that have the potential to occur at or near the LZs, an assessment of the species' range and current populations was conducted. The following is a list of the species that have been proposed for ESA listing by USFWS and their evaluations relative to the LZs.

Cyanea lanceolata
This species occurs in lowland mesic and lowland wet ecosystems, at elevations generally between 300 and 760 meters (1000 and 2500 feet) (Wagner et al. 1999). There are seven occurrences of this species in the north and south Koolau Mountains. The two north Koolau populations are located north of Kawaiiki stream, at Poamoho, and at Peahinaia. This species would not occur within the buffer zone of LZ Ku Tree and LZ Black due to training disturbances in the area and the dominance of non-native species. *C. lanceolata* would not occur at LZ Elephant's Foot because the LZ is below the species' elevational range. LZs Nixon, Italy, and Red are within dense *Dicranopteris-Acacia* (Uluhe and Koa) habitat which would not support this species. Furthermore, the LZs are not located at Poamoho, Peahinaia, and Kawaiiki stream.

Cyrtandra sessilis
This species occurs in lowland wet and wet cliff ecosystems at elevations ranging from 490 to 670 m (1600 to 2200ft) (Wagner et al. 1999). *C. sessilis* is known to occur along the Schofield-Waikae Trail in Kahana valley (FWS 2011). LZ Red is within the species' elevational range but is not near known populations of *C. sessilis*. Therefore, this species would not be impacted by training operations. All other LZs are below the elevational range of this species.

Melicope hiiakae
This species occurs in wet forest in the lowland wet ecosystem in the Koolau Mountains, between elevations of 396-698 m (1300-2260 ft) (Wagner et al. 1999). There are 40 individuals scattered form Kawailoa to Waimalu in the upper Koolau mountain range (FWS 2011). All of the LZs except for LZs Red and Black are outside of the species' elevational range. LZ Black is highly disturbed and does not support any native vegetation. LZ Red sits on a mountain plateau with *Dicranopteris-Acacia* (Uluhe-Koa) dominated gulches on all sides and would not support *M. hiiakae*.

Pleomele forbesii

This species mainly occurs in the Waianae Mountains from Mokuleia to Nanakuli, and a few individuals occur in the Koolau Mountains (FSW 2011). It occurs in mesic and dry forest and shrubland in the dry lowland, lowland mesic, lowland wet, and dry cliff ecosystems between 244 and 890 m (800 and 2920 ft) (Wagner et al 1999). This species would be absent at LZ Ku Tree and LZ Black because this area is highly disturbed and dominated by non-native grasses. LZ Nixon, Elephant's Foot, and Red are on mountain ridges with steep gulches surrounding the LZs. These areas are covered by dense *Dicranopteris-Acacia* (Uluhe-Koa) vegetation that would not support *P. forbesii*. LZ Italy is surrounded by non-native trees that would not support native vegetation. Due to the vegetation communities in these buffer zones, *P. forbesii* is unlikely to occur.

Psychotria hexandra ssp. *oahuensis*
Generally located in wet forests and shrubland in the lowland wet and wet cliff ecosystems at elevations ranging from 329 and 610 m (1080 and 2000 ft) (Wagner et al. 1999). Present in 3 lcoations: Maakua gulch in Hauula, Opaeula gulch, and between Kaipapau and Kalaunui, just south of Maakua gulch. This species would not be present at LZ Ku Tree or LZ Black because the habitat is highly disturbed by training and non-native species. It also would be absent at LZ Nixon and Elephant's Foot because these are below the species' elevational range. *P. hexandra* ssp. *oahuensis* would not occur at LZ Red and LZ Italy because the vegetation at these buffer zones does not support this species. The buffer zone at LZ Red is dominated by thick *Dicranopteris-Acacia* (Uluhe-Koa) vegetation that slopes into deep gulches. The buffer zone at LZ Italy is covered with non native trees.

Pteralyxia macrocarpa
This species occurs in the Waianae and Koolau Mountains, in lowland mesic, lowland wet, dry cliff, and wet cliff ecosystems, at elevations between 335 to 850 m (1100 2800 ft) (Wagner et al. 1999). This species would be absent at LZ Ku Tree and LZ Black because this area is highly disturbed and dominated by non-native grasses. LZ Nixon and Elephant's Foot are outside of the species elevational range and would have no impact to *P. macrocarpa*. LZ Red, dominated by dense *Dicranopteris-Acacia* (Uluhe-Koa) vegetation in the buffer area, would not support *P. macrocarpa*. The buffer zone at LZ Italy consists of non-native trees and does not support any native vegetation. Due to the vegetation communities at these buffer zones, *P. macrocarpa* is unlikely to occur within the action area.

Megalagrion nigrohamatum nigrolineatum, *M. leptodemas*, *M. oceanicum* (blackline, crimson, and oceanic Hawaiian damselflys)
Hawaiian damselflies breed in the slow reaches of streams and seep-fed pools. The aquatic life stage known as naiads frequent open water, resting horizontally, submerged below the surface, or on submerged vegetation. Adults perch on streamside vegetation and patrol along the stream corridor, staying close to breeding pools (FWS 2011). *M. oceanicum* has been recorded at the Kawailoa training area in a small stream (Army 2010). None of the LZs or buffer zones are near streams or pools that would support crimson Hawaiian damselfly habitat. All of the LZs are

located on mountain ridges or plateaus. Therefore, there would be no impact to these species by the proposed action.

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APPENDIX G

Cultural Resources

G-1
Historic Property Descriptions

G-2
MCB Hawaii Kaneohe Bay Archaeology

G-1 Historic Property Description

HAWAII BASING OF MV-22 AND H-1 AIRCRAFT

IDENTIFICATION OF HISTORIC STRUCTURES

April 2012
Mason Architects, Inc.

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HAWAII BASING OF MV-22 AND H-1 AIRCRAFT

IDENTIFICATION OF HISTORIC STRUCTURES

TABLES 1 & 2

STRUCTURES POTENTIALLY AFFECTED BY THE PROPOSED UNDERTAKING

ALTERNATIVES A & B

Table 1
Structures Potentially Affected by the Proposed Undertaking
Alternative A

Building No.	Facility Name	Year Built	NRHP Eligibility (E/NE)
101	Hangar	1941	NHL
167	Aircraft Spares Storage	1942	E
168	Aircraft Spares Storage	1942	E
169	Aircraft Spares Storage	1942 or 43	E
194	Aircraft Spares Storage	1942	E
195	Aircraft Spares Storage	1942	E
196	Aircraft Spares Storage	1943	E
225	Bachelor Enlisted Quarters	1941	E
226	Bachelor Enlisted Quarters	1941	E
227	Bachelor Enlisted Quarters	1941	E
228	Bachelor Enlisted Quarters	1941	E
229	Bachelor Enlisted Quarters	1941	E
230	Bachelor Enlisted Quarters	1941	E
250	Warehouse	1942-43	E
271	Warehouse	1944	E
301	Squadron Offices & Storage Building	1941	E
390	Transformer Station	1944	NE
584	Quonset Warehouse	1942	NE
1094	Bachelor Enlisted Quarters	1953	NE
1178	Engine Test Cell	1960	NE
1197	Fam Hsg Strg	1961	NE
3000	Chilled Water Plant	1970s	NE
4000	Maintenance Operation	1986	NE
4005	Air/Ground Org Storage	1987	NE
4040	Sewage Lift Station	1987	NE
4054	MAG 24 Armory	1986	NE

Table 1
Structures Potentially Affected by the Proposed Undertaking
Alternative A

Building No.	Facility Name	Year Built	NRHP Eligibility (E/NE)
4075	Warehouse	1987	NE
4091	Radar Approach	1986	NE
5019	Sentry Station	1987	NE
5037	Van Pad 1-A	1988	NE
5038	Van Pad 1-B	1988	NE
5039	Van Pad 1-C	1988	NE
5040	Van Pad 1-D	1988	NE
5049	Restroom	1988	NE
5050	Air Compressor Shed	1988	NE
5053	Air Compressor Shed	1988	NE
5054	Pad Mounted Transformer	1988	NE
5055	Chem Stg & Waste Coll Bldg	1988	NE
5056	Sentry Station	1988	NE
5064	Air Compressor Shed	1988	NE
5065	Fuel Tank Containment	1988	NE
5068	Aircraft Rescue Halon Reclaim	1991	NE
5069	Corrosion Control Hangar	1990	NE
6678	Self Storage Facility 1	2005	NE
6679	Self Storage Facility 2	2005	NE
6680	Self Storage Facility 3	2005	NE
6681	Self Storage Facility 4	2005	NE
6682	Self Storage Facility 5	2005	NE
6683	Self Storage Facility 6	2005	NE
6702	Warehouse General	2005	NE
6703	Personnel Support Storage	2005	NE

Table 2
Structures Potentially Affected by the Proposed Undertaking
Alternative B

Building No.	Facility Name	Year Built	NRHP Eligibility (E/NE)
14	Revetment	1942	E
15	Revetment	1942	E
17	Revetment	1942	E
101	Hangar	1941	NHL
167	Aircraft Spares Storage	1942	E
168	Aircraft Spares Storage	1942	E
169	Aircraft Spares Storage	1942 or 43	E
194	Aircraft Spares Storage	1942	E
195	Aircraft Spares Storage	1942	E
196	Aircraft Spares Storage	1943	E
225	Bachelor Enlisted Quarters	1941	E
226	Bachelor Enlisted Quarters	1941	E
227	Bachelor Enlisted Quarters	1941	E
228	Bachelor Enlisted Quarters	1941	E
229	Bachelor Enlisted Quarters	1941	E
230	Bachelor Enlisted Quarters	1941	E
250	Warehouse	1942-43	E
271	Warehouse	1944	E
301	Squadron Offices & Storage Building	1941	E
390	Transformer Station	1944	NE
584	Quonset Warehouse	1942	NE
601	Warehouse	1941	E
602	Warehouse	1941	E
612	Torpedo Storage Building	1942	E
620	Quonset Warehouse	1945	E

Table 2
Structures Potentially Affected by the Proposed Undertaking
Alternative B

Building No.	Facility Name	Year Built	NRHP Eligibility (E/NE)
995	Flammables Storehouse	1942	E
1094	Bachelor Enlisted Quarters	1953	NE
1178	Engine Test Cell	1960	NE
1197	Fam Hsg Strg	1961	NE
3000	Chilled Water Plant	1970s	NE
4000	Maintenance Operation	1986	NE
4005	Air/Ground Org Storage	1987	NE
4040	Sewage Lift Station	1987	NE
4054	MAG 24 Armory	1986	NE
4075	Warehouse	1987	NE
4091	Radar Approach	1986	NE
5019	Sentry Station	1987	NE
5037	Van Pad 1-A	1988	NE
5038	Van Pad 1-B	1988	NE
5039	Van Pad 1-C	1988	NE
5040	Van Pad 1-D	1988	NE
5049	Restroom	1988	NE
5050	Air Compressor Shed	1988	NE
5053	Air Compressor Shed	1988	NE
5054	Pad Mounted Transformer	1988	NE
5055	Chem Stg & Waste Coll Bldg	1988	NE
5056	Sentry Station	1988	NE
5064	Air Compressor Shed	1988	NE
5065	Fuel Tank Containment	1988	NE
5068	Aircraft Rescue Halon Reclaim	1991	NE
5069	Corrosion Control Hangar	1990	NE

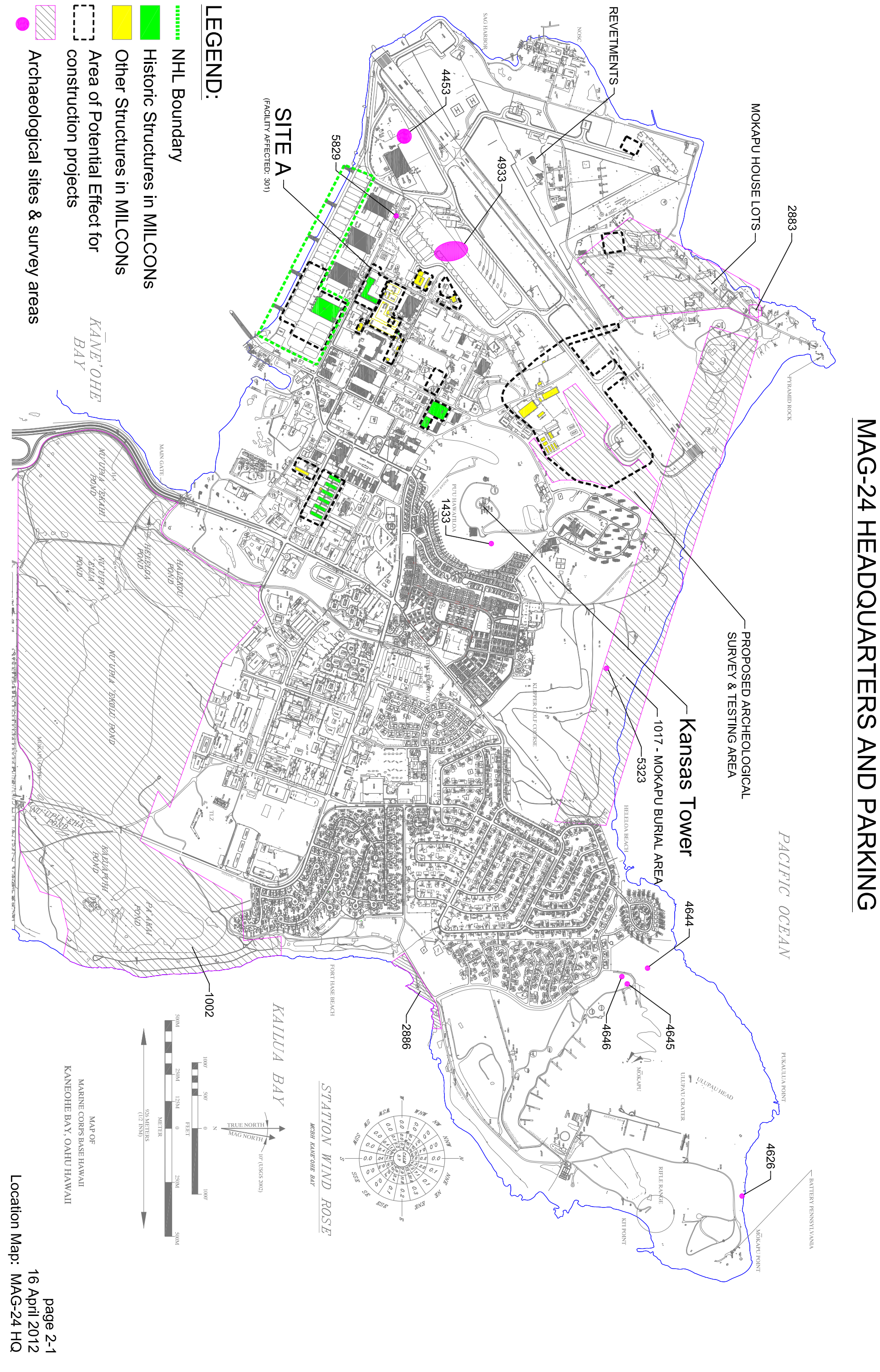
Table 2
Structures Potentially Affected by the Proposed Undertaking
Alternative B

Building No.	Facility Name	Year Built	NRHP Eligibility (E/NE)
6678	Self Storage Facility 1	2005	NE
6679	Self Storage Facility 2	2005	NE
6680	Self Storage Facility 3	2005	NE
6681	Self Storage Facility 4	2005	NE
6682	Self Storage Facility 5	2005	NE
6683	Self Storage Facility 6	2005	NE
6702	Warehouse General	2005	NE
6703	Personnel Support Storage	2005	NE

HAWAII BASING OF MV-22 AND H-1 AIRCRAFT

IDENTIFICATION OF HISTORIC STRUCTURES

MAG-24 HEADQUARTERS AND PARKING BUILDING



MAG-24 HEADQUARTERS AND PARKING BLDG

Project Identification

Construct a two-story building for use as a Marine Air Group HQ (MAG HQ) facility and a multi story parking structure for use by the occupants of adjacent hangars and the new MAG-24 headquarters facility. Paving and site improvements include paved parking, access roads/fire access lanes, sidewalks, earthwork (fill/grading), and landscaping. The project also includes the demolition of existing Facility 301. The new building will allow for the additional personnel resulting from the addition of the HMLA and VMM squadrons and provide more efficiently configured workspace.

Location Plans

Figure 2-1: Partial site plan of MCB Hawaii Kaneohe Bay. The heavy dashed lines indicate the project area. Site A is above.

Historic Structures Affected

Facility 301 – Squadron Offices & Storage Building

Facility 301 is eligible for inclusion on the National Register of Historic Places under Criterion A for its association with the initial development of Naval Air Station Kaneohe Bay in anticipation of U.S. involvement in WWII. Facility 301, constructed in 1941, existed at the time of the Japanese attack on December 7, 1941, and was one of the initial base facilities serving as the offices for the squadrons of pilots who operated the aircraft across the street. This facility was surveyed and found eligible as part of the *Marine Corps Base Hawaii, Kaneohe Bay, Historic Building Inventory* dated June 2005.

It is a one-story L-shaped concrete building with a steel roof structure. It has a low-slope gable roof in one section of the building and a flat roof in another section. There is an open lanai along most sides of the L-shaped plan. Historically the windows were steel framed multi-lite casement and fixed units, but many of the windows have been replaced with aluminum units. The historic massing of the facility and general fenestration pattern remain.

Several modifications have been made to the building since WWII, most of which affect the interior. Some historic open, interior spaces have been partitioned into small offices. Many historic, interior, single-lite doors remain. Most exterior windows have been replaced with aluminum windows, air-conditioning units, or painted over. Portions of the historic tongue and groove roof sheathing have been concealed by hung ceilings. Most of the historic bare concrete floors have been covered with resilient tiles or carpeting.

The project plans are to demolish this facility.

Figure 2-2: Photograph of the Squadron Offices & Storage Building, taken 9 September 1941. Source: National Archives.

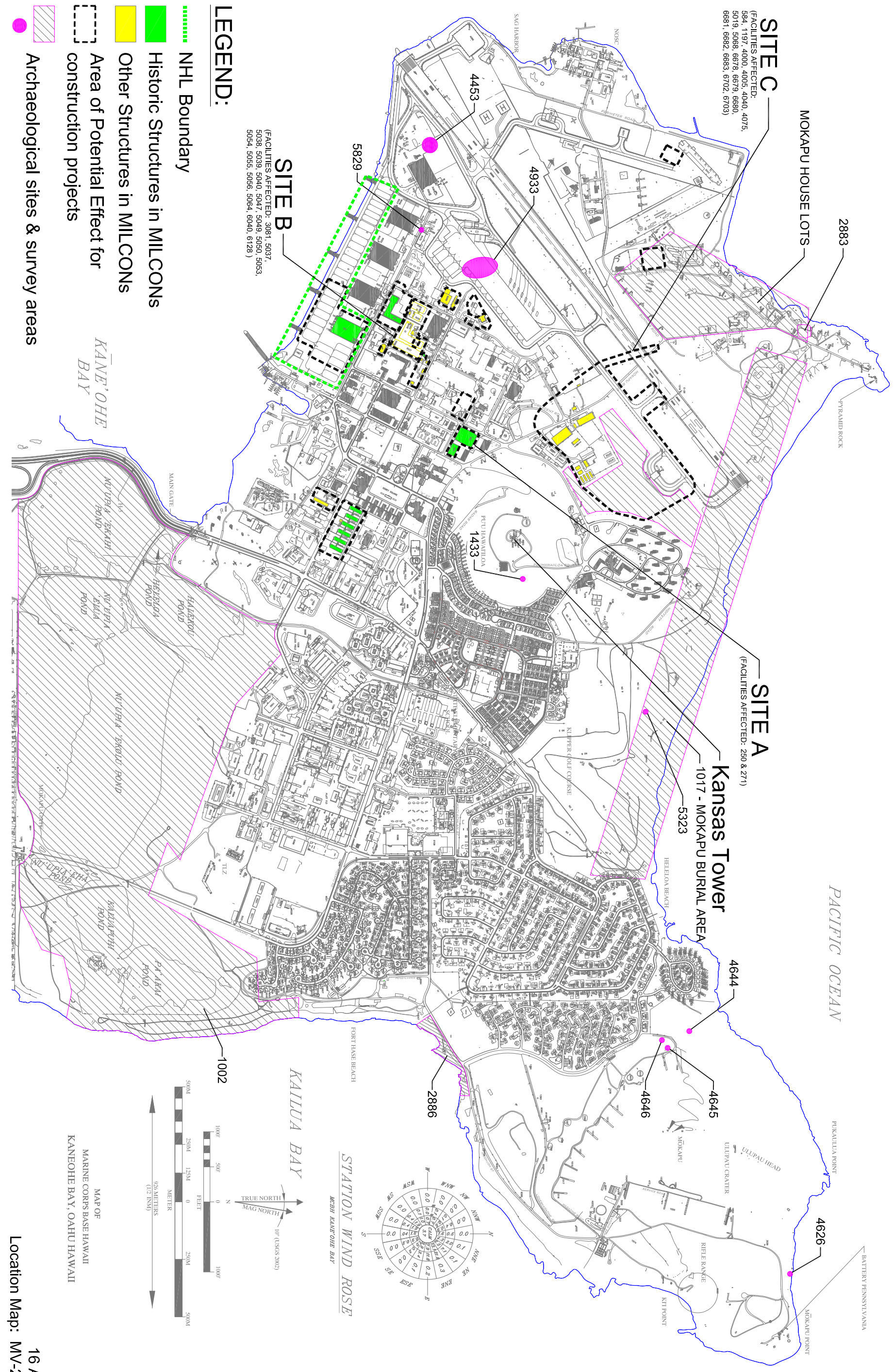
Figure 2-3: Photograph of the Squadron Offices & Storage Building. Photo taken in May 2004.

HAWAII BASING OF MV-22 AND H-1 AIRCRAFT

IDENTIFICATION OF HISTORIC STRUCTURES

MV-22 INFRASTRUCTURE UPGRADES

MV-22 INFRASTRUCTURE UPGRADES



Location Map: MV-22 INFRA
16 April 2012
page 3-1

MV-22 INFRASTRUCTURE UPGRADES

PROJECT DESCRIPTION

This project constructs one multi-story Type II modified high bay aircraft maintenance hangar to provide weather protected shelter for inspection, servicing, maintenance for the MV-22 squadron. This project also provides for MV-22 washrack facility, high bay MV-22 warehouse, POV parking, an aircraft parking apron, line vehicle parking, aircraft taxiway shoulder improvements to the taxiways, relocation of Mokapu Road, and utility infrastructure. This project also provides temporary facilities for displaced tenants of buildings that will be demolished in this phase, the renovation of warehouse buildings 250 and 271 and the construction of replacement MCCS self storage facilities. Facility 271 currently has a small restroom facility that is connected with a covered walkway. A small addition is planned for the existing restroom structure.

This project affects three areas of the base. For organizational purposes they are divided into Sites A, B, and C as indicated in the following figures.

LOCATION PLANS

Figure 3-1: Partial site plan of MCB Hawaii Kaneohe Bay illustrating site A. Work on warehouse facilities 250 and 271 will primarily be reorganization of the interior storage systems.

Figure 3-2: Partial site plan of MCB Hawaii Kaneohe Bay illustrating site B. The facilities within the dashed boundary are proposed for demolition. The MALS Supply Warehouse and van pads will be constructed in this area.

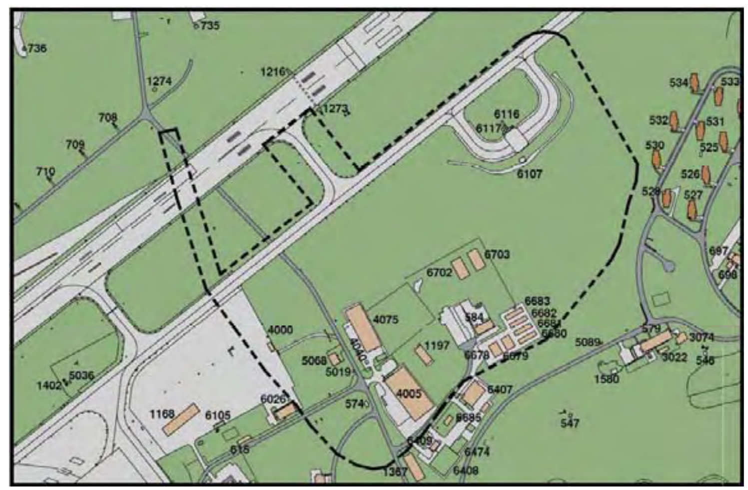


Figure 3-3: Partial site plan of MCB Hawaii Kaneohe Bay illustrating site C. The facilities within the dashed boundary are proposed for demolition. A MV-22 Aircraft Maintenance Hanger, an aircraft parking apron, a MCAS OPS complex, a new sewer pump station, wash rack, and a POV parking lot. Also, the road will be realigned and a new sentry station will be added.

Historic Structures Affected

Facilities 250 and 271 are eligible for inclusion on the National Register of Historic Places under Criterion A for their association with the vigorous construction of Naval Air Station Kaneohe Bay which resulted after the Japanese attack of December 7, 1941. These facilities are part of a grouping of warehouses constructed during the war. They were surveyed and found eligible as part of the *Marine Corps Base Hawaii, Kaneohe Bay, Historic Building Inventory* dated June 2005.

The project plans are to reconfigure the interior, non-permanent fixtures of both facilities and add a restroom to facility 271.

Figure 3-4: Photo dated August 26, 1945 showing Facilities 250, 269, 270 & 271 shortly after they were built. Note the additions along the long sides of Facilities 271 and 269. In the original photo it is not clear if these are already enclosed additions or just roofed over open air areas. Source: -- National Archives.

Figure 3-5: Facilities 250, 269, 270, & 271. Photo taken in 1999.

Facility 250 – Warehouse

Facility 250 constructed in late 1942 or early 1943 as part of the supply system for the aviation operations of the Naval Air Station. The building is a unique design for industrial buildings of the period, an International Style building designed by the noted architect Albert Kahn, with features that reflect the scarcity of building materials during World War II.

Figure 3-6: Facility 250, note the band of multi-lite, steel frame windows circling the building and the wide overhang of the roof at the loading area on the right. Photo taken in 2003.

The warehouse is a single story building with a low slope gable roof and a roof monitor. The exterior walls of the building consist of a concrete wall about 3'-6" high with a continuous band of fifteen-light metal-frame windows above it. The north and south sides of the building have corrugated metal siding which fills the gables above the level of the windows. Some window lights on the west and south sides are opaque, either replaced with solid panels or painted over. All four sides of the roof monitor have a continuous band of metal-frame windows with pivot sections. The eaves are open, and there are square metal gutters with metal downspouts.

Although the Secretary of the Navy emphasized the construction of temporary structures, Warehouse 250 was built as a permanent building (Bureau of Yards and Docks 1945, 1035), which demonstrates the importance of the facility to base operations. The use of wood, steel, and concrete in its construction and several of its distinctive design features were attempts to balance the need to conserve vital war materials with the requirements of the Naval Air Station for a serviceable warehouse.

Facility 271 – Warehouse

Facility 271 was built in 1944 as 160' x 60' temporary storehouse. It was constructed of metal siding over a wood frame with corrugated metal roofing and concrete footing foundations with concrete slab on grade floors. Many of the WW II buildings built at the base were permanent buildings authorized, designed, and constructed before the Japanese attack of December 7, 1941 made the utilization of cheaper, temporary construction imperative. This warehouse, however, was planned and built after the attack as a temporary building that was easy to erect and conserved vital war materials and funds. Facility 271 is grouped with two other warehouses, 269 and 270, around an earlier (1942) permanent-constructed warehouse, Facility 250, which is also part of this project.

Figure 3-7: Facility 271. Photo taken in April 2009.

After the war, the military realized that many of the wartime-constructed temporary buildings still had plenty of life left in them, and they were maintained and continued to be utilized. Their designations changed to semi-permanent or permanent to reflect this. This was the case with Facility 271.

Facility 271 had a 35' x 160' addition added on its north side in 1945. By 1966 it had been re-classified as a permanent mx-aircraft parts warehouse. Currently the building appears to have a bituminous mineral surface over a wood sheathed roof. A photo taken on August 26, 1945 from the top of Hawaii Loa Hill shows the roofs over this addition in place, but it is not clear if it was enclosed at this date or was merely an open-air roofed area next to the building. Until at least 2000 this buildings retained siding with the historic corrugation pattern and large-scale sliding wood doors; however, it no longer had windows. Sometime between 2000 and 2009 the siding was replaced with corrugated siding with a more contemporary pattern.

FACILITY 584 – QUONSET HUT

Facility 584 was constructed as a 40 foot by 100 foot Quonset hut in 1943. Typically Quonset huts are eligible under Criterion C for their distinctive form and construction. The setting of this facility in 1943 according to base maps was one of relative isolation unlike the majority of the Quonset huts on the base which were in groups. Today the runway extends much farther running near the area of facility 584 and several other storage buildings have been built in the general vicinity of the Quonset hut, altering the original setting. The characteristic texture of the sinewave siding Quonsets had during WWII has also changed. The current siding is box ribbed siding which is also attached differently than the original siding. Thus, the setting, design, materials, workmanship, feeling, and association have all been compromised to some degree; therefore, this building has been surveyed as not eligible for the National Register of Historic Places.

A HABS report (HABS No. HI-311-F) written and submitted in 2006 gives information regarding the history of Quonset huts at MCB Hawaii, Kaneohe Bay during and immediately following WWII. The report also surveyed the remaining Quonset huts and determines that facility 620 is the best example on MCB Hawaii of a WWII Quonset hut. Facility 620 is in its original location and the setting remains fairly similar to what it was during WWII. Facility 620 has also had the siding replaced except the replacement siding is a more similar corrugation pattern.

The project plans are to demolish facility 584.

Figure 3-8: Photograph of the facility 584.

ADDITIONAL STRUCTURES AFFECTED

This project plans to demolish facilities 1197, 4000, 4005, 4040, 4075, 5019, 5037, 5038, 5039, 5040, 5049, 5050, 5053, 5054, 5055, 5056, 5064, 5065, 5068, 6657, 6678, 6679, 6680, 6681, 6682, 6683, 6702, and 6703. These facilities are less than 50 years old with the majority of them constructed from 1980 to 2000.

Facilities 5037, 5038, 5039, 5040, 5049, 5050, 5053, 5054, 5055, 5056, 5064, and 5065 are located north of the current head quarters building. Facilities 5037, 5038, 5039, and 5040 are van pads which are marked areas of paving with no permanent vertical structures. The other facilities were all constructed in 1988 and make up the support structures for the van pads (facilities 5037 through 5040).

Facilities 6678, 6679, 6680, 6681, 6682, and 6683 are a group of storage buildings adjacent to the runway, and facility 6657 is a standalone structure also adjacent to the runway. These facilities do not appear on the 1991 base map, meaning they were likely not in the current location during the Cold War; however, some of them may have been moved to this location because the base construction dates are before 1991.

Facilities 1197, 4000, 4005, 4040, 4075, 5019, and 5068 are on the 1991 base map; however, during the Cold War study of the base, they were not found to have contributed to historic events or to be directly associated with Cold War missions. The facilities are not of distinctive architectural types.

A photo taken from Kansas Tower of the group of facilities and photos of some individual facilities are provided.

Figure 3-9: Photograph taken from Kansas Tower looking toward the runway. The cluster of storage facilities is visible at the far right. Facility 250 is visible at the far left. Photo taken in 2006 by Franzen Photography.

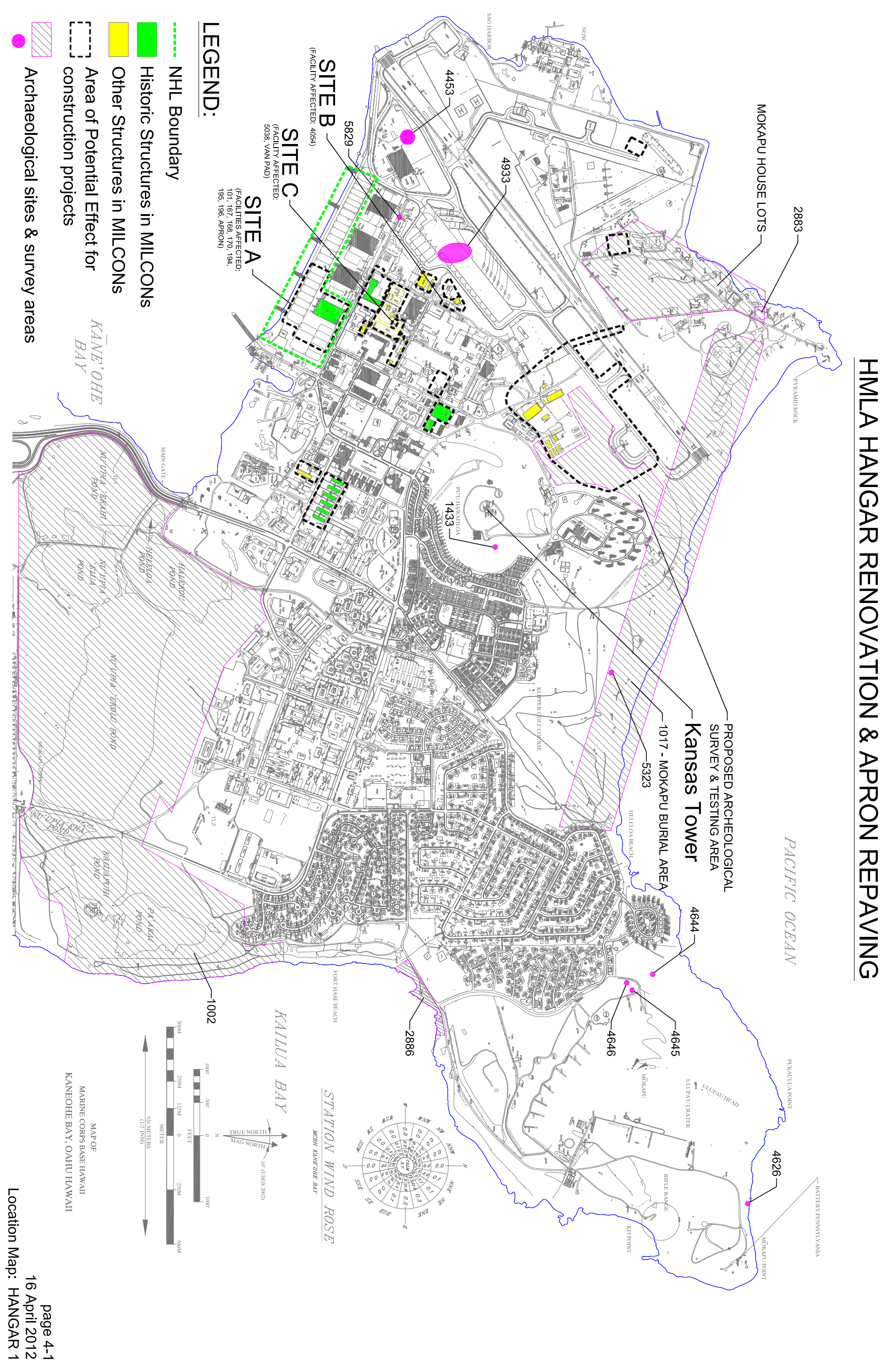
Figure 3-10: Facility 5068 is a haloncarbon reclamation facility constructed in 1991. Photo taken in August 2009.

Figure 3-11: Facility 4005 is a storage facility constructed in 1987. Photo taken in July 2009.

HAWAII BASING OF MV-22 AND H-1 AIRCRAFT

IDENTIFICATION OF HISTORIC STRUCTURES

HMLA HANGAR RENOVATION AND APRON REPAVING



HMLA INFRASTRUCTURE UPGRADES

Project Identification

This project is to renovate existing aircraft Hangar 1 and associated apron to adequately configure it for the HMLA squadron. Renovation includes existing crew and equipment space, existing squadron administration space, and hangar bay space. The project also includes repaving of the aircraft apron and upgrading a van pad.

This project affects four areas of the base. For organizational purposes they are divided into Sites A, B, C, and D as indicated in the following figures.

Location Plans

Figure 4-1: Site A. Partial site plan of MCB Hawaii Kaneohe Bay. The heavy dashed line indicates the project area.

Figure 4-2: Site B. Partial site plan of MCB Hawaii Kaneohe Bay. The heavy dashed line indicates the project area.

Figure 4-3: Site C. Partial site plan of MCB Hawaii Kaneohe Bay. The heavy dashed line indicates the project area.

HISTORIC STRUCTURES AFFECTED

The existing paved area which makes up the parking apron near Hangar 1 is larger than it was during the WWII era and portions were repaved during the 1990s. A survey of the paved area was conducted in February 2011 to identify any existing attack damage. MCB Hawaii is in the process of proposing options to avoid changes to the areas of attack damage. A report documenting the findings of the survey is at the end of this section. The seaplane ramps which are part of the National Landmark will not be affected by this project.

FACILITY 101 – HANGAR

By the time of the Japanese attack in 1941, Hangar 1 (Facility 101) was completed. During the attack Hangar 1, the surrounding apron, and seaplane ramps were heavily hit by Japanese fire. In 1942 the rebuilding of Hangar 1 was completed. On May 28, 1987, Hangar 1, the five seaplane ramps (Facilities 1-5), the seaplane parking area to the east of Hangar 1, and the seaplane parking area between the hangars and Kaneohe Bay were designated a National Historic Landmark.

Figure 4-4: Hangar 1. Photo taken May 2004.

The hangar is a large, two-story, rectangular building with a tall rectangular form at each corner. During the war a steel, shed roof addition was added to each end of the building between the tall, rectangular corner elements. A small shed roof structure was also added to the road-side of Hangar 1. Originally the siding was cement asbestos, some of which still exists; however, much of it has been replaced with steel siding with a similar corrugation pattern. Originally the building had two roof monitors to allow light into the large hangar spaces; however, these have been replaced by skylights. Historically there was a continuous band of steel windows around the facility; however, many of these, though extant on the interior, have been covered with metal siding on the exterior or the glass has been painted. A large concrete masonry office structure has been built in the open center of the hangar.

Figure 4-5: Aerial view of Kaneohe NAS dated 12/9/41, showing the newly constructed hangars and seaplane ramps two days after the attack. (Source: National Archives 1941)

This project plans to renovate Hangar 1 in accordance with the Secretary of the Interiors Standards for Rehabilitation. The primary work proposed will be on the interior of the facility including the addition of passenger elevators. A concrete topping will be installed over the existing concrete floor to provide the required slope from the center of the hangar to the hangar doors. A trench drain will be installed throughout the hangar floor. The proposed aircraft apron upgrade includes resurfacing, seal coating, and striping of the existing asphalt taxiways and parking apron pavement and the installation of large concrete hardstands at aircraft parking locations.

FACILITIES 167, 168, 170, 194, 195, & 196
AIRCRAFT SPARES STORAGE BUILDINGS

These facilities are eligible for inclusion on the National Register of Historic Places under Criterion A for their association with the initial development of Naval Air Station Kaneohe Bay in anticipation of U.S. involvement in WWII. These facilities are part of a group of twenty-one buildings constructed around the hangars as support storage facilities. All the facilities are small, concrete structures with flat roofs, small overhangs and few doors and windows. The facilities are separate structures from the hangar; however, they are located within a few feet of the hangar. They were surveyed and found eligible as part of the *Marine Corps Base Hawaii, Kaneohe Bay, Historic Building Inventory* dated June 2005.

This project plans to fill the space between each of these buildings and the hangar. The Anti-Terrorism Force Protection Standards do not allow for small spaces between buildings; therefore, rather than demolish the small buildings, the area will be filled. The filled areas will be slightly recessed from the current planes of the buildings.

Figure 4-6: Photos above all showing the adjacency to Hangar 1. Top left: Facility 170. Top right: Facility 167. Middle left: Facility 168. Middle right: Facility 194. Lower left: Facility 195. Lower right: 196. Photos taken in 2004.

Additional Structures Affected

This project plans to renovate and construct an addition to facility 4054, which was constructed in 1986. This facility is not of a distinctive type nor has been found to be directly associated with significant Cold War history.

Facility 5038, a van pad constructed in 1988, will be upgraded. The van pad is a concrete pad with utility service outlets and has no permanent vertical structure.

This project also plans to construct a new aid station in what is currently an open area.

Figure 4-7: Facility 4054. Photo taken in January 2009.

Figure 4-10: Facility 5038. Photo taken in 2009.

Hangars 1 -4: Aircraft Apron Surface Damage Survey

On 15 and 17 February 2011, Mason Architects surveyed the concrete aircraft areas surrounding Hangars 1 through 4 to record visible damage from the 7 December 1941 Japanese attack on Naval Air Station Kaneohe. This was accomplished by walking the concrete paved areas, noting any apparent attack damage or other historic features on the map below, and photographing the features so they can be identified for later detailed studies. The features identified include; two repaired bomb craters, eleven areas of spalled concrete damage (some with concrete repairs), and the center point and remnant ghost lines of a historic compass rose. The compass rose is in the area of a current active helicopter-landing pad and was not closely approached.

The damage at the eleven spalled concrete areas presented the widest variation in forms and appearances. Three of the areas (areas a, h, & i, see Figures 3-10) are large sections covered with small individual pits or pockmarks on the surface of the concrete. Some of these pits resemble bullet impact marks and others appear to be formed by chips of concrete spalling off, leaving a sharper edge to the resulting pit and revealing a piece of aggregate at the bottom. One of the other areas (area k, at the seaplane ramp between Hangars 2 and 3) has a collection of several apparent bullet impact marks that are more widely spaced than the individual pits at the pockmarked areas. The remaining seven damaged areas exhibit pitting that has conglomerated to form larger spalled depressions, several inches across in all directions. Some of these areas have been partially or completely repaired by filling the spalls with concrete that is finished flush with the surrounding surface.

The two bomb craters are irregularly shaped, typically between about 7 feet to 11 feet in diameter. Each bomb crater has a distinctive pattern of radial scars in the surrounding concrete that were formed by the impact of fragments thrown from the exploding bomb. Some of these radial scars are found over 40 feet from the center of the bomb crater. The bomb craters themselves have been filled with concrete. Although some areas of concrete near the craters have been replaced, thereby removing evidence of radial scars, the extant scars have not been repaired.

The figures below show the locations of the features and photos of the individual areas.

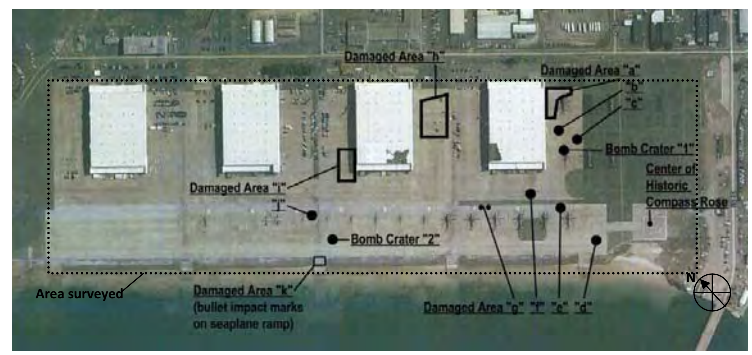


Figure 3-10: Aerial photo indicating the area surveyed and the locations of features.

Bomb Crater "1"

Figure 3-11: Bomb Crater "1" in the center of the photo; radial scars in the lower left corner; the corner of Hangar 1 at the upper right, and the bay in the upper center.

Figure 3-12: Bomb Crate "1" in the center of the photo. Photo taken looking southeast.

Damaged Area "a"

Figure 3-13: Damaged Area "a." Photo taken looking north, toward Hangar 1.

Figure 3-14: Damaged Area "a." Photo taken looking northwest.

Figure 3-15: Damaged Area "b." Photo taken looking west, toward Hangar 1.

Figure 3-16: Damaged Area "b." Photo taken looking southwest.

Figure 3-17: Damaged Area "c," the repaired concrete area in the center of the photo. Photo taken looking toward Hangar 1.

Figure 3-18: Damaged Area "c." Photo taken looking east.

Figure 3-19: Damaged Area "d," pitted and repaired area in the center of the photo. Photo taken looking north, toward Hangar 1.

Figure 3-20: Damaged Area "d." Photo taken looking west.

Figure 3-21: Damaged Area "e," pitted and repaired area in the center of the photo. Photo taken looking northeast, toward Hangar 1.

Figure 3-22: Damaged Area "e." Photo taken looking south, toward the bay.

Figure 3-23: Damaged Area "f," pitted and repaired area in the center of the photo. Photo taken looking north, toward Hangar 1.

Figure 3-24: Damaged Area "f." Photo taken looking west, toward the bay.

Figure 3-25: Damaged Area "g." Photo taken looking northeast, toward Hangar 1.

Figure 3-26: Damaged Area "g." Photo taken looking south.

Figure 3-27: Damaged Area "h." Photo taken looking northeast.

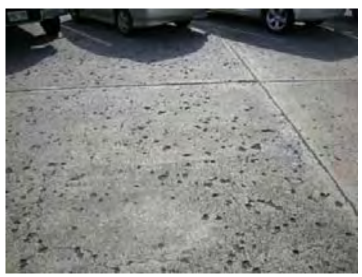


Figure 3-28: Damaged Area "h." Photo taken looking northeast.

Figure 3-29: Bomb Crater "2," Large repair in the center of the photo; radial damage surrounding the repair; replaced concrete section in the center left of the photo. Photo taken looking northeast, between Hangars 2 & 3.

Figure 3-30: Bomb Crater "2." Photo taken looking south, toward the bay.

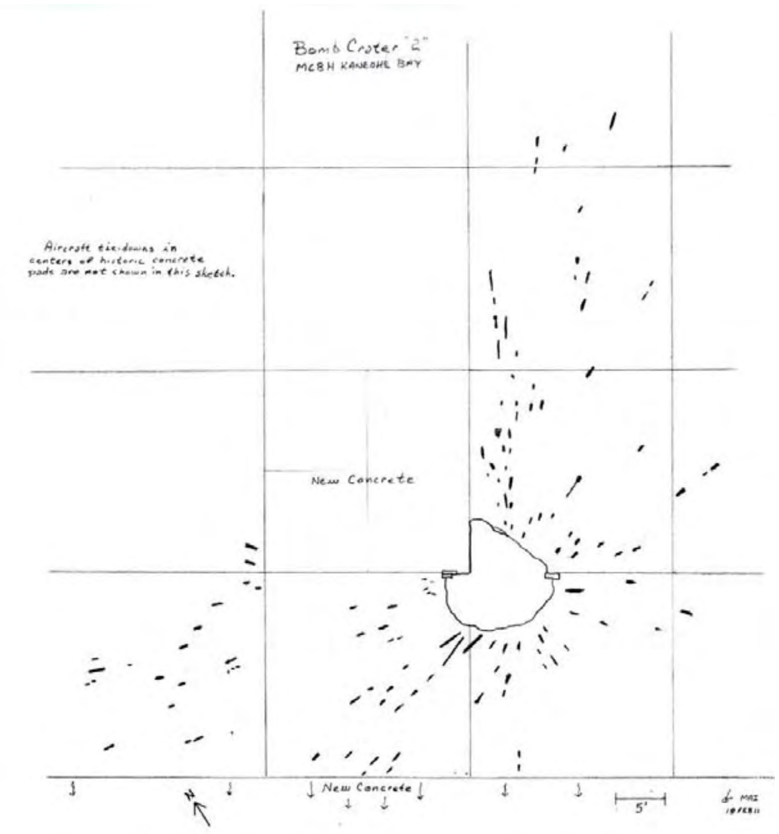


Figure 3-312: Bomb Crater "2." Sketch depicting the extent of the apparent features from a bomb; large repaired area and radiating damaged areas.

Figure 23: Damaged Area "i." Photo taken looking northeast, toward Hangar 2.

Figure 24: Damaged Area "i." Photo taken looking southwest, toward the bay.

Figure 25: Damaged Area "j," pitted and repaired areas in the center and lower left of the photo. Photo taken looking east, toward Hangar 2.

Figure 26: Damaged Area "j." Photo taken looking southeast, toward the bay.

Figure 27: Damaged Area "k," apparent bullet impact mark in Seaplane Ramp 3. Photo taken looking east, toward Hangars 1 & 2.

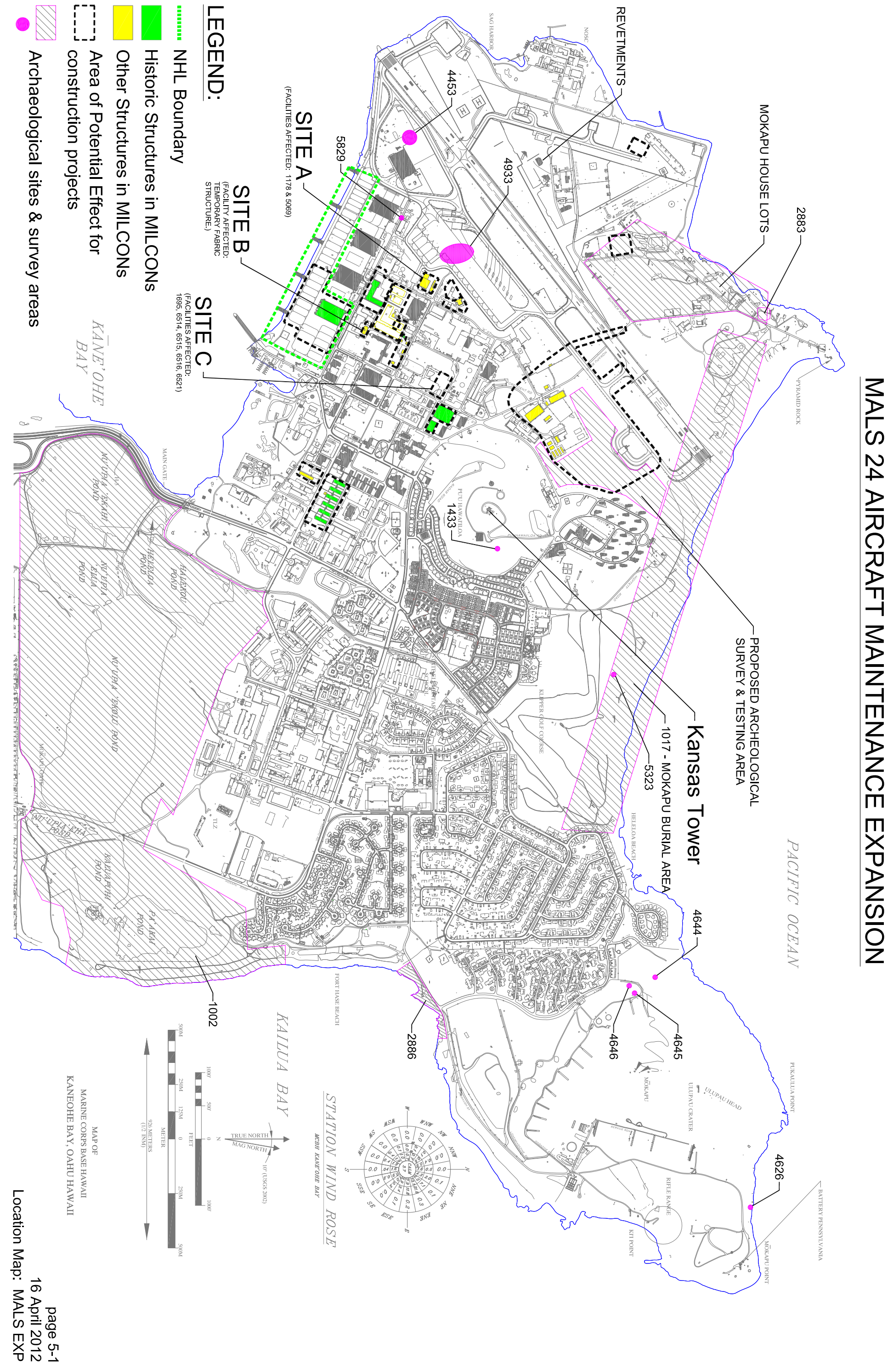
Figure 28: Damaged Area "k," apparent bullet impact mark in Seaplane Ramp 3. Photo taken looking south, toward the bay.

Figure 29: Historic compass rose. Photo taken looking southeast.

HAWAII BASING OF MV-22 AND H-1 AIRCRAFT

IDENTIFICATION OF HISTORIC STRUCTURES

MALS 24 AIRCRAFT MAINTENANCE EXPANSION



MALS 24 AIRCRAFT MAINTENANCE EXPANSION

PROJECT IDENTIFICATION

Construct a composite shop extension to the Corrosion Control Hangar (Facility 5069) and construct two warehouses. This project provides adequate aircraft maintenance and repair and spares storage for adequate MALS-24 support of for new HMLA and VMM squadrons. This project also includes demolition of facility 1178, a temporary fabric structure, and a softball field.

This project affects three areas of the base. For organizational purposes they are divided into Sites A, B, and C as indicated in the following figure.

LOCATION PLANS

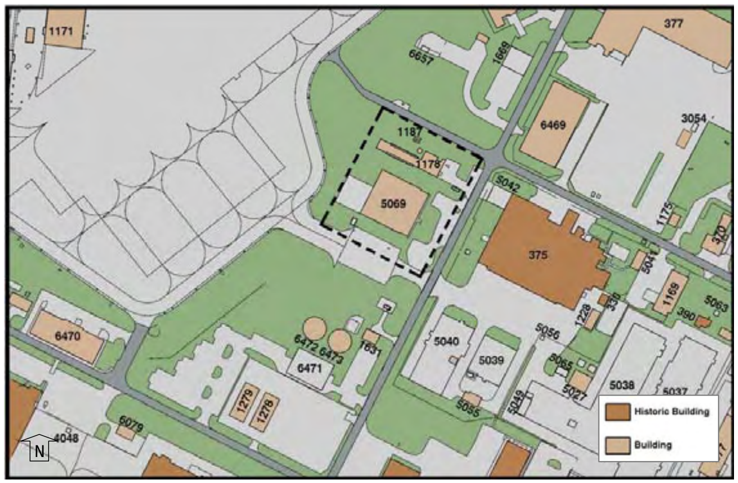


Figure 5-1: Partial site plan of MCB Hawaii Kaneohe Bay. The heavy dashed line indicates the project area. Site A is above. No historic facilities are in the general vicinity of the project areas.

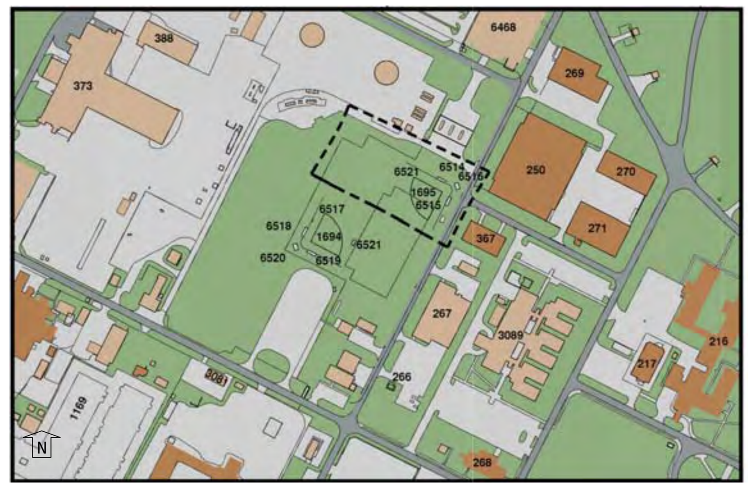


Figure 5-1: Partial site plans of MCB Hawaii Kaneohe Bay. The heavy dashed line indicates the project area. Site B is above. Site C is below. No historic facilities are in the general vicinity of the project areas.

STRUCTURES AFFECTED

No historic structures are affected by this project. The two facilities described below are in Site A. Site B currently contains a temporary fabric structure that will be replaced with a permanent warehouse.

FACILITY 1178

Facility 1178 was constructed as a turbo jet engine test cell in 1957-1958. This facility was surveyed as part of the recent Cold War survey and found to be too significantly altered to be eligible for the NRHP. Major character-defining features have been extensively altered after 1984 and compromise its integrity. Character defining features altered include: changes to the original air intake & exhaust systems; a renewed & replaced sound suppression; removal of important equipment; & addition of a major muffler extension.

The project plans are to demolish this facility.

Figure 5-3: Photograph of the facility 1178. Photo taken in July 2009.

FACILITY 5069

Facility 5069 is the Corrosion Control Hangar constructed in 1990. This facility was surveyed as part of the recent Cold War survey and not found to be eligible for the NRHP.

The project plans are to construct an addition to this building.

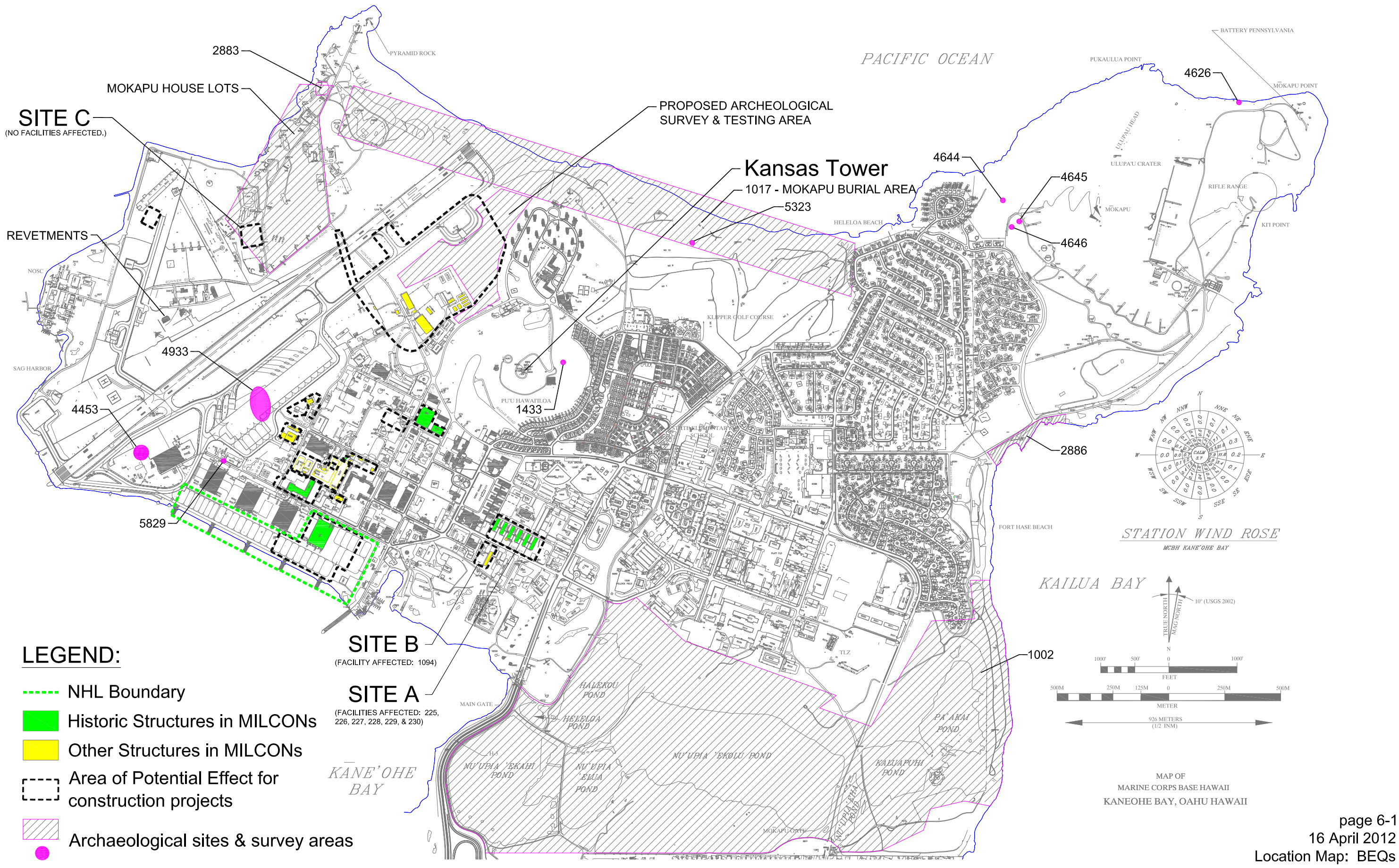
Figure 5-4: Photograph of the facility 5069. Photo taken in July 2009.

The five facilities located at proposed site C (1695, 6514, 6515, 6516, and 6521) for the new aviation simulator training facilities include a softball field and its associated structures, including a dugout and field storage structures. The field was constructed in the 1970s, while the dugout and storage structures were built in the 1990s. These facilities are less than 50 years old and are not of extraordinary significance; therefore, they are not considered eligible for the NRHP.

The project plans are to demolish the softball facilities at Site C and construct a maintenance facility in their place.

Figure 5-5: Photograph taken from Kansas Tower looking toward the hangar area. The heavy dashed line indicates the area where the ball field is currently located. This project will construct a new facility in this area. Photo taken in 2003 by Franzen Photography.

BACHELOR ENLISTED QUARTERS



page 6-1
16 April 2012
Location Map: BEQs

HAWAII BASING OF MV-22 AND H-1 AIRCRAFT

IDENTIFICATION OF HISTORIC STRUCTURES

BACHELOR ENLISTED QUARTERS (AV SUPT)

BACHELOR ENLISTED QUARTERS

Project Identification

This project is to construct Bachelor Enlisted Quarters (BEQ) and a Vehicle Parking Structure. The project includes the renovation of facilities 225 and 226, the demolition of facilities 227 through 230, and the demolition of facility 1094.

This project affects three areas of the base. For organizational purposes they are divided into Sites A, B, and C. Sites A and B are as indicated in the Location Plans. Site C is shown on page 6-1 and does not include any existing structures. The proposed plan for Site C is to construct storage facilities.

Location Plans

Figure 6-1: Partial site plans of MCB Hawaii Kaneohe Bay showing Site A above and Site B below. The heavy dashed lines indicate the project areas.

Historic Structures Affected

Facilities 225-230 – Bachelor Enlisted Quarters

Figure 6-2: Photograph of the Enlisted Men's Barracks taken 26 August 1940. Facility 224 is in the foreground. Source: National Archives.

Figure 6-3: Enlisted Men's Barracks from May 2004. Note the added aluminum-sash windows which do not fill the window openings

Facilities 225 through 230 are eligible for inclusion on the National Register of Historic Places under Criterion A for their association with the initial development of Naval Air Station Kaneohe Bay in anticipation of U.S. involvement in WWII. These facilities were surveyed and found eligible as part of the *Marine Corps Base Hawaii, Kaneohe Bay, Historic Building Inventory* dated June 2005.

All of these buildings were completed between 1940 and 1942. Each building is a two-story rectangular concrete building with a flat roof with wide overhangs and square copper gutters and downspouts. There are also flat thin concrete pent roofs over the windows on the first floor. The historic windows were steel framed casement and fixed units. Covered concrete walkways (Facilities 996-1006) connect all of the adjacent facilities. The historic covered walkway also exists from Facility 225 to the brig (Facility 211) and mess hall (Facility 212) and from there to five more barracks buildings (Facilities 220-224) constructed as part of the same complex.

A variety of alterations have occurred since the initial construction of these facilities. Many of the large historic openings have been partially in-filled and all the historic steel sash casement windows have been replaced with aluminum windows, air conditioning units, or infilled. The projected steel sash windows in the stairwells have been replaced with glass blocks or fixed windows. The historic wood and glass exterior doors have been replaced with flush steel doors or removed entirely. The major interior spaces have been reconfigured from the historic design. In Barracks 225-230 the historic large open dormitory rooms have been partitioned into individual dormitory rooms. Most historic ceilings are concealed with suspended acoustical ceilings with recessed fluorescent light fixtures.

The project plans are to demolish these facilities and construct new BEQs at this site.

ADDITIONAL STRUCTURES AFFECTED

FACILITY 1094 – BACHELOR ENLISTED FACILITY

Facility 1094 was constructed in 1953 as unaccompanied personnel housing, is not a contributing element of a listed or eligible National Register of Historic Places district, nor does it have religious or cultural significance for Native Hawaiian organizations. The Advisory Council of Historic Preservation has issued *Program Comment For Cold War Era Unaccompanied Personnel Housing (1946-1974).*

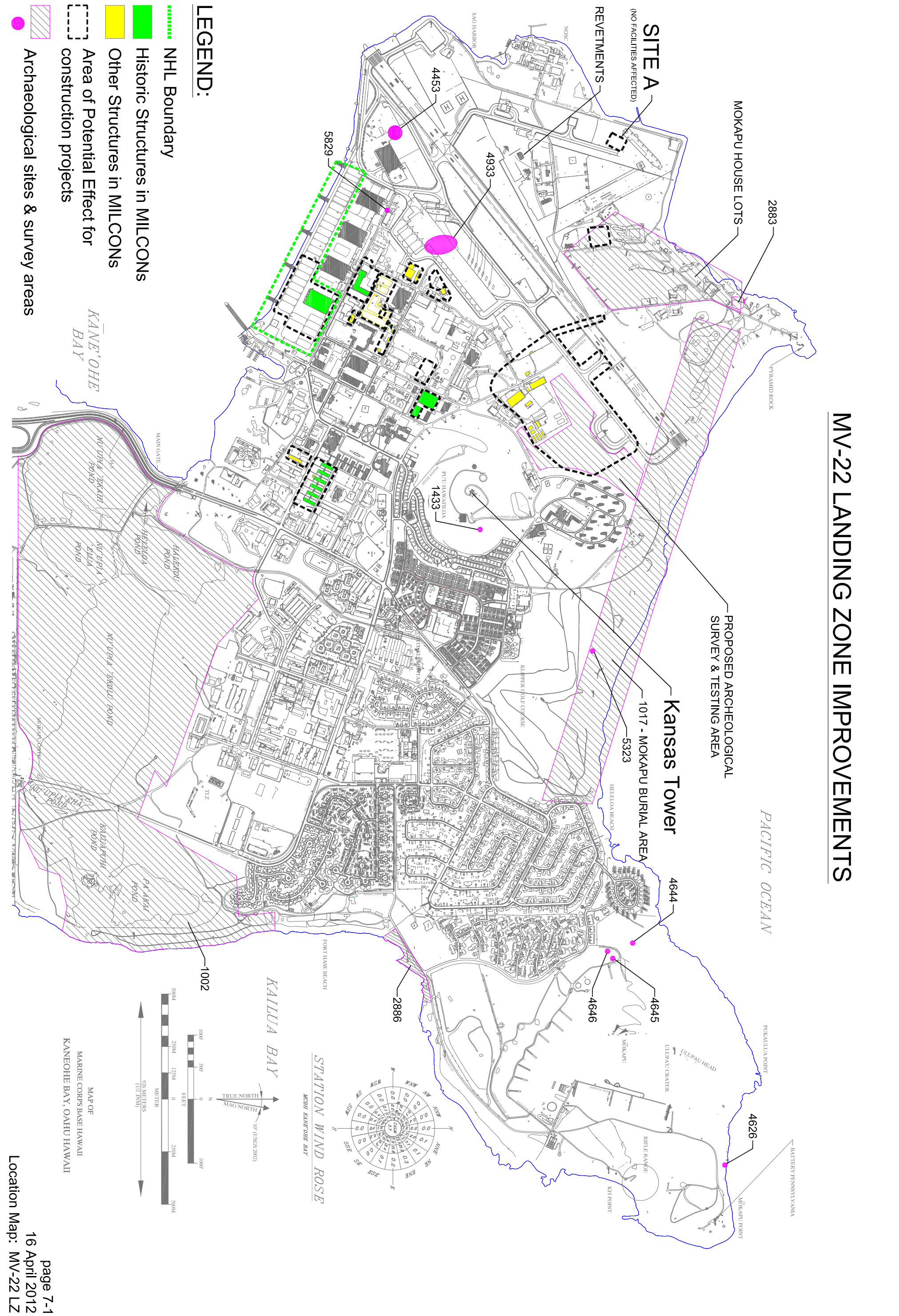
The project plans are to demolish this facility; therefore, the Program Comment applies. Demolition is an action requiring no further review by the Program Comment. A photograph of the facility is provided.

Figure 6-4: Facility 1094.

HAWAII BASING OF MV-22 AND H-1 AIRCRAFT

IDENTIFICATION OF HISTORIC STRUCTURES

MV-22 LANDING ZONE IMPROVEMENTS



MV-22 LANDING ZONE IMPROVEMENTS

Project Identification

Construct a helicopter landing pad at MCB Hawaii to accommodate MV-22 squadron.

Location Plan

Figure 7-1: Partial site plan of MCB Hawaii Kaneohe Bay. The heavy dashed line indicates the project area.

Structures Affected

The construction of a new MV22 landing pad does not call for the demolition or renovation of any existing structures. However, the location proposed for the landing pad is on part of Runway No. 2. This runway was constructed during the 1940s and is no longer used as a runway. Some parts of the former runway are used for flying maneuvers and training, most significantly, the 1987 painted LHA deck (facility 3043) used for helicopter training. The planned MV22 landing pad does not overlap with the existing LHA deck.

HAWAII BASING OF MV-22 AND H-1 AIRCRAFT

IDENTIFICATION OF HISTORIC STRUCTURES

ALTERNATIVE B

ALTERNATIVE B – VARIOUS PROJECTS

PROJECT IDENTIFICATION

Alternative B of the proposed action would locate the VMM hangar on the west side of the runway. Of the 16 facilities which would be demolished to build the hangar, ten are considered eligible for the NRHP.

LOCATION PLAN

Figure 8-1: Partial site plans of MCB Hawaii Kaneohe Bay. The heavy dashed lines indicate the project areas.

HISTORIC STRUCTURES AFFECTED

Figure 8-2: Photograph dated November 16, 1943 showing the revetments alongside the landing mat. South at top. Source: National Archives.

FACILITIES 14, 15, & 17 – AIRCRAFT REVETMENTS

These aircraft revetments were built in 1942. All three were originally five-sided concrete revetments which would have been covered by camouflage netting. The Japanese attack of 1941 resulted in the construction of plane revetments being given a high priority. More than fifty revetments were construction along the runway in Kaneohe.

FACILITIES 601 & 602 – WAREHOUSES

Facilities 601 and 602 are concrete and CMU warehouses with flat roofs. Facility 601 is longer than Facility 602; they are very simple, box-like structures with large three-leaf, sliding metal doors at one end of each building. Fixed, wood louvers are at the top of each of the long walls. A few feet from the entry door of each warehouse is a concrete structure formerly used as a discharging platform for smoke drums once stored in these facilities. Interior surfaces are unfinished or painted concrete. Light fixtures are of a style consistent with the historic time period.

Figure 8-3: Facility 602. Photo taken in 2009.

FACILITIES 603 & 605 – WAREHOUSES

Facilies 603 and 605 were originally constructed as a Small Arms Magazine (Fac. 603) and an Inert Storehouse (Fac. 605) and were completed in July 1941. The design of the buildings was based on standard plans for ordnance storage facilities that were developed by the Army and utilized by other branches of the military. These two buildings follow the design of typical above-ground facilities, which were built to store relatively stable, less volatile types of ordnance and components. The exterior of each facility has a regular pattern of concrete pilasters and recessed panels. Fac. 603 has eight bays and Fac. 605 has five bays. These facilities were built of concrete, one of the few deviations from the standard Army plans which typically utilized structural clay tile.

Figure 8-4: Facility 603. Photo taken January 2004.

Both buildings have been re-roofed and the windows have all been replaced, though the fenestration patterns remain intact.

FACILITY 612 – TORPEDO STORAGE BUILDING

Facility 612 is one of seven remaining torpedo storage buildings constructed on the base in 1942. Located mainly along the runway, they are one-story concrete rectangular buildings. This building has a flat roof, and a single, narrow, vertical section of cast concrete which projects about 1'-4" from the corner of the building to protect the edge of the sliding door when closed. The historic steel doors have been replaced with wood doors. Facility 612 retains the historic earth floor which has been filled with concrete in all of other buildings of this type.

FACILITY 620 – QUONSET WAREHOUSE

Facility 620 is a 40 foot by 100 foot Quonset hut and was constructed in 1945. It was built as part of a group of Ready Magazines, Smoke Drum Storehouses, and Aircraft Revetments in an area between the landing mat and the runway.

Figure 8-5: Left: Facility 612. Right: Facility 620. Photos taken in 2009.

FACILITY 995 – FLAMMABLE STOREHOUSE

Facility 995, built of cast concrete on concrete slab foundation, was used as a paint locker. Impressions of the forming boards used in its construction are still apparent. The exterior is smoothly finished with a stucco coating (only revealing a ghost impression of the horizontal forming boards), while the interior walls retain rough-textured horizontal impressions from the gaps between the forming boards. The ceiling also has impressions from the forming and a historic light fixture.

Figure 8-6: Facility 995. Photo taken in 2009.

APPENDIX G-2
Archaeological and Cultural Sites at MCB Hawaii Kaneohe Bay

Traditional Archaeological Resources

Site 50-80-11-2886. Site 2886, which falls within the buffer of LZ Eagle, contains buried cultural deposits and human remains in an active coastal context on the east coast of the peninsula. The site has been recommended eligible for listing on the National Register of Historic Places (Nickelson and Kirkendall 2008a), and is included as a contributing resource on a recently completed multiple resource nomination form for the Mōkapu Peninsula Archaeological Area (Nickelson and Jackson n.d.).

Archaeological work has been carried out in the Fort Hase Beach area since the mid-1970s (Dye 1976; Allen and Schilz 1997a). Testing by Dye (1976:6-9, 16-18) recorded 45 postholes, 10 firepits, 14 pits and trenches of unknown function, and a burial. The stratigraphic context of the features is a discontinuous layer of clay-like soil underlying 43 to 125 cm of crushed coral road fills and non-cultural overburden. Artifacts found at the site include drilled dog canines (ornaments), numerous basalt and volcanic glass lithic materials, polished hematite, coral abraders, cowrie lures, bone tools and ornaments, and historic period artifacts (ceramics, glass, metal, plastic, chert, rubber, bone, and slate).

Between 1999 and 2003, the site was the subject of monitoring and emergency data recovery in response to erosion from high storm surf (Clark et al. 2004). Excavations yielded large quantities of cultural materials, including midden, fishhooks, lithics, bone tools, and historic artifacts such as beads, glass, and metal implements. Human remains were also exposed by beach erosion.

Radiocarbon dates indicate an occupation from around AD 1435. Historic maps show this location as an 1899 house with nearby windmill (Monsarrat 1899) and the site of 1928 private clubhouse (Hand 1928).

Site 50-80-11-4933

Site 4933 consists of stratified cultural deposits containing traditional Hawaiian materials, including a postmold, firepits, and midden and faunal remains; a burial pit with the remains of an infant or prenatal fetus was also uncovered (Allen and Schilz 1996; Rechtman and Wolforth 2000; Prishmont et al. 2001; Gosser et al. 2002). Site 4933 has been recommended as eligible for listing on the NRHP (USACE 2006; Nickelson and Kirkendall 2008b), and is included as a contributing resource on a recently completed multiple resource nomination form for the Mōkapu Peninsula Archaeological Area (Nickelson and Jackson n.d.).

The site is located west of proposed undertakings related to MALS-24 composite shop/armory and MAG-24 warehouse projects. The horizontal extent of the subsurface deposits in the site are not known, and it is possible that the site extends into the area of the undertaking.

The site was first identified during archaeological monitoring of water line repairs along Third Street (Schilz and Allen 1996). Subsequently, Rechtman and Wolforth (2000) carried out data recovery excavation at the site and uncovered four subsurface features, including the burial, and a variety of artifacts (basalt flakes and debris, volcanic glass, a worked bone arrow point, and worked bone and shell). Prishmont et al. (2001) later found subsurface deposits north of the original site area and suggested expanding the site boundary to incorporate these deposits.

Site 4933 is interpreted as a temporary habitation site with a focus on fishing and shellfish gathering (Rechtman and Wolforth 2000:35). It occupied a high barrier beach or back beach that fronted an open bay to the south, an estuary to the east, and wetlands to the north and west. Faunal remains indicate that marine (mollusk and fish) resources as well as shorebirds (presumably from the nearby wetlands) were collected. A bone arrow point found in a pit feature, combined with a high occurrence of rat bone (*Rattus* sp.), suggested that *pana'iole*, or rat shooting, took place at this site; quoting Malo (1951:233), Rechtman and Wolforth (2000:36) state: "It was the only use which Hawaiians made of the bow and arrow." No historic period (i.e., European or Asian) artifacts were recovered.

Ten charcoal samples were processed for radiocarbon dating, of which three come from discrete event features (firepits) (Schilz and Allen 1996; Rechtman and Wolforth 2000). The three dates suggest occupation of the site between the AD mid-15th century to the early post-contact period. This is essentially contemporaneous with nearby Site 4453 to the southwest. Sites 4933 and 4453, along with Site 5829 to the south, form a cluster of subsurface cultural deposits and intact burials in this part of MCB Hawaii Kaneohe.

Historic Period Archaeological Resources

Archaeological resources dating to the 19th and early 20th centuries have been found in association with traditional sites (i.e., as a continuation of occupation at the same location) and as discrete sites (i.e., with no evidence for earlier occupation). In the former case, evidence for historic period use is expressed primarily through the presence of Euro-American or Asian artifacts. In the latter case, evidence comes in the form of such artifacts, as well as stratigraphic context and structural remains consisting of historic or modern building materials (e.g., concrete, machine-cut wood, metal wiring). The following discussion covers the discrete sites of the period (sites with traditional components are discussed above).

Site 50-80-11-2884. Site 2884 is a set of four concrete building foundations probably dating to World War II construction (Tuggle and Hommon 1986:51). These foundations are located at the southern base of Pali Kilo, in the eastern portion of the VMM Alternative B area. The site has not been evaluated for NRHP significance.

Sites 50-80-11-4612, 4613, and 4614. Sites 4612, 4613, and 4614 are the remains of early 20th century homes, part of the development of summer homes at Pali Kilo in the 1920s and 1930s. They are located in the VMM Alternative B area. Sites 4612 and 4614 are recommended as eligible for listing on the NRHP (USACE 2006); Ruzicka and O'Day (2005) include these sites in an NRHP nomination form for the Mokapu House Lots Archaeological District. The evaluation of Site 4613 has not been made, pending more research.

The remains consist of foundation features, modified terrace locations, and garden arrangements on individual residential lots. Drolet et al. (1996:67) state that the sites "reflect a historic period of change from agriculture and ranching activities to residential development of the area by prominent families from Honolulu. … there is considerable potential for subsurface evidence, in the form of trash deposits and buried building features, associated with the individual family units."

Site 4613 also contains a long, stacked rock wall that could be part of the pre-Contact or early historical occupation of the Pali Kilo area. The wall could be related to sites situated on Keawenui Hill to the north.

Site 50-80-11-4615. Site 4615 is a World War II era underground facility used for storing combustible liquid, most probably lubricants and paint. The site is located at the east edge of the VMM Alternative B area. Drolet et al. (1996:67) evaluate the site to be significant, based on "its integrity and association with the other World War II era structures in the Pali Kilo sector."

Site 50-80-11-4623. Site 4623 is a circular structure with a shallow interior depression (O'Day 2007:21). The eastern portion is a crudely stacked stone wall and the western half is an earthen berm. There are glass bottles and a large piece of corrugated tin on the surface of the site. Only a copper wire was found in a 40-cm deep shovel test in the southern interior of the feature. The structure is posited to be a historic feature, probably related to military use.

Site 4623, which is located just east of the VMM Alternative B area, is included as a contributing resource in the multiple property National Register nomination of the Mōkapu Peninsula Archaeological Area (Nickelson and Jackson n.d.; Nickelson and Kirkendall 2008c).

Site 50-80-11-4624. Site 4624 is a low, rectangular, stone-walled enclosure (Drolet et al. 1996; O'Day 2007:20) located just east of the VMM Alternative B area. Fragments of a broken concrete slab and a clay brick were found on the surface of the site. Portions of the structure have been disturbed by construction activities. A large banyan tree growing in the middle of the site has also disturbed a portion of the structure.

Site 4624 is evaluated to be eligible for listing on the NRHP under Criterion D because of its potential to yield information regarding pre-contact and early historic Native Hawaiian occupation on the peninsula (Nickelson and Kirkendall 2008d); it is included as a contributing resource in the multiple property National Register nomination of the Mōkapu Peninsula Archaeological Area (Nickelson and Jackson n.d.). However, O'Day (2007:20) finds that "the low frequency of traditional Hawaiian materials on the surface and the absence of subsurface cultural materials suggest that the various features of Site 4624 represent the remnants of a historical house." The NRHP significance evaluation needs to be reviewed.

Archaeological and Inadvertent Findings of Intact Burials

There are two main burial areas on Mōkapu Peninsula: the northern dunes (Mōkapu Burial Area, Site 1017) and the Ulupaʻu Dune on the east coast (part of the Mōkapu Fishpond Complex, Site 1002).

The first systematic investigation to record burial remains took place between 1938 and 1940. Led by Kenneth Emory and Gordon Bowles, a largely volunteer excavation team from the University of Hawaiʻi found 400 burials in extensive areas of the Heleloa and Heʻeia Dunes between Pyramid Rock and Ulupaʻu Crater. The dunes had been previously known to contain human remains, which had been observed during sand mining operations in the 1930s. In a 1981 interview, a retired City and County employee described finding and reburying human bone while hauling sand from the dunes; he was told they were "not suppose to mess around with the bones when you find them" (J. Ako interview transcript, reprinted in PHRI 1995:Appendix B). In 1957, anthropology graduate student Robert Bowen carried out further excavations on central Heleloa Dune (the C Site), following exposure of human remains during expansion of the military golf course and other construction work on the eastern ridge of the dune. More than 100 burials were recovered (Bowen 1974).

In 1975, archaeological monitoring and salvage excavations related to the City and County of Honolulu Kailua Effluent Force Main (KEFM) construction identified 108 individuals in three clusters of 94 burials along the east coast of the peninsula in Ulupaʻu Dune (Davis et al. 1976; Collins et al. 1994:39). Artifacts found in association with the burials indicate traditional and post-contact contexts: traditional artifacts include adze fragments, basalt tools and flakes, fishhooks, fishing sinkers and lures, bone/tooth ornaments, and a gaming stone; historic period artifacts include glass buttons and beads, ceramics, chert, and a metal bracelet. This area is now part of Site 1002 (Mōkapu Fishpond Complex).

Intact or nearly intact burials have also been found in other areas of the peninsula, mostly notably in sites that fall within areas of the proposed undertaking: Site 2886 at Fort Hase Beach, and Site 4933 on the east side of the runway.

Findings of Disturbed Remains in Secondary Contexts

There have been numerous encounters of disturbed remains from secondary contexts at MCB Hawaii Kaneohe Bay, during archaeological investigations as well as inadvertent finds during other activities, primarily construction.

Sand mining in the northern peninsula dunes in the 1930s and during the intensive war-time build-up of the installation resulted in an almost random distribution of dune sands in fill across the base. As noted by McIntosh and Cleghorn (2010:11), it was a common practice in the 1940s and 1950s to use sand to cushion underground utility pipelines; often the sand was obtained from the dunes on the base. In addition to occurrences in utility line trenches, disarticulated human remains have been found in building footings, under house pad foundations, under road beds, and in general fill layers. Jimenez et al. (1998:31) write:

> Landfill can be encountered anywhere on the entire peninsula. Although much of the landfill originated from the nearby bay, dune sands can occur over pre-1928 bay, inland, and shoreline areas. The distribution of known disarticulated human remains found in imported soil (Schilz 1996:31) indicates that they have been found as frequently over terrigenous deposits as they have been over aquatic and shoreline areas.

Cultural Sites

The *ʻIli* of Mōkapu

The *ʻili* of Mōkapu is the western portion of the peninsula (its boundary roughly extends from Hangar 105 to the Hilltop Officers Housing on Puʻu Hawaiʻiloa; see Fig. 3-10). The *ʻili* , which is a subdivision of the larger traditional socio-economic land unit called *ahupuaʻa*, may have been a significant place in the context of ritual life around Kāneʻohe Bay. In describing the land divisions on Mōkapu Peninsula, Tuggle and Hommon (1986:3) note that the *ʻili* of Mōkapu was the southern anchor of the bay, opposite the *ahupuaʻa* of Kualoa at the north end of the bay. Kualoa is traditionally noted as one of the most sacred places in Hawaiʻi; Mōkapu, in several iterations of translation, seems to refer to something sacred or prohibited.

Pukui et al. (1974:153-154) translate Mōkapu literally as a "taboo district," with *mō* being a shortened form of *moku* (district). They elaborate by noting that Mōkapu was originally named Moku-Kapu; referencing Fiddler (1956:1), they say that Kamehameha is said to have selected this site as a royal meeting place with his *aliʻi* (chiefs). Alternatively, *mō* could be a variation of *moʻo* (lizard) with the translation of Mōkapu as "sacred ridge," a ridge being figuratively a lizard's back (Handy and Handy 1972:456); Tuggle and Hommon (1986:16) suggests that this could be a reference to the Pali Kilo ridgeline that is roughly shaped like a lizard's back. Although Mōkapu now refers to the entire peninsula, "there is no good evidence that a single name was ever used for the peninsula as a whole until quite recently" (Tuggle and Hommon 1986:13).

The following undertakings fall within the *ʻili* of Mōkapu: VMM Alternatives A and B hangar and apron, Alternative A MCAS landing pad, and Altrnative B runway underpass.

Puʻu Hawaiʻiloa

Puʻu Hawaiʻiloa is one of three prominent cinder cones on Mōkapu Peninsula. It lies near the middle of the northern portion of the peninsula and rises up to 337 feet (102.7 m) above sea level. Its lower east, north, and west slopes have been developed in family housing and support facilities; a radar surveillance facility (commonly called Kansas Tower) sits at the summit. Site 1433, a complex of traditional rock structures, is located on the eastern slope of the hill.

An oral history and archival research study of Puʻu Hawaiʻiloa found that the hill does not meet the criteria to qualify as a traditional cultural property on the National Register of Historic Places (PHRI 1995:68-72). However, the study concludes that, while Puʻu Hawaiʻiloa does not qualify as a traditional cultural property:

> … it is important to acknowledge the current cultural significance of the *puʻu* to the Hawaiian community (significance is derived from a presumed association with a traditional navigator). The cultural significance of Hawaiʻi-loa to many contemporary Hawaiians in a living and evolving Hawaiian history is demonstrated by the journey of the voyaging canoe named Hawaiʻi-loa. The modern-day Hawaiian voyages of rediscovery and the revival of traditional skills celebrate the legacy of a legendary Hawaiʻi-loa and the reawakening of a Hawaiian identity.

The following undertakings fall within the area of Puʻu Hawaiʻiloa: VMM Alternative A MCCS self-storage and VMM Alternative A Family Housing warehouse.

Ulupaʻu Crater

Ulupaʻu Crater forms the northeastern point of Mōkapu Peninsula. The interior of the crater is presently used as a training range and LZ Rifle Range is situated on one of the ranges.

The crater is said to have been scooped out by the Hawaiian deity Pele when she chose the location as her landing place on Oʻahu (USACE 2006:3-10).

The Puʻu Hawaiʻiloa study (PHRI 1995:Table 2) identified four locations within Ulupaʻu Crater that may be traditional cultural places. Ulupaʻu-Mokumanu (related to the shark gods; see Sterling and Summers 1988) and Kahekili's Leap (MacCaughey 1917; Sterling and Summers 1988) are located on the north rim of the crater. Kiʻi Bay and bluffs (for fish spotting; mentioned by six informants) is located on the east coast. Pōhakupuka, a point on the Kuwaaohe-Ulupaʻu boundary, is situated at the west summit of Ulupaʻu Crater.

Mōkapu Cove Fishery and Salt Works

Mōkapu Cove (Davis Point) fishery and salt works is the area around the southern end of the runway and Hangars 101 to 105 (including Sites 4453, 4933, and 5829). The area is mentioned by five informants in the Puʻu Hawaiʻiloa study (PHRI 1995). The name "Davis Point" presumably comes from the Davis family home, which was located at the west end of the peninsula in the early 20th century.

The following undertakings fall within the Mōkapu Cove area: MAG-24 headquarters, MALS Maintenance projects, and portions of the HMLA projects.

Mōkapu Peninsula Fishpond Complex

The Mōkapu Fishpond Complex is the area encompassed by Site 1002, a complex of pre-contact and historic native Hawaiian fishponds called Nuʻupia, Heleloa, Halekou, Kaluapuhi, and Paʻakai (Dega et al. 1997; Schilz

1996). Additional pre-contact and historic period archaeological sites that make up the complex include lithic scatters, burial areas, construction materials, and historic pond gates (Hammatt et al. 1985; Price-Beggerly 1987; Dega et al. 1997). Site 1002 also includes cultural deposits in the southern Ulupaʻu Beach dune (Davis et al. 1976; Schousboe 1982); the deposits include charcoal, midden, a wide range of artifacts, and numerous fire pits, *imu* (earth ovens), and postholes, as well as more than 60 pre-contact and historic burials. At the eastern end of Kaluapuhi Pond was the Paʻakai salt works, which operated until 1902 when channel dredging transformed it into a pond (Cordy 1984).

LZ Boondocker falls at the northern edge of the Mōkapu Fishpond complex.

Pali Kilo Multiple Resource Complex

The Pali Kilo Multiple Resource Complex consists of traditional Hawaiian residences, *heiau*, burials, and fishtraps on the high ground at the northwest point of the peninsula (PHRI 1995:58). It includes the remains of historic period residences, which are discussed in the section on Historic Period Archaeological Resources (above). VMM Alternative B hangars and apron includes a portion of the Pali Kilo complex.

APPENDIX H

Socioeconomics

Appendix H provides additional tables, graphs, and figures referred to in Chapter 3.

Table H-1. Home Address of Marines Currently Living Off-Base

Area	Families[1]	Bachelors[2]	Total	Share
Windward Oahu	631	283	914	56%
Kailua	*362*	*179*	*541*	*33%*
Kaneohe	*261*	*98*	*359*	*22%*
Waimanalo	*8*	*6*	*14*	*1%*
Honolulu	209	123	332	20%
Leeward Oahu	244	63	307	19%
Central Oahu and North Shore	55	21	76	5%
Total	1,139	490	1,629	100%

Notes:

1 Marines with dependents in Hawaii, whether married, divorced or single.

2 Marines without local dependents, including "geo-bachelors" with families elsewhere.

Housing location is identified from zip-coded data provided by Installation Personnel Administration Center (IPAC), MCB Hawaii (personal communication, CWO J. Beaty, January 2011). . Locations are grouped by the Tax Map Key regions of the island:

Windward: Zone 4 (Waimanalo to Kaneohe)
Honolulu: Zones 1, 2, 3 (Hawaii Kai to Fort Shafter)
Leeward: Zones 8, 9 (Aiea to the Waianae Coast, Mililani)
Central/North Shore: Zones 5, 6, 7 (Kaaawa to Waialua, Wahiawa)

Source: Zip code address tabulation for Marines stationed at MCB Hawaii Kaneohe Bay but living off-base on Oahu compiled by IPAC in January 2011.

Table H-2. Projected Population and Housing on Oahu, 2000 to 2035

	2000	2010	2020	2035
Resident Population				
City and County of Honolulu	876,156	911,841	969,467	1,038,317
Koolau Poko SCP	118,457	114,209	116,118	111,594
Kaneohe	40,013	38,765	38,672	37,013
Kailua	41,607	39,953	40,451	38,791
Mokapu (MCB Hawaii Kaneohe Bay)	11,827	11,513	11,285	10,958
Resident Housing Units				
City and County of Honolulu	315,998	340,906	372,256	416,347
Koolau Poko SCP	36,964	37,237	39,037	39,279
Kaneohe	13,116	13,246	13,642	13,696
Kailua	14,298	14,319	14,964	15,049
Mokapu (MCB Hawaii Kaneohe Bay)	2,388	2,388	2,388	2,388
Annual Rate of Change		2000–2010	2010–2020	2020–2035
Resident Population				
City and County of Honolulu		0.4%	0.6%	0.5%
Koolau Poko SCP		-0.4%	0.2%	-0.3%
Kaneohe		-0.3%	0.0%	-0.3%
Kailua		-0.4%	0.1%	-0.3%
Mokapu (MCB Hawaii Kaneohe Bay)		-0.3%	-0.2%	-0.2%
Resident Housing Units				
City and County of Honolulu		0.8%	0.9%	0.7%
Koolau Poko SCP		0.1%	0.5%	0.0%
Kaneohe		0.1%	0.3%	0.0%
Kailua		0.0%	0.4%	0.0%
Mokapu (MCB Hawaii Kaneohe Bay)		0.0%	0.0%	0.0%

Notes: SCP = Sustainable Community Plan Area

MCBH KB = MCB Hawaii Kaneohe Bay

The Koolaupoko SCP area includes the three subareas listed plus Waimanalo and Kahaluu. The areas identified as Kaneohe and Kailua are larger than the CDPs discussed earlier.

Source: Allocation of state socio-economic projections to SCPs and Sub-Areas by Honolulu Department of Planning and Permitting. Tables issued in 2009, and accessed in January 2011 at http://honoluludpp.org/planning/demographics2/Projections/2000-2035byDPSA.pdf

Table H-3. Housing and Household Characteristics

Housing and Households	State of Hawaii	City and County of Honolulu	Kaneohe CDP	Kaneohe Station CDP	Kailua CDP
Total Housing Units, 2010 Census	*519,508*	*336,899*	*11,553*	*2208*	*13650*
Total Housing Units, ACS	505,087	334,469	11,274	2,373	12,127
Occupied housing units	86.7%	90.8%	96.1%	93.0%	93.7%
Vacant housing units	13.3%	9.2%	3.9%	7.0%	6.3%
Share of vacant units held for seasonal or recreational use	44.4%	37.3%	2.3%	0.0%	34.8%
Tenure of Occupied Units					
Owner-occupied (% of occupied)	58.1%	56.0%	69.8%	1.0%	71.0%
Renter-occupied (% of occupied)	41.9%	44.0%	30.2%	99.0%	29.0%
Average household size (all units)	2.84	2.87	3.04	3.14	3.02
Owner-occupied units	3.00	3.06	3.15	3.67	3.12
Renter-occupied units	2.62	2.63	2.78	3.14	2.76
Household type (% of all households)					
Family households	70.0%	70.6%	79.2%	93.1%	76.5%
With own children under 18 years	29.4%	29.9%	30.6%	64.7%	30.2%
Nonfamily households	30.0%	29.4%	20.8%	6.9%	23.5%
Householder living alone	23.4%	23.0%	17.1%	6.3%	18.5%
65 years and over	7.5%	7.3%	7.4%	0.0%	6.3%

Note: CDP = Census Designated Place. 2010 Census data are shown in italics, to distinguish them from earlier ACS data.

Sources: American Community Survey results for 2005 to 2009; 2010 US Census.

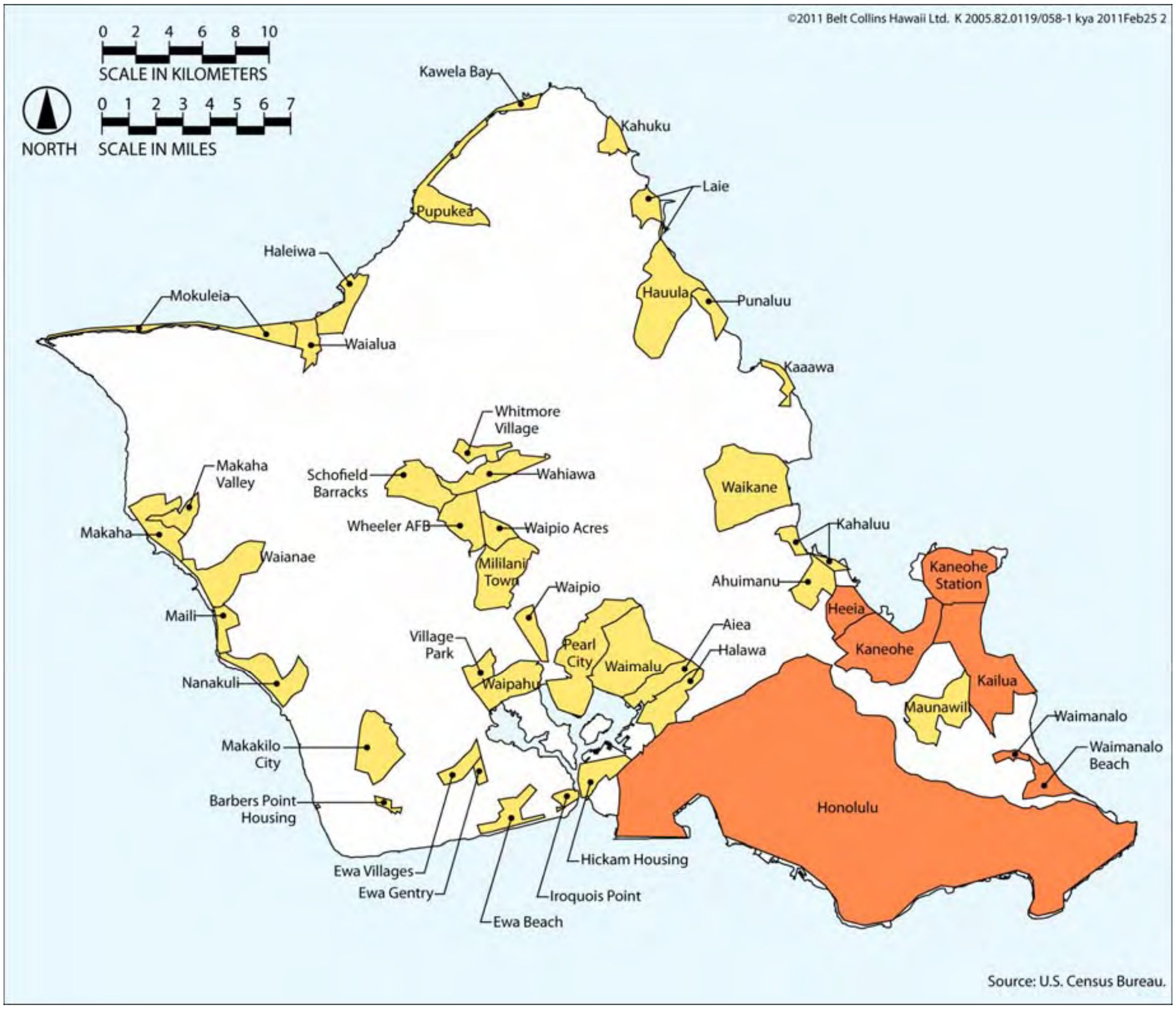
Table H-4. Cost of Housing, 2005 Through 2009

Cost of Housing	State of Hawaii	City and County of Honolulu	Kaneohe CDP	Kaneohe Station CDP	Kailua CDP
Selected Monthly Ownership Costs					
Median, with a mortgage	$2,132	$2,225	$2,253	—	$2,786
Median, without a mortgage	$422	$451	$432	—	$544
Median Gross Rent	$1,221	$1,262	$1,584	$1,962	$1,652
Share of households paying high % of income for housing costs					
Owner-occupied, with mortgage					
30.0 to 34.9%	9.5%	9.7%	8.0%	100.0%	9.2%
35.0% or more	36.6%	35.4%	33.6%	0.0%	38.8%
Owner-occupied, without mortgage					
30.0 to 34.9%	2.5%	2.2%	1.6%	0.0%	3.1%
35.0% or more	8.7%	8.1%	5.9%	0.0%	9.5%
Renters					
30.0 to 34.9%	9.3%	9.3%	5.9%	9.7%	7.6%
35.0% or more	43.4%	45.0%	38.7%	69.6%	41.0%

Source: American Community Survey, 2005 through 2009.

Table H-5. Economic Status, 2005 Through 2009

Economic Status	State of Hawaii	City and County of Honolulu	Kaneohe CDP	Kaneohe Station CDP	Kailua CDP
Employment Status (% of population age 16 and older)					
In labor force	66.5%	66.1%	67.1%	87.4%	66.8%
Civilian labor force	62.2%	60.0%	64.3%	20.8%	63.2%
Employed	59.1%	57.2%	61.6%	18.5%	60.4%
Unemployed	3.1%	2.8%	2.7%	2.3%	2.8%
Armed forces	4.3%	6.0%	2.7%	66.6%	3.6%
People whose income in last 12 months was below poverty level					
All people	9.4%	8.9%	6.8%	9.0%	5.5%
Under 18 years	11.8%	11.0%	12.5%	12.6%	8.7%
18 to 64 years	8.9%	8.4%	5.6%	6.5%	5.0%
65 years and over	7.8%	7.8%	4.6%	0.0%	3.0%
Income and benefits (2009 dollars)					
Median household income (dollars)	$64,661	$67,066	$80,935	$49,673	$88,699
As % of State median	100.0%	103.7%	125.2%	76.8%	137.2%
Per capita income (dollars)	$28,662	$29,221	$31,159	$19,052	$37,466
As % of State median	100.0%	102.0%	108.7%	66.5%	130.7%
Median earning for workers (dollars)	$31,480	$32,321	$36,569	$21,964	$39,487
As % of State median	100.0%	102.7%	116.2%	69.8%	125.4%



Note: The Census Defined Places are smaller than the total areas recognized as Kaneohe and Kailua by island residents, zip codes (96744 and 96734), or the City and County of Honolulu Neighborhood Board geography. The CDPs are used here because they include the areas nearest to MCB Hawaii, and exclude outlying areas (Heeia, Maunawili).

Figure H-1. Census Defined Places of Oahu

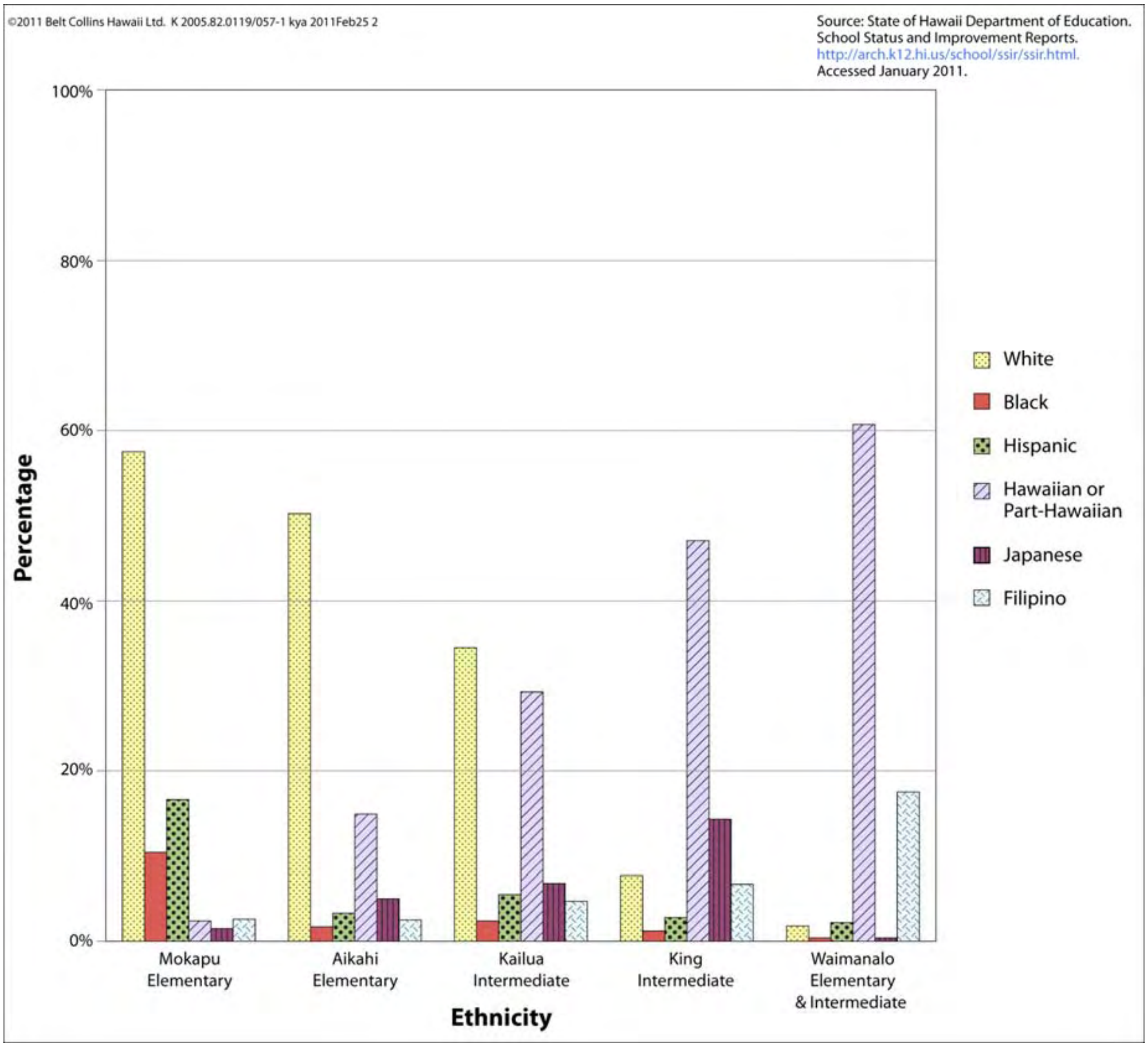


Figure H-2. Ethnic Composition, Selected School 2009

APPENDIX I

Infrastructure

I-1
Traffic Impact Report

I-2
Design Populations for Water and Wastewater System Analysis

I-3
Water System Analysis

I-4
Wastewater System Analysis

Traffic Impact Report for the Marine Aviation Plan to Locate MV-22 and HMLA Squadrons at MCB Hawaii Kaneohe Bay Kaneohe, Hawaii

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15 September 2011

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Traffic Impact Report for the Aviation Plan
to Locate MV-22 and HMLA Squadrons
at MCBH Kaneohe Bay, Kaneohe, Hawaii

15 September 2011

1 Executive Summary

The Aviation Plan to locate MV-22 and HMLA squadrons at Marine Corps Base Hawaii (MCBH) Kaneohe Bay will increase the number of personnel on the base. Increases in traffic volumes are expected as a result and a traffic study was done to identify these impacts and propose mitigation measures as needed.

1.1 Impacts in the Surrounding Area and at MCBH Entrance Gates

The project will not have a significant impact to traffic conditions in the surrounding area. The H-3 Freeway and Mokapu Road connect the Marine base to the neighboring area; both of these roadways will have sufficient capacity to serve the small increases in traffic expected with the proposed project.

However, if no changes in gate operations are made, the entrance gates would be impacted because the already long delays and queues would lengthen as traffic demand increases. While security would still take precedence, gate procedures will need to be evaluated to increase capacity. The existing practice of tandem checking of passes and identification cards may need to be expanded so that three cars per lane can be checked simultaneously. Longer durations of tandem checking of passes and identification cards will also reduce delays and queues.

1.2 Impacts within MCBH Kaneohe Bay

The increased population due to the proposed project is expected to "fill-in" existing peak hours, which in many locations have widely varying traffic demand within the peak hours. The increased traffic demand will increase delays at intersections; several locations where changes in operations or where construction of roadway improvements are necessary have been identified.

While traffic volumes on Mokapu Road at the runway crossing are not expected to increase, road users may be impacted by the additional airfield operations, which may increase the number and duration of road closures. The proposed relocation of Mokapu Road will increase the crossing distance, which will require a longer time to cross, thereby adversely affecting the roadway capacity and closure times. An analysis shows that adequate roadway capacity will still be available and the capability of various new aircraft to operate without the full use of the runway will mitigate the impact of increased airfield activity.

1.3 Recommendations for Roadway Improvements on MCBH Kaneohe Bay

Roadway improvements should be programmed for implementation as soon as possible. Several roadway improvements are needed to address existing poor levels of service or inappropriate intersection conditions. One temporary change that has already occurred (after field counts were taken for this study) is the operation of the traffic signal at the intersection of G Street, Lawrence Road, and Mokapu Road as a flashing red, or all-way stop operation, replacing the four-phase operation that included long signal cycles (over 2 minutes) resulting in long delays and queues. Traffic analyses confirm observed field conditions in which operations are improved and user delays are lessened.

Other traffic engineering improvements to address undesirable existing traffic conditions were identified and are listed in Table S-1. The listing order indicates priority in terms of traffic needs.

	Table S-1 – Roadway Improvements for Existing Conditions	
	To address:	Roadway improvement
1.	Pedestrian safety and inefficient use of traffic signal at intersection of **G Street and Third Street**	upgrade the traffic signal system at the intersection of G Street and Third Street by adding pedestrian heads and push buttons for the south crosswalk, adding vehicular detectors on the Third Street approaches, and retiming the signal operation with an actuated east-west (Third Street) phase **[Figure 6]**
2.	Long delays for westbound left turns on **Mokapu Road at G Street**	modify the lane use on the westbound Mokapu Road approach to the intersection with G Street and Lawrence Road, by having the through traffic movement share the right lane instead of the left lane **[Figure 7]**
3.	Poor sight distance and very long delays, **E Street between Second Street and Third Street**	channelize the intersection of Second Street and E Street by providing a new approach from Second Street that is perpendicular to the main flow of traffic and farther away from the E Street intersection with Third Street, to improve the driver's sight line and to increase opportunities to enter traffic **[Figure 8]**
4.	Confusion at intersection of **E Street and Third Street**	restripe parking stalls and reverse the flow in the parking lot between Building 213 and E Street to eliminate the existing exit at the intersection of E Street and Third Street **[Figure 8]**
5.	Delays due to left turns to and from driveways **along Mokapu Road,** and lengthy pedestrian crossings	restripe Mokapu Road from G Street to Harris Avenue from the existing two lanes of traffic in each direction to one lane of traffic in each direction with a median lane that will be available for left turns, and at selected locations, for pedestrian refuge **[Figure 10]**
6.	Conflicts in traffic movements at the intersection of **Mokapu Road and Harris Avenue**	convert the lane assignments at the intersection of Mokapu Road and Harris Avenue to improve the distribution of traffic and modify traffic signal operations **[Figure 11]**
7.	Driver confusion, poor sight distance at the intersection of **Third Street and Selden Street**	reconfigure the intersection of Third Street and Selden Street (while the existing free flow between Third Street and Selden Street east of the intersection will be impeded, driver sight lines and expectations will be improved) **[Figure 12]**
8.	Very long delays to traffic on **Craig Street at Selden Street**	convert the existing two-way stop at the intersection of Craig Avenue and Selden Street to an all-way stop control **[Figure 16]**

In addition to the improvements listed above, minor improvements would be necessary to adequately serve the changes in traffic demands that are expected with full implementation of the Grow The Force (GTF) initiative:

	Table S-2 – Roadway Improvements to Support GTF	
	To address:	Roadway improvement
1.	changing traffic demands	monitor and adjust signal timing as needed at the two existing signalized intersections
2.	Very long delays at **Craig Avenue and Selden Street**	add left turn lanes on Selden Street at the intersection with Craig Avenue **[Figure 16]**

The proposed Aviation Plan project will further increase population and traffic volumes on the base. Additional improvements identified to address the traffic impacts of the Aviation Plan are:

	Table S-3 – Roadway Improvements to Mitigate Project Impacts	
	To address:	Roadway improvement
1.	changing traffic demands	monitor and adjust signal timing as needed at the two existing signalized intersections; add a fourth phase to the traffic signal at the intersection of Third Street and G Street to convert a portion of the Third Street phase to allow unopposed westbound traffic
2.	Very long delays and over-capacity conditions at intersection of **G Street, Mokapu Road, and Lawrence Road**	Widen the west leg (Mokapu Road) of the intersection to add a second eastbound lane **[Figure 20]**
3.	Very long delays at the intersection of **Craig Avenue and Selden Street**	Restripe the southbound approach on Craig Avenue to provide a separate right turn lane.
4.	Very long delays for southbound traffic on **Reed Road at Mokapu Road**	widen the southbound Reed Road approach to Mokapu Road to mitigate the anticipated very long delays at the stop sign **[Figure 21]**

2 Introduction

The proposed action is the development of facilities to support an Aviation Plan to locate MV-22 and HMLA squadrons at Marine Corps Base Hawaii (MCBH) Kaneohe Bay on the island of Oahu, Hawaii. Figure 1 shows the location of MCBH Kaneohe Bay. This report focuses on the traffic impacts of the proposed action that are expected on the base. However, traffic impacts to roadways in the surrounding area are also discussed herein.

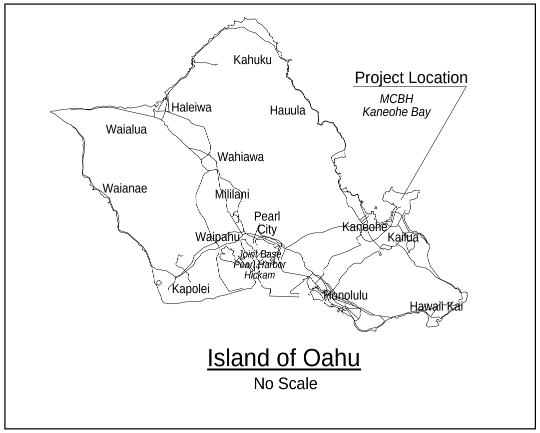

Figure 1 – Project Location

This report is organized in several sections. Section 1 is an executive summary of the findings and recommendations. This Section 2 provides an introduction and definitions of traffic engineering terms. Section 3 provides information on existing conditions. Section 4 discusses future conditions, including the potential impacts of the project and identifies improvements that will be needed, as well as an evaluation of the runway crossing and bikeway opportunities. Section 5 provides the conclusion and recommendations.

2.1 Traffic Analyses

This report includes the results of traffic analyses at intersections and along roadway segments. The analyses used procedures described in the *Highway Capacity Manual* published by the Transportation Research Board.

2.2 Levels of Service Definitions

Traffic engineers describe traffic conditions using a "level of service" (LOS) concept. Six levels of service, ranging from "A" to "F" are used; LOS A describes unimpeded flow with no congestion or delay, while LOS F describes congested conditions and excessive delays. Free flow with little or no delay is described by LOS A. A condition that is not free flow, but with minimal delays or restrictions to maneuvering is LOS B. An "average" condition, described by LOS C, includes some restriction to flow and reasonable delays at intersections. Conditions in which travel on roadway segments appear congested, but flow is stable, or when long delays occur at intersections are LOS D. In urban areas, LOS D or better is considered acceptable for peak hour traffic demands. Near-capacity conditions are described by LOS E, and include very long delays at intersections while flows on roadways are heavy and approach instability. Unstable flows with traffic demands over-capacity or when there are excessive delays at intersections are described by LOS F. Table 1 shows the delays associated with Levels of Service at intersections.

Table 1 – Level of Service Criteria

Level of Service	Control Delay (per vehicle)	
	at Unsignalized Intersections	at Signalized Intersections
A	up to 10 seconds	up to 10 seconds
B	> 10 and ≤ 15 seconds	> 10 and ≤ 20 seconds
C	> 15 and ≤ 25 seconds	> 20 and ≤ 35 seconds
D	> 25 and ≤ 35 seconds	> 35 and ≤ 55 seconds
E	> 35 and ≤ 50 seconds	> 55 and ≤ 80 seconds
F	> 50 seconds	> 80 seconds
Reference: *Highway Capacity Manual 2010*		

Traffic analyses were done for peak hours (those with highest volumes). For individual movements or approaches, mitigation of LOS E or LOS F conditions is desirable, but overall conditions at the intersection are a better indicator or adequacy, as often mitigation of poor conditions for all movements would not be justified. For signalized intersections, overall LOS E or LOS F is considered unacceptable and would indicate that improvements are needed.

3 Existing Traffic Conditions

The description of existing traffic conditions are based on field observations and manual traffic counts, which were taken during weekday peak periods at nine locations on MCBH Kaneohe Bay over a two-week period in September 2010. Machine counts were also taken of traffic on Mokapu Road crossing the runway. The counts were scheduled to avoid special events and the reported population on base during that month was 18,987 persons. The traffic counts were recorded at 15-minute intervals and summaries of the counts are attached in Appendices A & B. The locations of the counts are shown in Figure 2.

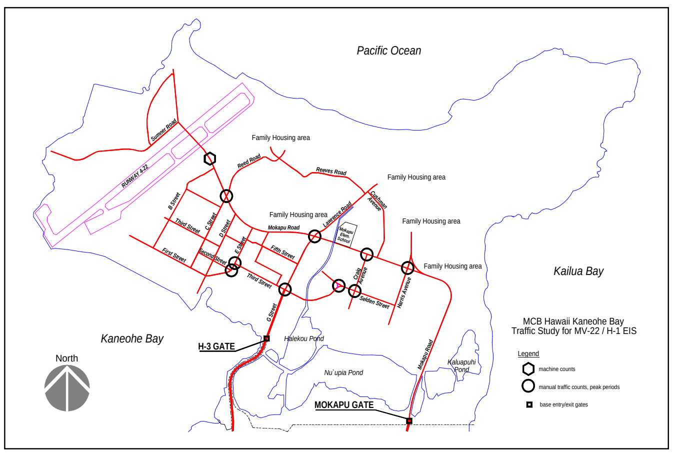

Figure 2 – Traffic Count Locations

In addition, traffic counts taken by the Base Safety Office were reviewed and incorporated into the analyses. The evaluation of traffic impacts on the roadways surrounding the base used traffic data published by the State of Hawaii Department of Transportation (Highways Division Planning Branch).

3.1 Existing Conditions on Roadways Surrounding MCBH Kaneohe Bay

Vehicular traffic between MCBH Kaneohe Bay and the rest of the island of Oahu must pass through one of two security gates. The main gate ("H-3 Gate"), which is normally open 24 hours, is located at the northeast terminus of Interstate Route H-3, a four-lane freeway that connects to other freeways at the Halawa Interchange, approximately 15 miles to the southwest, near Joint Base Pearl Harbor Hickam. The Mokapu Gate is located at the east side of the base, and it connects Mokapu Road, a two-lane roadway within the base, to a four-lane divided boulevard in the Aikahi Park neighborhood of the town of Kailua.

Counts of inbound traffic at the gates are shown in Table 2. The H-3 Gate has two inbound lanes; while both are used during peak periods, at most times passage is only through the left lane adjacent to the guard shack. Two outbound lanes lead directly onto the freeway. The Mokapu Gate, which is open for traffic between 0500 and 2200 hours, has a single lane in each direction.

Table 2 – Inbound Traffic Volumes at Gates (2010)

	H-3 Gate	Mokapu Gate
Average weekday volume (Monday-Thursday)	7,840	6,370
Friday daily volume	8,360	6,960
Saturday daily volume	5,730	5,950
Sunday daily volume	5,000	6,000
Hourly volumes:		
Typical weekday morning	1,050	360
Typical weekday midday	450	480
Typical weekday late afternoon	380	590
Source: MCBH Kaneohe Bay, Base Safety Office		

Daily traffic volumes leaving the base were not counted but are expected to be similar to entering volumes. The daily volume of 16,000 vehicles on the H-3 Freeway near MCBH Kaneohe Bay is less than 15% of the capacity of a 4-lane freeway (the *Highway Capacity Manual 2000* Exhibit 8-18 shows daily volumes of between 208,000 and 280,000 vehicles per day reported on 8-lane freeways in 1990; half of these volumes, or 120,000 vehicles per day, would be an estimate of the daily capacity of a four-lane freeway).

Traffic counts taken in 2008 at the H-3 Mokapu Interchange (less than one mile from the H-3 Gate of MCBH Kaneohe Bay) show northbound on-ramp and southbound off-ramp volumes are each about 2,900 vehicles per day, meaning that less than 2/3 of the vehicles entering at the H-3 Gate have been on the H-3 Freeway farther than the Mokapu Interchange.

The highest hourly volume of two-way traffic counted on the south leg of the intersection of G Street and Third Street occurred during the AM Peak Hour, with a volume of nearly 1,400 vehicles. Because several driveways between the intersection and the H-3 Freeway were observed to have little net effect on the traffic volume along G Street, the existing peak two-way volume on the nearest segment of the H-3 Freeway is also about 1,400 vehicles per hour.

The average capacity at the H-3 Gate under DEFCON Alpha conditions is estimated to be 450 vehicles per lane per hour, using an average service time of 8 seconds (from field observations) when vehicles are checked at a single location. With tandem checking, where two vehicles in one lane are checked simultaneously, the estimated capacity would increase to 600 vehicles per lane per hour (at an average service time of 12 seconds for each pair of vehicles). Tandem checking occurs during the weekday morning peak period and the gate capacity is 1,200 vehicles per hour; with the typical morning peak hour traffic volume of 1,050 vehicles per hour, calculated average delay is nearly 2 minutes with a design queue of 40 vehicles per lane (0.23 mile at 30 feet per vehicle). Field observations confirm the computed existing queue lengths and delays.

The daily volume of 13,000 vehicles per day on the four-lane Mokapu Road south of the Mokapu Gate is less than 35% of the capacity of the roadway (due to interruptions to flow caused by driveways and intersections, the capacity of a collector street like Mokapu Road is estimated to be one-third of a freeway with uninterrupted flow, or 40,000 vehicles per day).

On Mokapu Road, counts taken in 2008 north of the existing signalized intersection with Kaneohe Bay Drive and North Kalaheo Avenue showed a daily northbound volume of 4,575 vehicles per day, which is 72% of the average volume of 6,369 vehicles per day for the same two days of the week counted entering the Mokapu Gate in July 2010 by the Base Safety Office.

The average capacity at the Mokapu Gate under DEFCON Alpha conditions is estimated to be 500 vehicles per lane per hour if each vehicle is checked at a single location (at an average service time of 7 seconds; the higher proportion of residents with DOD stickers and ID cards at this gate results in quicker checking than at the H-3 Gate). With tandem checking, where two sentries check two vehicles simultaneously, the estimated capacity would increase to 720 vehicles per lane per hour (at an average service time of 10 seconds for each pair of vehicles). Tandem checking with an existing peak traffic volume of 600 vehicles per hour is computed to have an average delay of 42 seconds design queue of 13 vehicles per lane (400 feet at 30 feet per vehicle).

3.2 Existing Conditions on MCBH Kaneohe Bay

Daily traffic volumes on the various roadways on MCBH Kaneohe Bay were computed from traffic count data, including 24-hour counts taken by the Base Safety Office and the machine and manual counts collected as part of this traffic study. Daily volumes are shown in Figure 3.

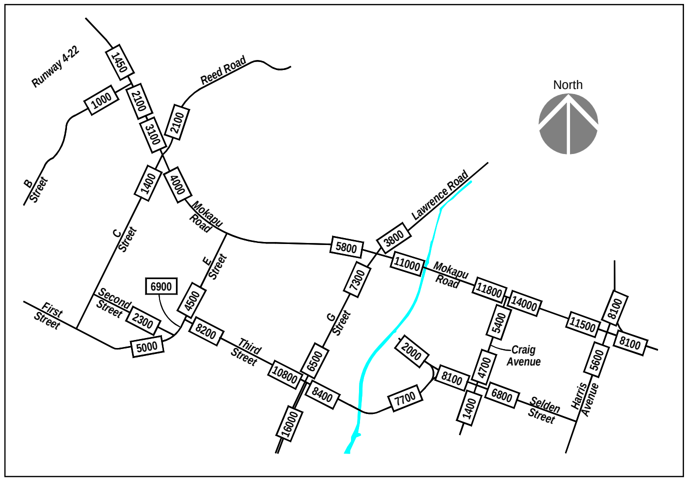

Figure 3 – Daily Traffic Volumes (2010)

Three weekday peak periods were identified for study: the AM Peak Hour when many employees are starting their workday, the MIDDAY Peak Hour, and the PM Peak Hour when many employees are leaving. Peak hour volumes from the manual counts are shown in Figures 4 and 5. Existing peak hour traffic volumes at several key intersections west of the drainage way that parallels G Street are shown in Figure 4; these locations will be directly affected by the Aviation Plan. Traffic volumes at intersections east of the drainage way, which will be affected by the increase in personnel on the base, are shown in Figure 5.

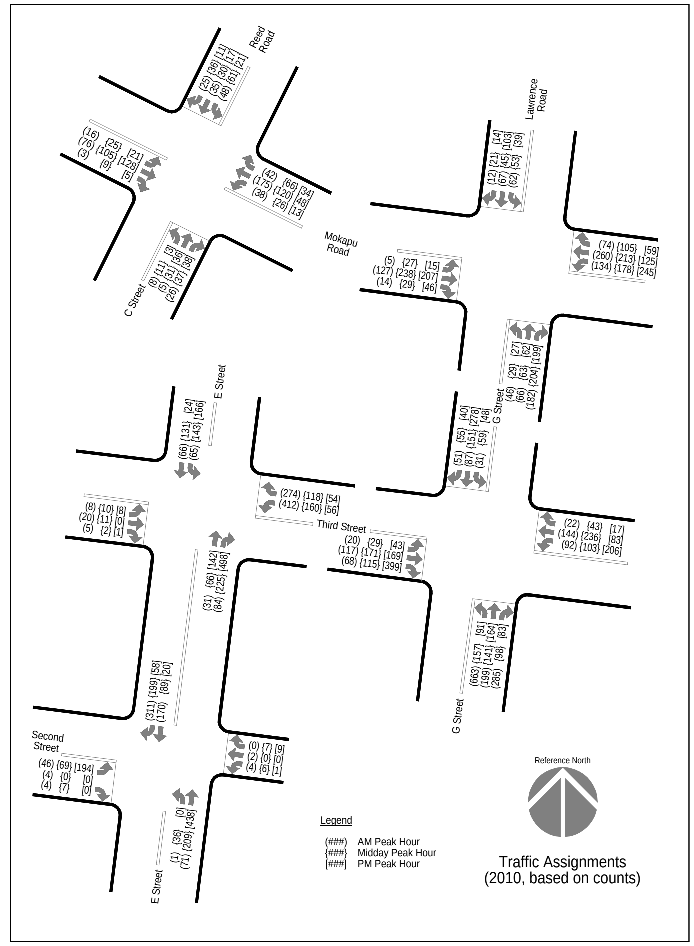

Figure 4 – Peak Hour Volumes – West Side (2010)

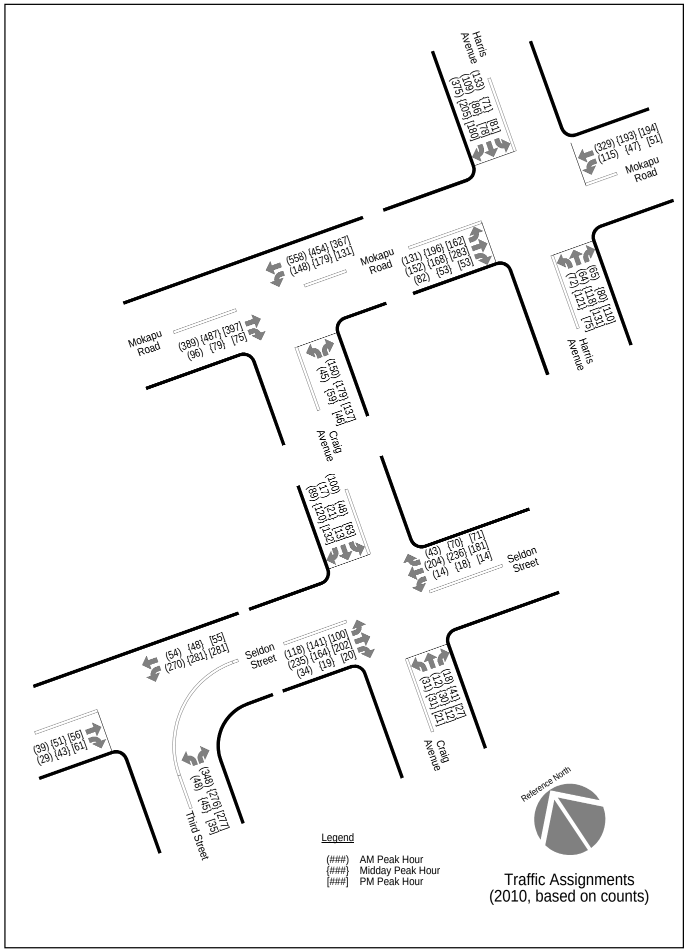

Figure 5 – Peak Hour Traffic Volumes – East Side (2010)

The roadways on MCBH Kaneohe Bay west of G Street are generally of minimal width and many do not have curbs to help define the traffic lanes. East of G Street, roadways are wider and many have curbs and paved sidewalks.

Traffic signal systems have been placed at three intersections and on both approaches on Mokapu Road to the runway crossing. At other locations, traffic movements on MCBH Kaneohe Bay are controlled by the use of "STOP" or "YIELD" signs placed on minor street or driveway approaches to intersections with streets that have higher traffic flows.

The intersection of G Street and Third Street serves nearly 21,000 vehicles per weekday. A traffic signal system, operated with three phases, controls vehicular and pedestrian flows across this intersection. Individual phases minimize conflicts for traffic on the northbound and southbound approaches of G Street and a single signal phase is provided for traffic on Third Street, where left turns yield to oncoming through traffic. The analyses of peak hour volumes at this intersection show overall acceptable conditions.

The intersection of Mokapu Road and Harris Avenue serves about 16,600 vehicles per weekday. A traffic signal system, operated with three phases, controls vehicular and pedestrian flows across this intersection. Individual phases minimize conflicts for traffic on the westbound and eastbound approaches of Mokapu Road and a single signal phase is provided for traffic on Harris Avenue where left turns yield to oncoming through traffic. While the analyses of peak hour volumes at this intersection show overall acceptable conditions, field observations noted that there was confusion and some conflicts between northbound and southbound traffic on Harris Avenue, which share one phase of the signal operation.

The intersection of G Street, Mokapu Road, and Lawrence Road serves nearly 14,000 vehicles per weekday. At the time of the manual counts, the traffic signal system at this intersection was operated with four phases, with individual phases for each vehicular approach. The analyses of peak hour volumes at this intersection show very high delays at this intersection. The layout of the intersection, with skewed approaches, required that the signal be operated in four phases, and with only two of the pedestrian crossings being demand-actuated, long phases were needed which resulted in a long signal cycle. While the intersection was not highly utilized, delays to traffic were very long.

The results of the analyses of the 2010 peak hour conditions at the signalized intersections are shown in Table 3. In all of the analyses, the variation of existing traffic volumes within the peak hour was taken into consideration by using an overall peak hour factor (PHF) computed from the manual counts.

Table 3 – Existing (2010) Conditions at Signalized Intersections

	AM Peak Hour			Midday Peak Hour			PM Peak Hour		
	V/C	AD	LOS	V/C	AD	LOS	V/C	AD	LOS
G Street and Third Street									
Southbound G Street	0.73	47.6	D	0.74	41.3	D	0.90	52.6	D
Northbound G Street	0.99	62.7	E	0.50	34.5	C	0.85	53.0	D
Westbound Third Street	0.65	25.5	C	0.90	43.5	D	0.98	68.0	E
Eastbound Third Street	0.33	17.7	B	0.39	19.7	B	0.53	24.3	C
Overall Intersection	**0.78**	**49.4**	**D**	**0.75**	**36.5**	**D**	**0.93**	**50.7**	**D**
Mokapu Road and Harris Avenue									
Southbound Harris Avenue	0.95	35.7	D	0.45	14.5	B	0.43	15.7	B
Northbound Harris Avenue	0.68	25.3	C	0.73	24.7	C	0.74	25.5	C
Westbound Mokapu Road	0.81	40.5	D	0.63	36.4	D	0.80	44.7	D
Eastbound Mokapu Road	0.91	49.2	D	0.58	27.0	C	0.75	29.3	C
Overall Intersection	**0.91**	**38.7**	**D**	**0.67**	**24.7**	**C**	**0.75**	**28.3**	**C**
G Street, Mokapu Road, and Lawrence Road									
Southbound Lawrence Road	0.44	48.0	D	0.34	45.9	D	0.59	52.4	D
Northbound G Street	0.48	52.9	D	0.84	81.7	F	0.68	70.7	E
Westbound Mokapu Road	0.84	58.4	E	0.85	58.1	E	0.90	66.3	E
Eastbound Mokapu Road	0.84	84.8	F	0.97	90.7	F	0.80	68.1	E
Overall Intersection	**0.65**	**60.2**	**E**	**0.74**	**71.1**	**E**	**0.76**	**64.9**	**E**

V/C = utilization or volume/capacity ratio
AD = average delay per vehicle (seconds)
LOS = Level of Service

The traffic signals at the intersection of G Street, Mokapu Road, and Lawrence Road have since been changed to flash red on every approach, effectively converting this intersection operation to an all-way stop control. Field observations of the intersection with this modification reveal improved conditions, which are supported by the analyses (Table 4).

At unsignalized intersections, delays are identified for traffic movements that are controlled by stop signs or that yield to other movements. The latter includes left turns that yield to oncoming through traffic on a major street (one on which traffic is not controlled by a stop sign).

For the volumes counted at the intersection of G Street. Mokapu Road, and Lawrence Road, the utilization increases on the westbound approach in the PM Peak Hour from 0.90 to 0.98; delay decreases slightly from 66.3 to 61.3 seconds, but the Level of Service changes from “E” to “F” because of the different criteria for levels of service for signalized and unsignalized intersections. For all other cases, utilization is reduced or not significantly changed, and delays are significantly reduced with the conversion to all-way stop control.

Table 4 – All-way Stop Control with Existing (2010) Volumes
Intersection of G Street, Mokapu Road, and Lawrence Road

	AM Peak Hour			Midday Peak Hour			PM Peak Hour		
	V/C	AD	LOS	V/C	AD	LOS	V/C	AD	LOS
Southbound Lawrence Road	0.39	15.1	C	0.28	13.6	B	0.58	21.8	C
Northbound G Street	0.49	14.8	B	0.49	14.8	B	0.48	16.3	C
Westbound Mokapu Road	0.86	36.8	E	0.77	28.1	D	0.98	61.3	F
Eastbound Mokapu Road	0.43	15.2	C	0.64	20.4	C	0.65	23.6	C
Overall Intersection	**--**	**23.1**	**C**	**--**	**20.6**	**C**	**--**	**34.6**	**D**

V/C = utilization or volume/capacity ratio
AD = average delay per vehicle (seconds)
LOS = Level of Service

Other unsignalized intersections were also analyzed. The results of the analyses are shown in Table 5 and discussed herein.

Table 5 – Existing (2010) Conditions at Unsignalized Intersections

	AM Peak Hour			Midday Peak Hour			PM Peak Hour		
	V/C	AD	LOS	V/C	AD	LOS	V/C	AD	LOS
C Street and Reed Road at Mokapu Road									
Reed Road southbound approach	0.25	14.3	B	0.32	15.6	B	0.12	12.3	B
Mokapu Road westbound left turn	0.03	7.5	A	0.02	7.8	A	0.01	7.6	A
Mokapu Road eastbound left turn	0.01	7.8	A	0.02	7.5	A	0.02	7.5	A
C Street northbound approach	0.06	10.6	B	0.17	12.5	B	0.16	11.5	B
Third Street at E Street									
E Street southbound left turn	0.05	7.6	A	0.15	8.6	A	0.25	10.5	B
Third Street westbound right turn	0.29	10.2	B	0.19	10.6	B	0.11	11.3	B
Third Street westbound left turn	0.69	22.7	C	0.78	54.8	F	0.35	30.3	D
Eastbound exit from parking lot	0.06	12.4	B	0.13	23.7	C	0.06	25.5	D
Second Street at E Street									
Second Street eastbound approach	0.18	17.9	C	0.32	25.1	D	0.99	94.6	F
E Street northbound left turn	0.00	8.6	A	0.04	8.2	A	0.00	7.5	A
Second Street westbound approach	0.01	13.7	B	0.03	13.2	B	0.04	16.6	C
Craig Avenue at Mokapu Road									
Mokapu Road westbound left turn	0.17	9.4	A	0.24	10.4	B	0.15	9.3	A
Craig Avenue northbound approach	0.59	28.0	D	0.78	42.7	E	0.51	23.0	C
Craig Avenue at Selden Street									
Craig Avenue southbound approach	0.71	38.4	E	0.68	36.1	E	0.35	17.3	C
Selden Street westbound left turn	0.01	8.1	A	0.02	7.9	A	0.01	7.9	A
Selden Street eastbound left turn	0.11	8.3	A	0.16	8.9	A	0.10	8.3	A
Craig Avenue northbound approach	0.34	30.7	D	0.72	63.6	F	0.22	20.5	C
Selden Street at Third Street									
Selden Street eastbound approach	0.26	31.1	D	0.32	28.1	D	0.34	32.8	D
Third Street northbound left turn*	0.10	9.6	A	0.08	9.7	A	0.09	10.2	B
Third Street northbound left turn**	0.07	8.0	A	0.05	8.1	A	0.06	8.2	A
Selden Street eastbound right turn	0.05	10.0	A	0.10	10.5	B	0.14	11.2	B

V/C = utilization or volume/capacity ratio
AD = average delay per vehicle (seconds)
LOS = Level of Service

* yield to turn onto Selden Street
** yield across Third Street traffic

At the intersection of C Street and Reed Road at Mokapu Road, "STOP" signs are placed on the C Street and Reed Road approaches to maintain free flow on Mokapu Road. Good conditions prevail at this intersection, even during peak hours, as existing volumes on all approaches are relatively low.

At the intersection of Third Street and E Street, westbound traffic on Third Street is stopped, with separate lanes provided for left turns and for right turns onto E Street. Eastbound traffic on a one-way driveway exiting the parking lot across from Third Street is also stopped. Southbound left turns on E Street yield to the opposing northbound traffic. The combination of higher left turn volumes from Third Street with the moderate volumes on E Street results in very long delays for the westbound left turn movement during the midday peak hour.

At the intersection of Second Street and E Street, the eastbound approach is a stop-controlled single lane shared by left and right turns; most movements are left turns. The angle of the approach relative to the major flow, along with the proximity of the nearby intersection with Third Street, makes using the eastbound approach a difficult maneuver. High volumes on Second Street trying to enter into high volumes on E Street during parts of the PM Peak Hour result in near-capacity condition and very long delays.

At the "T"-intersection of Craig Avenue and Mokapu Road, vehicles on the stop-controlled northbound approach of Craig Avenue share a single lane. Westbound left turns into Craig Avenue are made from the second (inner) lane of Mokapu Road and yield to oncoming (eastbound) traffic. Crosswalks at this intersection are set back from the edges of the roadways, allowing drivers in turning vehicles to complete their turn and yield to pedestrians in the crosswalk. Poor conditions during the midday peak hour are caused by the lack of adequate gaps in the Mokapu Road traffic for Craig Avenue traffic.

At the intersection of Craig Avenue and Selden Street, the single-lane Craig Avenue approaches are stopped. Any left turns from Selden Street yield to oncoming traffic. Crosswalks at this intersection are set back from the edges of the roadways, allowing drivers in turning vehicles to complete their turn and yield to pedestrians in the crosswalk. Poor conditions occur during the AM Peak Hour and the midday peak hour because of the lack of adequate gaps in the Selden Street traffic to serve the traffic on Craig Avenue.

At the intersection of Selden Street and Third Street, a large traffic island separates the various traffic movements. The south leg of Third Street and the east leg of Selden Street are the major (uncontrolled) approaches and the connecting roadway east of the triangular island carries the “through” traffic. Eastbound traffic on Selden Street north of the triangular island is stopped before continuing onto Selden Street, yielding to the “through” traffic. The roadway west of the triangular island serves as a connector between the south and west legs of the intersection; traffic from the west (Selden Street) wishing to make a right turn onto Third Street is controlled by a “YIELD” sign. The opposite flow from the south (Third Street) to the west is made with two yields, initially to oncoming traffic on Third Street and secondly before turning left onto Selden Street. Low turning volumes to and from the west leg result in acceptable levels of service; however, several instances of unclear priority of use were observed as traffic from the west leg of Selden Street violated the right-of-way in merging with the major flow from Selden Street to Third Street.

3.3 Possible Mitigation of Unacceptable Existing Conditions

Possible short-term mitigation measures that involve relatively minor construction have been identified for the unacceptable existing conditions at several locations on the base.

At the signalized intersection of G Street and Third Street, average delay for all movements are acceptable; however, the approaches with peak movements have very long delays (Level of Service E, northbound in the AM Peak Hour and westbound in the PM Peak Hour).

Decreased delay could be achieved in the AM Peak Hour by reducing the duration of the Third Street signal phase. The signal phasing currently has a very long phase for Third Street, to accommodate any pedestrians that may want to cross G Street in the crosswalk south of the intersection, since this crossing does not have pedestrian heads or actuators (push buttons), the time provided for this phase is based on the time needed to cross using the south crosswalk.

The addition of pedestrian heads and actuators for the south crossing will allow for a shorter Third Street phases when there are no pedestrians crossing the south leg of the intersection, which would result in more cycles per hour and less delay. In the PM Peak Hour, the Third Street phase will still need a long duration to serve the higher vehicular volume, but reductions in the duration of all phases could reduce delays by a small amount. These improvements would require the addition of new signal heads, vehicle detectors on the Third Street approaches, and adjustments to settings in the signal controller, as shown in Figure 6.

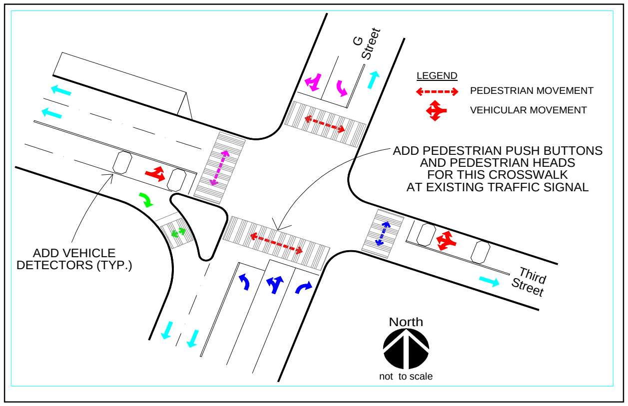

Figure 6 – Modifications to Existing Traffic Signals
Intersection of Third Street and G Street

Slight improvements in peak hour conditions would result from the retimed signal, as summarized in Table 6.

Table 6 – Conditions at G Street and Third Street (signal retimed)

	AM Peak Hour			Midday Peak Hour			PM Peak Hour		
	V/C	AD	LOS	V/C	AD	LOS	V/C	AD	LOS
Southbound G Street	0.68	42.1	D	0.76	36.3	D	0.95	57.7	E
Northbound G Street	0.90	42.8	D	0.52	28.7	C	0.92	57.1	E
Westbound Third Street	0.77	34.5	C	0.94	46.8	D	0.92	51.6	D
Eastbound Third Street	0.37	19.9	B	0.41	17.0	B	0.51	20.9	C
Overall Intersection	**0.80**	**38.7**	**D**	**0.79**	**34.2**	**C**	**0.93**	**49.0**	**D**
Compare: (existing timing)	*0.78*	*49.4*	*D*	*0.75*	*36.5*	*D*	*0.93*	*50.7*	*D*

V/C = utilization or volume/capacity ratio
AD = average delay per vehicle (seconds)
LOS = Level of Service

At the Mokapu Road, G Street, and Lawrence Road intersection, existing traffic conditions could be improved. In addition to continuing the four-way stop operation, a modification of the lane uses on the westbound approach by using the right lane instead of the left lane for through movements will provide a slight improvement (the approach changes from a right turn only lane and a left turn/through option lane to a right turn/through option lane and a left turn only lane), as shown in Figure 7.

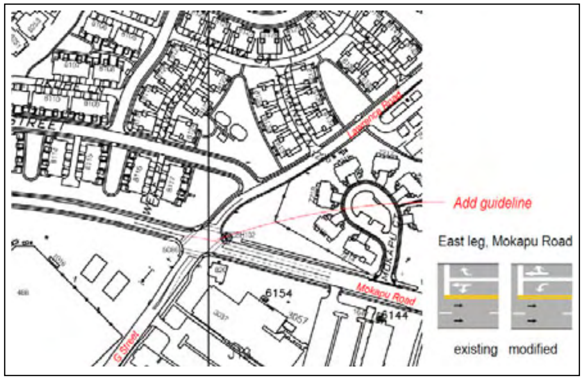

Figure 7 – Lane Use Modification
Intersection of Mokapu Road, G Street, and Lawrence Road

Table 7 – All-way Stop Control with Existing (2010) Volumes
Modified Intersection of G Street, Mokapu Road, and Lawrence Road

	AM Peak Hour			Midday Peak Hour			PM Peak Hour		
	V/C	AD	LOS	V/C	AD	LOS	V/C	AD	LOS
Southbound Lawrence Road	0.41	16.0	C	0.31	14.6	B	0.59	22.3	C
Northbound G Street	0.49	15.1	C	0.51	15.6	C	0.47	15.8	C
Westbound Mokapu Road	0.73	22.6	C	0.67	20.0	C	0.73	24.2	C
Eastbound Mokapu Road	0.47	16.7	C	0.71	25.7	D	0.68	25.6	D
Overall Intersection	--	**18.5**	**C**	--	**19.8**	**C**	--	**22.2**	**C**
Compare: (existing layout)	--	*23.1*	*C*	--	*20.6*	*C*	--	*34.6*	*D*

V/C = utilization or volume/capacity ratio
AD = average delay per vehicle (seconds)
LOS = Level of Service

High midday delays at the intersection of Third Street and E Street can be mitigated by reversing the flow of traffic in the parking lot fronting Building 213 to simplify operations at the intersection. The existing one-way exit would be converted to an entrance only and the existing entrance farther north on E Street would become the exit.

At the intersection of Second Street and E Street, conditions could be improved by realigning the eastbound approach from Second Street; the existing west leg would be used as a one-way roadway for westbound traffic, and the eastbound traffic on Second Street would be turned before the intersection to meet First Street at a right angle. The separation of the movements to and from Second Street, along with the improved visibility of eastbound First Street traffic, will provide additional gaps for Second Street traffic.

Figure 8 shows the changes proposed at these intersections and Table 8 shows the results of the analyses with these changes.

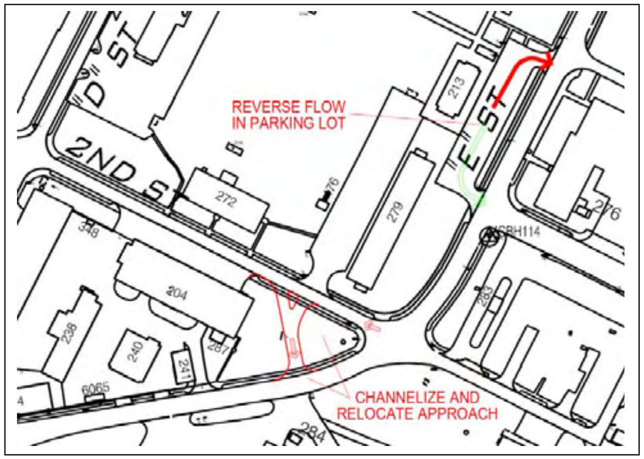

Figure 8 – Realign Second Street Approach

Table 8 –Conditions with Modifications, Vicinity of Second Street and E Street

	AM Peak Hour			Midday Peak Hour			PM Peak Hour		
	V/C	AD	LOS	V/C	AD	LOS	V/C	AD	LOS
Third Street at E Street (reverse flow in parking lot)									
E Street southbound left turn	0.06	7.6	A	0.17	8.6	A	0.25	10.5	B
Third Street westbound right turn	0.26	10.0	A	0.19	10.6	B	0.11	11.3	B
Third Street westbound left turn/thru	0.73	24.7	C	0.71	42.6	E	0.33	27.6	D
E Street northbound left turn	0.00	7.4	A	0.00	7.7	A	0.00	7.3	A
Second Street at E Street (realign Second Street approach)									
Second Street southbound approach	0.12	13.1	B	0.23	16.6	C	0.71	35.9	E
First Street eastbound left turn	0.00	8.9	A	0.04	8.4	A	0.00	7.7	A

V/C = utilization or volume/capacity ratio
AD = average delay per vehicle (seconds)
LOS = Level of Service
* yield to turn onto Selden Street
** yield across Third Street traffic

Poor conditions at the intersection of Craig Avenue and Mokapu Road could be mitigated by use of a Two-Way left Turn Lane (TWLTL) on Mokapu Road from G Street/Lawrence Road to Harris Avenue.

Figure 9 provides a summary of the advantages and disadvantages of TWLTLs.

Advantages of Two-Way Left-Turn Lanes (TWLTL's)

1. Removes left-turning vehicles from through traffic lanes thereby increasing capacity.
2. Generally reduces delay to left-turning vehicles.
3. Enhances operational flexibility for emergency vehicles and detours.
4. Permits use as a reversible lane during peak hours.
5. Improves safety relative to roads with no separate left-turn lanes in median and reduces frequency of rear-end accidents associated with left-turn maneuvers.
6. Spatially separates opposing traffic flows.
7. Eliminates fixed-object collisions at openings of median island.
8. Provides refuge for vehicles turning left onto highway and for disabled vehicles.
9. Maximizes access to side streets and driveways.

Disadvantages of Two-Way Left-Turn Lanes

1. Increases conflicting vehicle movements at driveways.
2. May operate poorly under high volumes of through traffic.
3. Delays to left-turning vehicles increase when two-way through volume reaches about 2,800 to 3,800 vph (especially when opposing through volumes exceed 750 to 800 vpl).
4. Limits operating speeds to a maximum rate of 45 mph.
5. Does not guarantee uni-direction use at high-volume intersections.
6. Allows numerous potential conflict points.
7. Results in unsafe operation where sight distance is inadequate (as when a TWLTL goes over a steep hill).
8. Does not provide refuge areas for pedestrian crossing the arterial.
9. Visibility may be impaired when pavement markings outlive their design life – especially with snow, rain or ice.
10. Creates safety problem when used as a passing lane.
11. May generate safety problems at closely spaced driveways and intersections.
12. May encourage strip development.
13. Is not aesthetically pleasing.
14. Requires high maintenance costs to keep pavement striping and raised pavement markings in proper operating conditions.
15. May require continual instruction to the public on the proper use and operation – at least where lanes are first provided.

Source: Adapted from B. L. Bowman and R. L. Vecellio, "Effect of Urban and Suburban Median Types on Both Vehicular and Pedestrian Safety," *Transportation Research Record 1445*, Transportation Research Council, Washington, D. C., 1994 and FHWA Report 93-30, *Investigation of the Impacts of Medians and Road Users,* December 1994.

from: Table 6 of Institute of Transportation Engineers, "Access Management at Intersections, Part II", November 12, 2008

Figure 9 – Considerations on Use of Two-Way Left Turn Lanes

Figure 10 illustrates a possible treatment and the existing and proposed lane layouts on Mokapu Road.

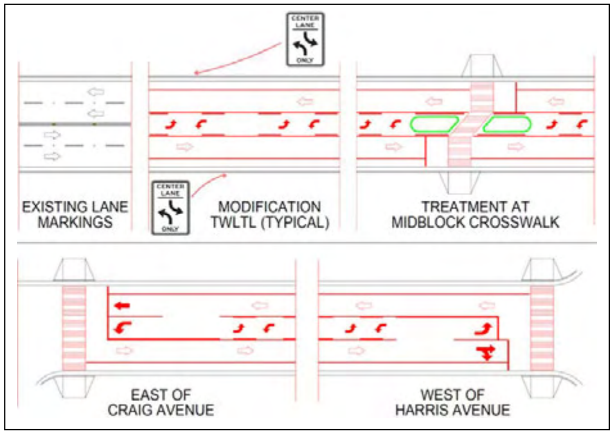

Figure 10 – Typical Roadway Layouts, Mokapu Road

New pavement markings would change the present cross-section of two lanes in each direction to a single lane in each direction plus a median used as a two-way left turn lane (TWLTL). The proposed alternative would also leave sufficient space on the existing pavement for a bicycle lane in each direction. Raised islands could be provided within the median for pedestrian refuge at midblock crosswalks or to enforce new left turn restrictions.

Drivers wishing to turn left from Mokapu Road to Craig Avenue or to driveways would change lanes into the median to wait for a gap in oncoming traffic to complete the turn, thereby not blocking through traffic in the travel lane. The median can also be used as a refuge area for left turns onto Mokapu Road, from Craig Avenue or from the many driveways along Mokapu Road. The portions of the pavement that would be used for bicycle lanes should be smooth and free of utility covers, grates, or other irregularities that may interfere with safe use of the lanes by bicycles.

Use of a TWLTL on Mokapu Road would also affect the lane assignments for the westbound traffic at the intersection of Mokapu Road and Harris Avenue. The existing two lanes for westbound traffic (through movements can use both lanes, with left turns from the second lane) would be designated for through movements only in the right lane and for left turns only from the left lane. Other changes include remarking the southbound approach for through movements sharing the left lane, and changes to the signal phasing to reduce vehicular conflicts. Figure 11 shows the proposed changes at the intersection.

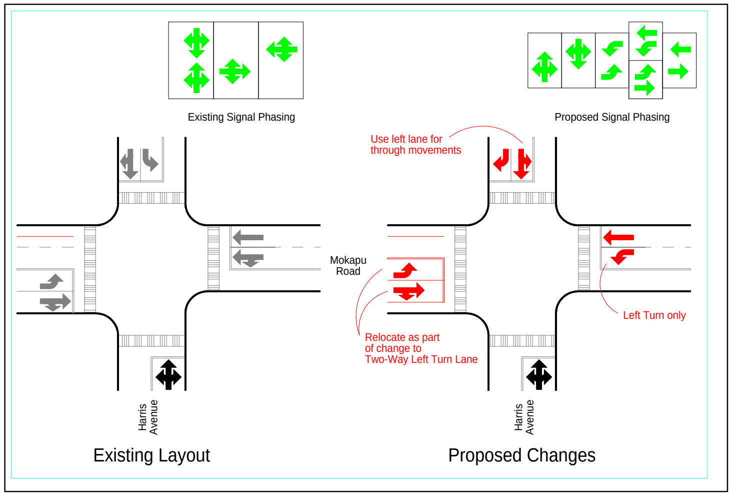

Figure 11 – Changes at Intersection of Mokapu Road and Harris Avenue

The changes at the signalized intersection will address conflicts that were observed but would increase average delays; the delays, however, would still be in acceptable range. Conditions at the two intersections with the TWLTL on Mokapu Road are shown in Table 9.

Table 9 – Mokapu Road Intersections with TWLTL (2010 volumes)

	AM Peak Hour			Midday Peak Hour			PM Peak Hour		
	V/C	AD	LOS	V/C	AD	LOS	V/C	AD	LOS
Craig Avenue at Mokapu Road									
Mokapu Road westbound left turn	0.17	9.4	A	0.24	10.4	B	0.15	9.3	A
Craig Avenue northbound approach	0.54	23.8	C	0.48	23.6	C	0.48	20.6	C
Mokapu Road and Harris Avenue (signalized)									
Southbound Harris Avenue	0.96	51.2	D	0.59	28.3	C	0.71	31.8	C
Northbound Harris Avenue	0.77	45.6	D	0.76	35.3	D	0.86	42.9	D
Westbound Mokapu Road	0.92	51.7	D	0.68	40.1	D	0.76	41.4	D
Eastbound Mokapu Road	0.85	52.9	D	0.72	37.3	D	0.79	38.4	D
Overall Intersection	**0.91**	**51.1**	**D**	**0.70**	**34.8**	**C**	**0.77**	**38.5**	**D**

V/C = utilization or volume/capacity ratio
AD = average delay per vehicle (seconds)
LOS = Level of Service

While this traffic study has not included data collection or an evaluation of existing or future conditions on Mokapu Road east of Harris Avenue, the extension of this concept to that segment should also be considered. Changes to pavements markings could convert the existing cross-section of two westbound lanes and a single eastbound lane to a westbound bicycle lane, a single westbound lane for motorized vehicles, a median lane for left turn lanes and left turn refuge area, and a single eastbound lane (the eastbound shoulder is already designated a bicycle lane).

At the intersection of Craig Avenue and Selden Street, an all-way stop control will increase overall delay, but will provide sufficient capacity and reassign priorities to eliminate excessive delays. Table 10 shows the results of the analyses of the counted volumes if an all-way stop controlled the intersection.

Table 10 – All-way Stop Control with Existing (2010) Volumes Intersection of Craig Avenue and Selden Street

	AM Peak Hour			Midday Peak Hour			PM Peak Hour		
	V/C	AD	LOS	V/C	AD	LOS	V/C	AD	LOS
Southbound Craig Street	0.41	13.2	B	0.44	14.4	B	0.36	11.5	B
Westbound Selden Street	0.48	13.7	B	0.69	21.2	C	0.43	12.2	B
Eastbound Selden Street	0.70	20.1	C	0.71	22.6	C	0.53	14.2	B
Northbound Craig Street	0.13	10.6	B	0.25	12.3	B	0.11	9.7	A
Overall Intersection	--	**16.1**	**C**	--	**19.4**	**C**	--	**12.6**	**B**

V/C = utilization or volume/capacity ratio
AD = average delay per vehicle (seconds)
LOS = Level of Service

At the intersection of Selden Street and Third Street, there is sufficient capacity to serve existing traffic at acceptable levels of service. However, the layout of the intersection does not clearly define the uses of the streets and drivers that stop or yield have difficult lines of sight to determine when they can proceed. Creating a standard "T"-intersection with channelized right turn lanes would require replacing the existing single traffic island with two islands (Figure 11). This alignment would result in the high volume left turn of westbound traffic from Selden Street to Third Street yielding to oncoming traffic.

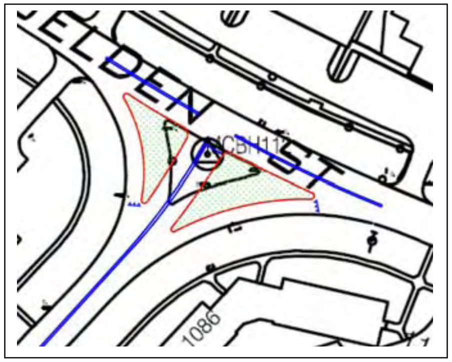

Figure 12 – Realignment of Third Street at Selden Street

At the merge of the right turns from Third Street with the eastbound through movements on Selden Street, Figure 12 shows the preferred control where the right turn movement yields to the through movements, as would be expected with the layout. This results in the yield being placed on the much higher volume flow; reversing the yield control would decrease delays; however, eastbound drivers would have the difficult task of determining when to proceed as they would need to look back over their right shoulder (similar to the existing situation), and this control scheme could adversely affect the westbound left turn if there is any queuing or slowing of the eastbound traffic. Results of the intersection analyses with the counted volumes are shown in Table 11.

Table 11 – Realigned Third Street at Selden Street (2010 volumes)

	AM Peak Hour			Midday Peak Hour			PM Peak Hour		
	V/C	AD	LOS	V/C	AD	LOS	V/C	AD	LOS
Selden Street westbound left turn	0.21	7.9	A	0.21	7.9	A	0.24	8.1	A
Third Street northbound left turn	0.20	20.4	C	0.17	19.6	C	0.19	23.4	C
Selden Street eastbound right turn	0.05	10.3	B	0.07	10.3	B	0.12	11.0	B
Third Street northbound right turn *	0.41	11.0	B	0.31	10.2	B	0.37	10.7	B
>Selden Street eastbound through **	*0.03*	*7.3*	*A*	*0.04*	*7.3*	*A*	*0.04*	*7.3*	*A*

V/C = utilization or volume/capacity ratio
AD = average delay per vehicle (seconds)
LOS = Level of Service

* - if right turns yield to Selden Street
** - alternatively, if through movements yield to Third Street right turns

4 Future Traffic Conditions

Future conditions have been evaluated for the year 2018, when full implementation of the Aviation Plan is expected.

A review of existing base population data and projections indicates that much of the increased military personnel expected as part of other actions ("Grow The Force" or GTF initiative) were already assigned to MCBH Kaneohe Bay at the time field surveys of traffic conditions were done. However, full implementation of the GTF initiative will increase the de-facto population on the base as a result of a smaller number of assigned but deployed personnel. Future peak hour traffic conditions without the Aviation Plan ("baseline") were evaluated to identify roadway improvements that may be needed even without the proposed Aviation Plan project.

Future conditions were also evaluated for the with-project case that includes the additional population expected on the base with the completion of the Aviation Plan, which will add 1,000 military personnel, 22 civilian employees, and approximately 1,100 military family members.

4.1 Effect of Grow The Force (GTF)

Population data obtained from the Facilities Planning Office at MCBH Kaneohe Bay indicate that the total population on the base in September 2010, when traffic counts and most of the field observations were conducted, was 16,640 persons (active-duty Marine and Navy military personnel, dependents living on base, civilian employees).

Upon completion of the GTF initiative and its goal of maintaining a 2:1 "dwell-to-deploy" ratio of assigned personnel, i.e., two persons are on-base (dwell) for every one that is deployed, the average number of people on the base will be 17,490, or about 5.1% more than the existing population; this increase over a period of 8 years would average to 0.6% per year, which is consistent with the expected increase in traffic on other roadways on Oahu.

The increase in population on MCBH Kaneohe Bay is expected to affect peak hour volumes on the roadways approaching the base. If peak hour traffic volumes have a proportionate increase, the highest increase in hourly traffic on the H-3 Freeway between the H-3 Gate and Mokapu Interchange would be about 70 vehicles per hour (5.1% of the existing 1,400 vehicles per hour in the AM Peak Hour). The highest increase in two-way traffic volume on Mokapu Road is estimated to be 60 vehicles per hour (5.1% of 9% of daily traffic of 13,000). These increases compare to the 100 vehicles per hour that has been recommended as a threshold for conducting a traffic impact study.

For roadways on the base, the location of work areas was used as an indicator of the changes in peak hour traffic demands. In evaluating traffic conditions, the base was divided into four quadrants, using the drainage way east of G Street as a north-south axis, with the east-west axis located approximately halfway between Mokapu Road and Third Street. Major work areas near the flight hangars and runway on the southwest side of the base are the major existing generators of traffic; lesser activity is currently located in the northwest portion (to include areas northwest of the runway, which are accessed by crossing the runway at Mokapu Road). The east side also has major activities, including commercial venues, both along the Mokapu Road corridor in the northeast and along Selden Street in the southeast.

The increase in personnel on-board the base was used to develop projections of future peak hour traffic demands. Factors developed by considering the work areas and traffic patterns were applied to the existing (counted) peak hour volumes. A slight decrease in population in the southwest quadrant is projected (-5%) with completion of GTF, as several projects that have been identified as part of the GTF effort will relocate some activities from this area to the southeast quadrant. In the southeast quadrant, a 30% increase in traffic has been projected. A 4% increase in traffic is projected along Mokapu Road in the northeast quadrant, and a 10% increase is expected in the northwest quadrant.

Figure 13 shows the estimates of average weekday traffic volumes on major streets on the base for the future baseline condition.

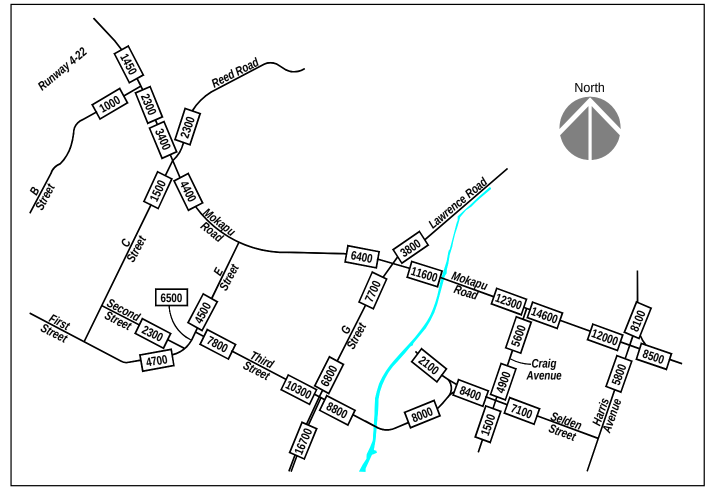

Figure 13 – Future Baseline Daily Traffic Volumes (2018)

The increased traffic volumes are expected to result in higher utilization throughout the peak hours (i.e., volumes during the peak hour would not vary as much as they do today). The "Peak Hour Factor" (PHF) is used in the traffic analyses to account for variations in traffic demand over the duration of the peak hour. With a PHF of 1.0, peak hour volume is 4 times the volume of the highest 15-minute period, i.e., volume is consistent throughout the peak hour; a PHF of 0.75 represents a condition with peaks within the peak hour, as the total volume in the hour would be only 3 times the volume of the highest 15-minute period. The range of PHF from the manual intersection movement counts was between 0.74 and 0.97. For the analyses of future peak hours, a PHF of 0.91 was used at all locations. The 2018 Baseline (with GTF) traffic assignments are shown in Figures 14 and 15.

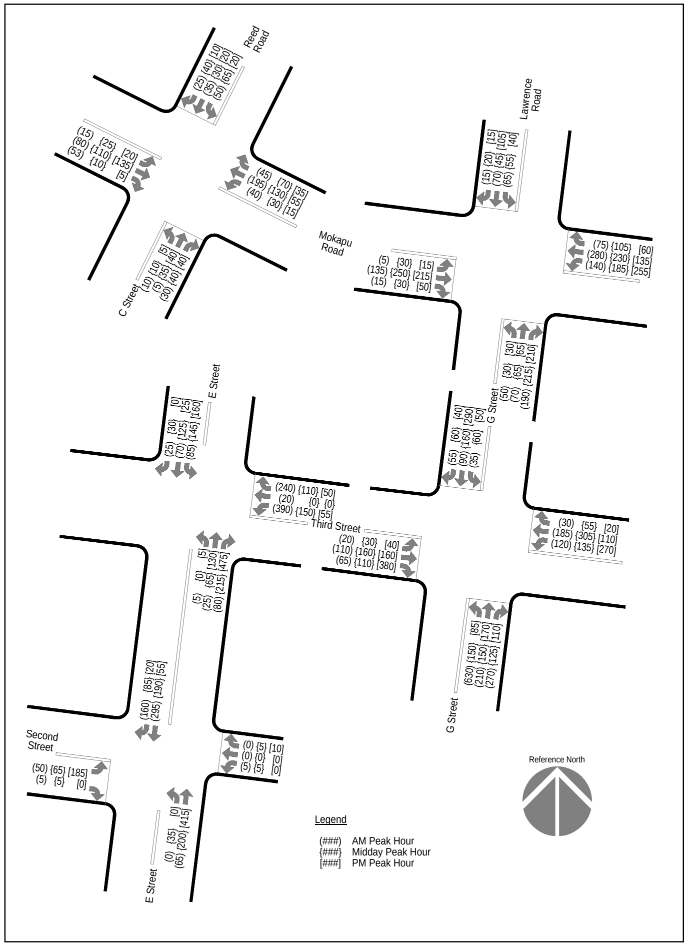

Figure 14 – Peak Hour Traffic Assignments – West Side (2018 Baseline)

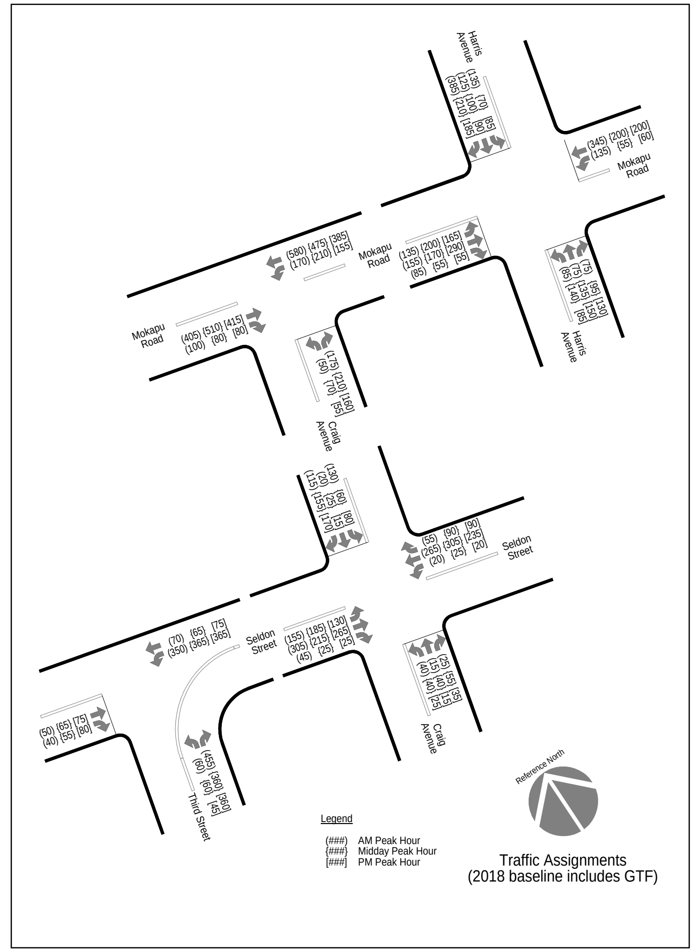

Figure 15 – Peak Hour Traffic Assignments – East Side (2018 Baseline)

The gate and intersection analyses were redone for the future baseline traffic assignments, assuming the short-term roadway improvements described in Section 3.3 above have been implemented and the signal timing optimized. The results of the analyses* are shown in Tables 12 and 13.

Table 12 – Future (2018) Baseline Conditions at Signalized Intersections

	AM Peak Hour			Midday Peak Hour			PM Peak Hour		
	V/C	AD	LOS	V/C	AD	LOS	V/C	AD	LOS
G Street and Third Street									
Southbound G Street	0.55	32.4	C	0.66	32.0	C	0.83	42.2	D
Northbound G Street	0.85	34.5	C	0.57	33.3	C	0.70	41.2	D
Westbound Third Street	0.75	34.5	C	0.83	29.2	C	0.86	37.1	D
Eastbound Third Street	0.26	17.8	B	0.31	13.8	B	0.33	15.5	B
Overall Intersection	**0.75**	**32.3**	**C**	**0.73**	**28.8**	**C**	**0.82**	**36.4**	**D**
Mokapu Road and Harris Avenue									
Southbound Harris Avenue	0.74	29.6	C	0.61	28.7	C	0.69	31.2	C
Northbound Harris Avenue	0.82	49.6	D	0.85	42.3	D	0.87	44.1	D
Westbound Mokapu Road	0.89	48.7	D	0.69	40.3	D	0.59	35.7	D
Eastbound Mokapu Road	0.75	41.6	D	0.71	36.8	D	0.82	38.5	D
Overall Intersection	**0.80**	**40.2**	**D**	**0.73**	**36.7**	**D**	**0.78**	**37.7**	**D**

V/C = utilization or volume/capacity ratio
AD = average delay per vehicle (seconds)
LOS = Level of Service

As peak hour traffic volumes increase, less variation in traffic volumes over the course of the peak hours is expected and both signalized intersections will provide adequate capacity for acceptable operating conditions.

With the exception of the intersection of Selden Street and Craig Avenue, all unsignalized intersections would operate at acceptable levels of service during the peak hours.

* In some cases conditions are better than existing despite having higher volumes, due to the assumption that peak hour volumes are spread out relatively even over the peak hour (PHF = 0.91). While the PHF cannot be accurately predicted, use of a reasonable and consistent PHF in evaluating future conditions will provide good comparisons of conditions with and without the proposed project, and the comparisons of these conditions are used to identify the project impacts.

Table 13 – Future (2018) Baseline Conditions at Unsignalized Intersections

	AM Peak Hour			Midday Peak Hour			PM Peak Hour		
	V/C	AD	LOS	V/C	AD	LOS	V/C	AD	LOS
C Street and Reed Road at Mokapu Road									
Reed Road southbound approach	0.23	14.1	B	0.28	14.7	B	0.09	11.6	B
Mokapu Road westbound left turn	0.03	7.5	A	0.02	7.5	A	0.01	7.5	A
Mokapu Road eastbound left turn	0.01	7.8	A	0.02	7.7	A	0.01	7.4	A
C Street northbound approach	0.07	10.6	B	0.15	12.1	B	0.13	11.1	B
Third Street at E Street									
E Street southbound left turn	0.06	7.6	A	0.13	8.3	A	0.18	9.7	A
Third Street westbound right turn	0.27	10.1	A	0.14	10.0	A	0.08	11.2	B
Third Street westbound left turn/thru	0.73	25.1	D	0.45	22.3	C	0.20	20.0	C
E Street northbound left turn	0.00	7.4	A	0.00	7.6	A	0.00	7.3	A
Relocated Second Street at First Street									
Second Street southbound approach	0.13	13.2	B	0.22	16.4	C	0.65	30.1	D
First Street eastbound left turn	0.00	8.9	A	0.04	8.4	A	0.00	7.7	A
G Street and Mokapu Road (All-way Stop)									
Southbound Lawrence Road	0.33	13.6	B	0.29	14.1	B	0.38	15.2	C
Northbound G Street	0.36	12.5	B	0.45	14.4	B	0.43	13.9	B
Westbound Mokapu Road	0.68	19.1	C	0.68	19.9	C	0.58	17.4	C
Eastbound Mokapu Road	0.33	13.2	B	0.67	22.9	C	0.60	20.1	C
Overall Intersection	--	**15.7**	**C**	--	**18.7**	**C**	--	**22.2**	**C**
Craig Avenue at Mokapu Road									
Mokapu Road westbound left turn	0.19	9.6	A	0.26	10.4	B	0.17	9.4	A
Craig Avenue northbound approach	0.63	28.9	D	0.51	24.7	C	0.56	24.3	C
Craig Avenue and Selden Street (All-way Stop)									
Southbound Craig Street	0.55	17.8	C	0.51	17.2	C	0.50	15.3	C
Westbound Selden Street	0.66	20.7	C	0.82	32.6	D	0.62	18.0	C
Eastbound Selden Street	0.94	47.9	E	0.85	36.4	E	0.75	24.8	C
Northbound Craig Street	0.18	12.4	B	0.31	14.1	B	0.16	11.3	B
Overall Intersection	--	**31.1**	**D**	--	**28.9**	**D**	--	**19.5**	**C**
Third Street at Selden Street									
Selden Street westbound left turn	0.21	7.9	A	0.21	7.9	A	0.24	8.1	A
Third Street northbound left turn	0.20	20.4	C	0.17	19.6	C	0.19	23.4	C
Selden Street eastbound right turn	0.05	10.3	B	0.07	10.3	B	0.12	11.0	B
Third Street northbound right turn *	0.41	11.0	B	0.31	10.2	B	0.37	10.7	B

V/C = utilization or volume/capacity ratio
AD = average delay per vehicle (seconds)
LOS = Level of Service

The poor conditions on the eastbound Selden Street approach at the Craig Avenue intersection can be mitigated with the addition of separate left turn lanes on Selden Street (there is sufficient existing pavement width to add a turn lane if the existing bicycle lane is removed near the intersection; shared use of the roadway by motorized vehicles and bicycles could be emphasized by using wider lanes with “sharrow” pavement markings, as shown in Figure 16). Table 14 shows the results of the intersection analyses for the mitigated case.

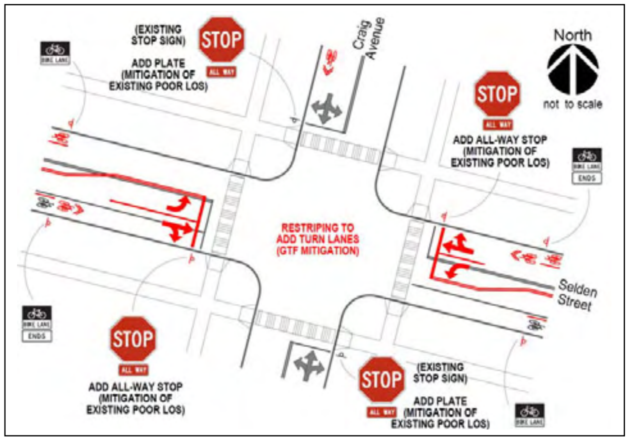

Figure 16 – Intersection Improvements at Selden Street and Craig Avenue

Table 14 – Mitigated Baseline Conditions at Selden Street and Craig Avenue

	AM Peak Hour			Midday Peak Hour			PM Peak Hour		
	V/C	AD	LOS	V/C	AD	LOS	V/C	AD	LOS
Southbound Craig Street	0.50	15.3	C	0.46	14.8	B	0.47	13.8	B
Westbound Selden Street	0.58	17.3	C	0.72	23.3	C	0.56	16.0	C
Eastbound Selden Street	0.61	16.6	C	0.44	14.6	B	0.50	13.9	B
Northbound Craig Street	0.17	11.3	B	0.28	12.5	B	0.15	10.6	B
Overall Intersection	**--**	**16.1**	**C**	**--**	**17.3**	**C**	**--**	**14.2**	**B**

V/C = utilization or volume/capacity ratio
AD = average delay per vehicle (seconds)
LOS = Level of Service

4.2 Traffic Conditions with the Project (Aviation Plan)

The Aviation Plan will further increase the number of persons on MCBH Kaneohe Bay. The additional air squadrons will include 1,000 military personnel accompanied by 1,100 dependents and a small number of new civilian employees. With a 2:1 dwell-deploy ratio and assuming all dependents are housed on-base and will remain during the service member’s deployment, the Aviation Plan will increase the average number of people on the base by another 1,800 persons, to a total 19,300 persons, an increase of 16.0% over existing, or another 10.3% over the future case without the Aviation Plan.

For a proportionate increase in traffic volumes, the project impact on the H-3 Freeway between the MCBH Kaneohe Bay gate and the nearest on- and off-ramps (Mokapu Interchange) would be highest during the AM Peak Hour, during which there will be an increase of 153 vehicles (total in two directions) on the freeway. The greatest increase in traffic volume in one direction would also occur during the AM Peak Hour, when northbound volume would become 1,220 vehicles per hour, well below the capacity of two freeway lanes. South of Mokapu Interchange, the maximum project impact would be 96 vehicles per hour (total in two directions).

On Mokapu Road, the project impact has been computed to be 120 vehicles per hour just south of the gate, with the peak direction volume increasing to 650 vehicles per hour, significantly less than the estimated capacity of 2,000 vehicles per hour on two lanes of a divided collector street. Project impact on Mokapu Road just north of its intersection with Kaneohe Bay Drive has been estimated to be less than 90 vehicles per hour (total in two directions).

The project’s traffic impact to other roadways outside MCBH Kaneohe Bay has been estimated to be less than 100 vehicles per hour (total in two directions) during the highest hour. This impact would not be considered significant.

Increased demand entering the base will result in longer queues at the gates. The projected increase to 1,250 vehicles per hour at H-3 Gate will exceed the estimated current capacity of 1,200 vehicles per hour on two lanes with two sentries per lane checking two vehicles simultaneously. At the Mokapu Gate, the entering volume in the highest hour would be 685 vehicles per hour, which is closer to the estimated capacity of 720 vehicles per hour at that gate. Checking three vehicles simultaneously is estimated to increase capacities by 20%, which would reduce the delays and queues. The results of queuing analyses at the gates are summarized in Table 15.

Table 15 – Queuing at Gates

Parameter	H-3 Gate			Mokapu Gate		
	V	AD	Q	V	AD	Q
Existing	1,050	106	40	600	42	13
Future Baseline	1,100	129	47	620	47	14
Future with project	1,250	201	70	685	73	20
Future with project*	1,250	99	45	685	21	9

Note: * assumed 10% improvement in service time at gates (all others existing)
V = volume in vehicles per hour
AD = average delay in seconds
Q = Design queue in number of vehicles

At both gates, quicker processing of the identification checks will be required in order to accommodate the increased traffic demand, to decrease delay, and to limit queue lengths.

The Aviation Plan includes the relocation of some activities that currently occur on the west side of the base to the east side, with new facilities in the vacated spaces to provide operational and maintenance support for the new air squadrons. The relocation of the air terminal from the southwest corner of the base to a new site near the existing runway crossing, along with new facilities for the MV-22 aircraft, will move the center of activity along the east side of the runway to the north. No changes in the volume of vehicular traffic across the runway are anticipated as all new groundside activity will be located east of the runway. A review of the various projects in the Aviation Plan was used to

estimate the applicable factors for the impact of the Aviation Plan: 1.00 in the southwest quadrant, 2.00 in the northwest sector, 1.03 in the northeast sector, and 1.06 in the southeast sector.

Figure 17 shows the estimates of average weekday traffic volumes on major streets on the base for the Future with-Project condition.

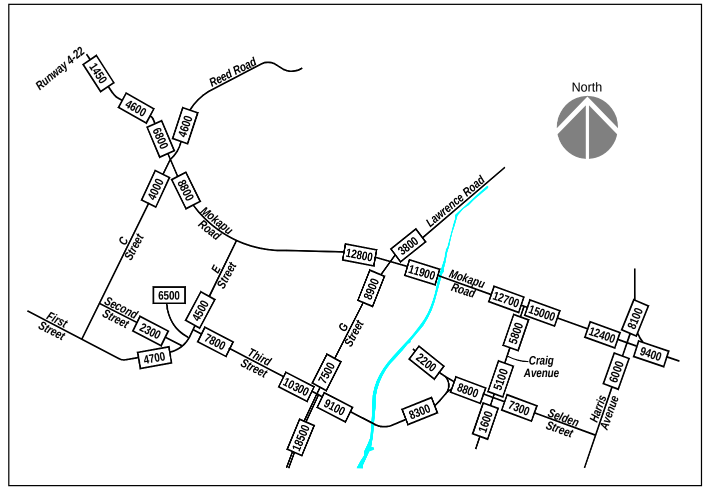

Figure 17 – Future with-Project Daily Traffic Volumes (2018)

The factors were also applied to the future baseline traffic assignments and the future with-project traffic assignments are shown in Figures 18 and 19.

The results of the intersection analyses for the with-project traffic assignments at the signalized intersections are shown in Table 16. The project impact at the two signalized intersections would be increased delays as the utilization of the intersection increases.

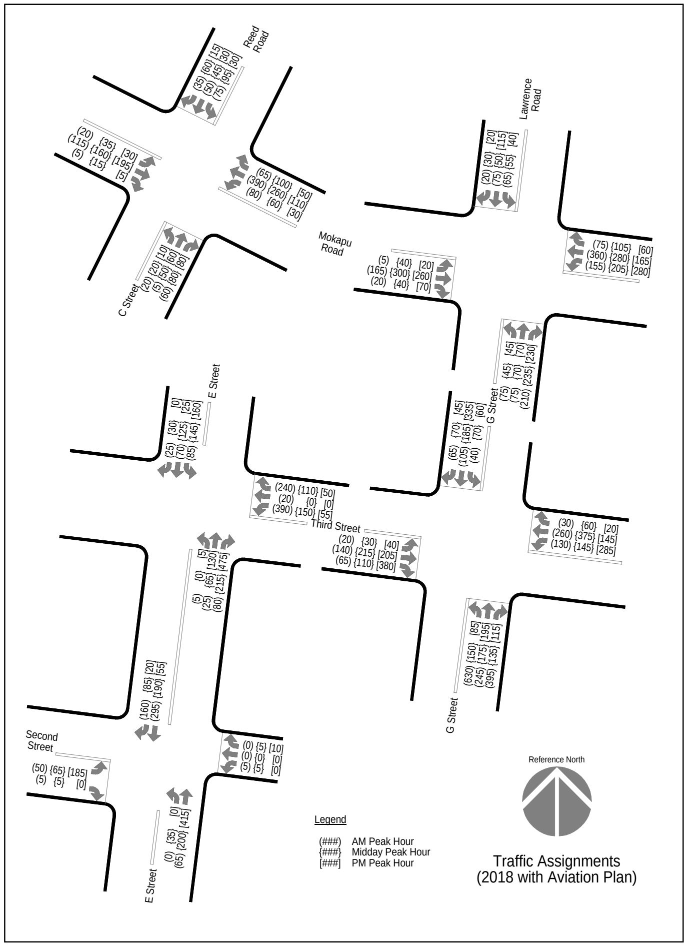

Figure 18 – Peak Hour Traffic Assignments – West Side (2018 with Project)

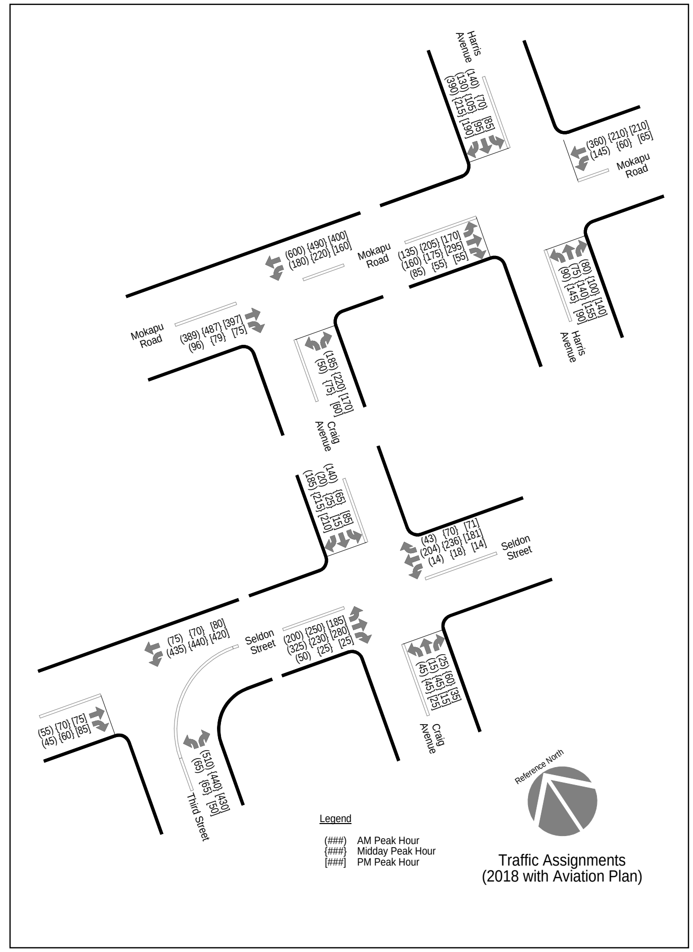

Figure 19 – Peak Hour Traffic Assignments – East Side (2018 with Project)

Table 16 – Future (2018) With-project Conditions at Signalized Intersections

	AM Peak Hour			Midday Peak Hour			PM Peak Hour		
	V/C	AD	LOS	V/C	AD	LOS	V/C	AD	LOS
G Street and Third Street									
Southbound G Street	0.67	41.4	D	0.88	52.1	D	0.90	54.6	D
Northbound G Street	0.90	44.2	D	0.66	40.8	D	0.74	49.1	D
Westbound Third Street	0.73	29.4	C	0.96	45.8	D	0.95	53.6	D
Eastbound Third Street	0.51	33.3	C	0.54	26.2	C	0.54	32.2	C
Overall Intersection	**0.81**	**40.0**	**D**	**0.89**	**42.7**	**D**	**0.90**	**49.4**	**D**
Mokapu Road and Harris Avenue									
Southbound Harris Avenue	0.75	30.3	C	0.62	29.1	C	0.71	31.9	C
Northbound Harris Avenue	0.86	54.3	D	0.88	46.3	D	0.92	51.1	D
Westbound Mokapu Road	0.93	53.7	D	0.72	42.0	D	0.62	37.0	D
Eastbound Mokapu Road	0.76	42.2	D	0.73	37.5	D	0.83	39.5	D
Overall Intersection	**0.82**	**42.7**	**D**	**0.76**	**38.4**	**D**	**0.78**	**40.1**	**D**

V/C = utilization or volume/capacity ratio
AD = average delay per vehicle (seconds)
LOS = Level of Service

The analyses results reported in Table 16 assume that a fourth phase is provided for unimpeded westbound left turns from Third Street to G Street. This fourth phase will be needed for acceptable peak hour levels of service.

Table 17 shows the results of the analyses at the unsignalized intersections, assuming the improvements identified previously have been implemented. The project impacts at unsignalized intersections are longer delays, but conditions would be acceptable at all locations except two intersections.

At the G Street, Mokapu Road, and Lawrence Road intersection, restriping crosswalks to minimize pedestrian crossing times along with adding pedestrian push buttons and vehicle detectors on all approaches to operate the signal with full actuation was considered, but the analyses showed that attaining even near-acceptable levels of service would require widening of Mokapu Road in both directions beyond the intersection.

Table 17 – Future (2018) With-project Conditions at Unsignalized Intersections

	AM Peak Hour			Midday Peak Hour			PM Peak Hour		
	V/C	AD	LOS	V/C	AD	LOS	V/C	AD	LOS
C Street and Reed Road at Mokapu Road									
Reed Road southbound approach	0.61	35.6	E	0.74	45.5	E	0.19	15.5	C
Mokapu Road westbound left turn	0.06	7.6	A	0.05	7.7	A	0.02	7.7	A
Mokapu Road eastbound left turn	0.02	8.4	A	0.03	8.2	A	0.02	7.6	A
C Street northbound approach	0.20	14.6	B	0.74	18.7	C	0.28	13.7	B
Third Street at E Street									
E Street southbound left turn	0.06	7.6	A	0.13	8.3	A	0.18	9.7	A
Third Street westbound right turn	0.27	10.1	B	0.14	10.0	A	0.08	11.2	B
Third Street westbound left turn/thru	0.73	25.1	D	0.45	22.3	C	0.20	20.0	C
E Street northbound left turn	0.00	7.4	A	0.00	7.6	A	0.00	7.3	A
Relocated Second Street at First Street									
Second Street southbound approach	0.13	13.2	B	0.22	16.4	C	0.65	30.1	D
First Street eastbound left turn	0.00	8.9	A	0.04	8.4	A	0.00	7.7	A
G Street, Lawrence Road, and Mokapu Road (All-way Stop)									
Southbound Lawrence Road	0.38	15.4	C	0.41	18.7	C	0.46	18.5	C
Westbound Mokapu Road	0.84	29.4	D	0.94	43.7	E	0.70	23.2	C
Eastbound Mokapu Road	0.42	15.6	C	1.04	82.6	F	0.82	36.4	E
Northbound G Street	0.43	14.6	B	0.67	22.3	C	0.52	16.9	C
Overall Intersection	**--**	**21.4**	**C**	**--**	**46.5**	**E**	**--**	**24.4**	**C**
Craig Avenue at Mokapu Road									
Mokapu Road westbound left turn	0.21	9.8	A	0.27	10.6	B	0.18	9.6	A
Craig Avenue northbound approach	0.68	32.5	D	0.54	27.3	C	0.63	27.9	C
Craig Avenue and Selden Street (All-way Stop)									
Southbound Craig Street	0.69	22.6	C	0.65	21.9	C	0.57	17.0	C
Westbound Selden Street	0.68	22.9	C	0.86	38.4	E	0.63	19.4	C
Eastbound Selden Street	0.72	22.0	C	0.61	20.3	C	0.55	16.0	C
Northbound Craig Street	0.20	12.6	B	0.35	15.1	C	0.16	11.3	B
Overall Intersection	**--**	**21.8**	**C**	**--**	**25.6**	**D**	**--**	**17.0**	**C**
Third Street at Selden Street									
Selden Street westbound left turn	0.31	8.4	A	0.32	8.4	A	0.30	8.4	A
Third Street northbound approach	0.57	16.4	C	0.49	16.4	C	0.48	14.8	B
Selden Street eastbound right turn	0.08	11.7	B	0.11	11.9	B	0.15	12.1	B

V/C = utilization or volume/capacity ratio
AD = average delay per vehicle (seconds)
LOS = Level of Service

Replacing the signalized intersection with a compact urban roundabout was also considered and found to provide acceptable conditions during the peak hours (Table 18). Appendix C provides additional information about the roundabout that was considered.

Table 18 – Future (2018) With-project Conditions at Roundabout G Street, Mokapu Road, and Lawrence Road

	AM Peak Hour			Midday Peak Hour			PM Peak Hour		
	V/C	AD	LOS	V/C	AD	LOS	V/C	AD	LOS
Lawrence Rd. southbound approach	0.33	11.2	B	0.27	9.6	A	0.33	10.3	B
Mokapu Road westbound approach	0.74	17.4	C	0.77	18.9	C	0.64	13.3	B
Mokapu Road eastbound approach	0.28	7.7	A	0.60	14.2	B	0.64	17.5	C
G Street northbound approach	0.51	11.0	B	0.60	15.7	C	0.54	12.9	B
Overall average for roundabout	**--**	**16.4**	**C**	**--**	**19.6**	**C**	**--**	**16.9**	**C**

V/C = utilization or volume/capacity ratio
AD = average delay per vehicle (seconds)
LOS = Level of Service

Another alternative that was considered is the realignment of the approaches of both G Street and Lawrence Road to Mokapu Road. These realignments would provide perpendicular approaches but the approaches would need to be located a minimum of 250 feet apart. Replacing a single, skewed four-way intersection with two perpendicular three-way intersections would reduce conflicts and improve pedestrian crossings.

However, the construction of either of these alternatives would require the use of lands that are part of the housing area, will have challenges in the maintenance of traffic during construction, and would likely have high construction costs.

A simpler alternative to improve traffic conditions would be limited widening of one or more of the approaches at the existing intersection. The widening of the eastbound approach (west leg) of Mokapu Road at the intersection with G Street and Lawrence Road was found to reduce delays to acceptable levels. A conceptual layout is shown in Figure 20.

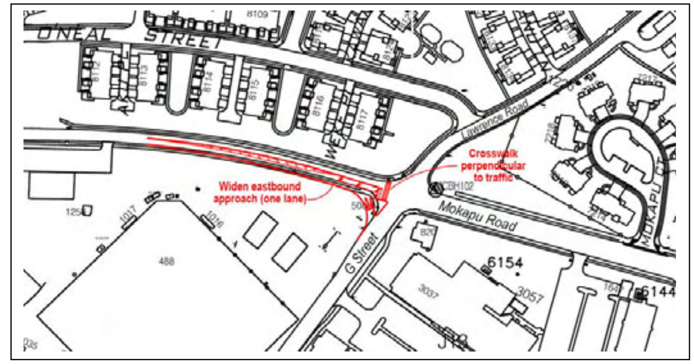

Figure 20 – Widening of Mokapu Road, west leg at G Street and Lawrence Street

In the proposed layout, a channelization island is provided to improve the pedestrian crossing of the west leg; for vehicular traffic, it will also improve the right turn onto G Street and separate several conflicting movements. The additional eastbound lane provided sufficient additional capacity to reduce average delays to acceptable levels.

Unacceptable conditions at two other locations can also be mitigated with minor improvements. At the intersection of Craig Avenue and Selden Street, the unacceptable level of service on the westbound approach in the midday peak hour can be mitigated by restriping the southbound approach to provide a separate right turn only lane.

At the intersection of C Street, Mokapu Road, and Reed Road, where very long delays would occur in the single lane at the southbound Reed Road approach, delays can be lessened and acceptable conditions provided with the addition of a separate right turn lane, as shown in Figure 21.

Table 19 shows the results of the reanalyses of three intersections with the added lanes as described above.

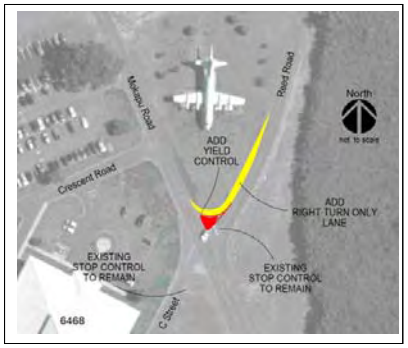

Figure 21 – Reed Road at Mokapu Road

Table 19 – Future (2018) With-project Conditions at Unsignalized Intersections (mitigated)

	AM Peak Hour			Midday Peak Hour			PM Peak Hour		
	V/C	AD	LOS	V/C	AD	LOS	V/C	AD	LOS
C Street and Reed Road at Mokapu Road									
Reed Road southbound approach	0.55	30.3	D	0.65	34.2	D	0.17	15.1	C
Mokapu Road westbound left turn	0.06	7.6	A	0.05	7.7	A	0.02	7.7	A
Mokapu Road eastbound left turn	0.02	8.4	A	0.03	8.2	A	0.02	7.6	A
C Street northbound approach	0.20	14.6	B	0.74	18.7	C	0.28	13.7	B
G Street, Lawrence Road, and Mokapu Road (All-way Stop)									
Southbound Lawrence Road	0.36	14.4	B	0.36	15.9	C	0.42	16.5	C
Westbound Mokapu Road	0.82	27.5	D	0.87	34.5	D	0.67	21.2	C
Eastbound Mokapu Road	0.37	14.4	B	0.74	27.4	D	0.68	24.0	C
Northbound G Street	0.42	14.0	B	0.62	19.3	C	0.50	15.7	C
Overall Intersection	--	**20.2**	**C**	--	**27.0**	**D**	--	**19.9**	**C**
Craig Avenue and Selden Street (All-way Stop)									
Southbound Craig Street	0.38	14.0	B	0.43	14.5	B	0.37	12.6	B
Westbound Selden Street	0.65	21.1	C	0.82	33.6	D	0.62	18.4	C
Eastbound Selden Street	0.69	20.1	C	0.58	18.7	C	0.54	15.4	C
Northbound Craig Street	0.20	12.5	B	0.36	14.9	B	0.16	11.4	B
Overall Intersection	--	**18.3**	**C**	--	**22.0**	**C**	--	**15.3**	**C**

V/C = utilization or volume/capacity ratio
AD = average delay per vehicle (seconds)
LOS = Level of Service

4.3 Project Impact on Runway Crossing

Traffic on Mokapu Road is stopped at the approaches to the runway when the runway or parallel taxiways are in use. Vehicular traffic is controlled by traffic signals on each side of the runway; these signals are manually operated in conjunction with lighted gate arms that are lowered across the approach lane to reinforce the closure of the roadway. A sentry is present at each gate to assure that vehicles do not enter the runway/taxiway area when the signal is red and the gate lowered. Vehicular traffic on Mokapu Road is stopped for varying periods of time, from two minutes to as long as fifteen minutes, when the runway is used. Queues of up to fifteen vehicles on the Mokapu Road approaches on each side of the runway have been observed.

Field observations taken at various times during the two-week period when other traffic counts were being taken indicate that a typical closure of Mokapu Road is for a two- to three-minute duration. The gate is lowered when air traffic control is preparing for a take-off or landing on the runway, or when an aircraft needs to taxi across Mokapu Road (helicopter operations that do not use the portion of the runway near Mokapu Road do not require closure of the road to vehicular traffic). The gate closure time includes the approximately 35 seconds needed for a vehicle to travel the 1,250-foot distance between the gates. Traffic is stopped about 110 seconds prior to a take-off (or touch-and-go operation) and the gate is raised once the aircraft passes the crossing (takeoffs and landings were observed only in the northeast direction, i.e., Runway 4). Longer durations of road closure (about 3 minutes) were observed for landings, as traffic is typically stopped 90 seconds before the landing and the gate is kept in the lowered position (traffic stopped) until the landed aircraft is able to slow and turn around, and taxi southwest past Mokapu Road toward the terminal. Multiple aircraft operations kept vehicular traffic on Mokapu Road stopped for longer periods.

The Air Traffic Control Office at Marine Corps Air Station Kaneohe Bay reported that the number of aircraft operations totaled 65,338 in the one-year period from September 1, 2009 to August 31, 2010. Table 20 shows the daily aircraft operations and daily (two-way) traffic volume on Mokapu Road during a ten-day period in September. Due to the relatively light volume of aircraft operations, no hourly pattern of aircraft operation was discerned; while no formal observations were made as to the time-of-day aircraft operations occur, the operations that required road closure seemed to occur more frequently in the late-morning hours (1000-1200 hours) and the late-afternoon to early evening hours (1700-2000 hours).

Table 20 – Mokapu Road and Runway Conflicts

	Aircraft operations *	Vehicular traffic
07 September 2010 (Tuesday)	296	1,337
08 September 2010 (Wednesday)	380	1,408
09 September 2010 (Thursday)	342	1,282
10 September 2010 (Friday)	199	1,755
11 September 2010 (Saturday)	49	1,131
12 September 2010 (Sunday)	0	1,207
13 September 2011 (Monday)	239	1,471
14 September 2010 (Tuesday)	284	1,515
15 September 2010 (Wednesday)	298	1,926
16 September 2010 (Thursday)	158	1,966
17 September 2010 (Friday)	177	1,493
* Source: Air Traffic Control Office, MCAS Kaneohe Bay		

The data in Table 20 average to 264 weekday aircraft operations, and vehicular traffic on Mokapu Road across the runway averages 1,573 vehicles per day. Based on the sample, extrapolated annual totals are 71,100 aircraft operations and 530,500 vehicles.

With normal weekday airfield operations occurring between 0700 and 2400 hours on Mondays through Thursdays, between 0700 and 2200 hours on Fridays, and between 0800 and 1700 hours on Saturdays, the average number of aircraft operations was 13.3 per hour. Based on an estimate from the Air Operations

Office that 80% of the operations would require closure of Mokapu Road, the existing average-is 10.6 closures per hour during a typical weekday.

The highest recorded hourly volume of two-way traffic on Mokapu Road during the study period was 243 vehicles, although that volume included vehicles used by MCCS in their advance preparations for the BayFest airshow that occurred later in the month. The typical peak hour volume on Mokapu Road, however, was about 180 vehicles, with about 55% in the peak direction, and the peak hour occurred at various times of the day between 0700 and 1700 hours.

An operational analysis was performed on the traffic signal at the runway. For existing conditions with an estimated 80% of aircraft operations requiring Mokapu Road closure and with half of the aircraft operations assumed for takeoffs (2-minute closure) and half for landings (3-minute closure), the signalized intersection analysis procedure showed adequate capacity with the volume/capacity ratio in the peak direction at 0.14, but due to the long closure times, average delay per vehicle was 110 seconds.

Increasing the number of closures to account for 6 additional closures of Mokapu Road per hour due to airfield operations, the analysis shows the volume/capacity ratio increasing to 0.44 for the peak direction, and the average delay increasing to 170 seconds per vehicle.

Alternative A of the Aviation Plan proposes to realign a portion of Mokapu Road and relocate the southeast gate to provide a 250-foot separation from the edge of the runway clear zone, resulting in a longer crossing. With the plan showing the northwest gate remaining at its existing location within the runway clear zone and stops traffic on both Mokapu Road and Sumner Road, the crossing distance increases from 1,250 feet to 1,500 feet, and the clearance time (from the lowering of the near gate to the last vehicle passing the far gate) increases from 35 seconds to 45 seconds. Accounting for the increased time needed for ground vehicles to cross the runway, the results of the analysis are a volume/capacity ratio of 0.63 and an average delay of 200 seconds per vehicle. The analysis also found that with seven additional closures (instead of six), traffic volume will exceed capacity.

Alternative A of the Aviation Plan, therefore, will affect ground access across the runway, by a) increasing delays to drivers who wish to cross, as increases in the number of road closures are expected, and b) increasing the length of crossing, thereby requiring a longer duration of crossing to allow vehicles to completely traverse the runway.

An Alternative B would locate the MV-22 apron, hangar and support facilities on the northwest side of the runway, resulting in about three times the volume crossing the runway, far exceeding the capacity of Mokapu Road crossing at-grade. Alternative B includes an underpass to alleviate the need for frequent road closures during use of the runway; the at-grade crossing of the runway, however, would still be needed to allow overheight vehicles passage between the two sides of the runway.

The Aviation Plan also locates the MV-22 parking and maintenance areas and the operational areas on opposite sides of Mokapu Road. Movement of aircraft between these areas will not require the closure of Mokapu Road due to their ability to take-off and land like helicopters.

For future conditions, the Air Operations Office will continue to control vehicular crossing of the runway, and operate the traffic signals. Notices to regular users should be provided when the number or duration of road closures are to be higher than average.

4.4 Bikeway Improvements

The Public Works Office is preparing a bicycle master plan for the base. The proposed traffic improvements provide opportunities for bicycle facilities that will result in many benefits, including reduced traffic congestion, reduced automotive emissions, and improved user health and safety. These traffic improvements include the reduction in the number of lanes on portions of

Mokapu Road (with use of a Two-Way Left Turn Lane), and the addition of special pavement marking ("sharrows") on wide two-lane streets, such as Selden Street, Craig Avenue, and Harris Avenue south of Mokapu Road, to alert drivers of the shared use of the street.

5 Conclusions and Recommendations

Increases in the number of personnel on MCBH Kaneohe Bay are expected to result in increases in traffic demands. The impacts outside of the base will be minimal, but improved operations at the gates will be necessary to maintain mobility and decrease delays for traffic entering the base.

On the base, poor existing conditions can be addressed with traffic engineering improvements that will increase capacity, improve traffic operations, and decrease delays to users. These improvements should be programmed for implementation as soon as possible:

- upgrade the traffic signal system at the intersection of G Street and Third Street by adding pedestrian heads and push buttons for the south crosswalk, adding vehicular actuators for the Third Street approaches, and retiming the signal operation with an actuated east-west (Third Street) phase.
- modify the lane use on Mokapu Road at the westbound approach to the intersection with G Street and Lawrence Road, by having the through movement share the right lane instead of the left lane.
- channelize the intersection of Second Street and E Street by providing a new approach from Second Street that is perpendicular to the main flow of traffic and farther away from the E Street intersection with Third Street, to improve the driver's sight line and to increase opportunities to enter traffic.
- restripe parking stalls and reverse the flow in the parking lot between Building 213 and E Street to eliminate the existing exit at the intersection of E Street and Third Street.
- restripe Mokapu Road from G Street to Harris Avenue from the existing two lanes of traffic in each direction to one lane of traffic in each direction with a median lane that will be available for left turns, and at selected locations, for pedestrian refuge.

- convert lane assignments at the intersection of Mokapu Road and Harris Avenue to improve the distribution of traffic.
- reconfigure the intersection of Third Street and Selden Street to reduce driver confusion.
- convert the existing two-way stop at the intersection of Craig Avenue and Selden Street to an all-way stop control.

In addition to the improvements listed above, minor improvements would be necessary to adequately serve the small changes in traffic demands that are expected with full implementation of the Grow The Force (GTF) initiative:

- monitor and adjust signal timing as needed at the two existing signalized intersections.
- add left turn lanes on Selden Street at the intersection with Craig Avenue.

The proposed Aviation Plan project will further increase population and traffic volumes on the base. Additional improvements identified to address the traffic impacts of the Aviation Plan are:

- monitor and adjust signal timing as needed at the two existing signalized intersections.
- widen the eastbound Mokapu Road approach to G Street to provide an additional approach lane.
- widen the southbound Reed Road approach to Mokapu Road to mitigate anticipated very long delays at the stop sign.

These improvements will provide acceptable peak hour conditions on roadways within the base.

Improvements for bicycle facilities should also be considered as increased use of bicycles can provide many benefits, including reduced traffic congestion, reduced automotive emissions, and improved user health and safety. The reduction in the number of lanes on portions of Mokapu Road (with use of a Two-Way Left Turn Lane) provides an opportunity to add bicycle lanes on the existing street. Pavement marking ("sharrows") to alert drivers of the shared use of the wide two-lane streets, such as Selden Street, Craig Avenue, and Harris Avenue south of Mokapu Road, should be considered.

APPENDIX A

Manual Traffic Count Summaries

Intersection of G Street and Third Street (signalized) - Wednesday 08 September 2010

	Third Street			G Street			G Street			Third Street		
	Eastbound approach			Southbound approach			Northbound approach			Westbound approach		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
AM peak period counts taken by Belt Collins Hawaii Ltd												
6:00 - 6:15	3	12	11	4	15	7	105	47	50	16	18	2
6:15 - 6:30	5	26	14	5	10	13	159	39	67	20	35	8
6:30 - 6:45	**5**	**25**	**12**	**7**	**20**	**14**	**153**	**56**	**47**	**22**	**39**	**6**
6:45 - 7:00	**4**	**21**	**19**	**7**	**16**	**11**	**170**	**44**	**69**	**25**	**35**	**3**
7:00 - 7:15	**4**	**49**	**16**	**8**	**19**	**15**	**185**	**59**	**91**	**18**	**30**	**4**
7:15 - 7:30	**7**	**22**	**21**	**9**	**32**	**11**	**155**	**40**	**78**	**27**	**40**	**9**
7:30 - 7:45	8	39	25	9	26	27	107	52	26	11	44	11
7:45 - 8:00	6	31	15	3	19	21	105	50	41	21	44	6
Count total	42	225	133	52	157	119	1,139	387	469	160	285	49
6:30 - 7:30	20	117	68	31	87	51	663	199	285	92	144	22
peak hour PHF	0.71	0.60	0.81	0.86	0.68	0.85	0.90	0.84	0.78	0.85	0.90	0.61
Midday counts taken by Island Traffic Data Service												
11:00 - 11:15	11	41	24	11	28	8	16	25	22	40	36	10
11:15 - 11:30	20	47	22	5	32	12	25	32	16	27	40	5
11:30 - 11:45	19	61	41	13	38	8	34	30	25	37	57	12
11:45 - 12:00	13	36	16	18	35	13	30	30	12	24	36	6
12:00 - 12:15	**9**	**55**	**45**	**16**	**50**	**20**	**41**	**38**	**27**	**33**	**53**	**11**
12:15 - 12:30	**6**	**40**	**20**	**10**	**39**	**8**	**27**	**44**	**17**	**19**	**47**	**7**
12:30 - 12:45	**5**	**30**	**18**	**12**	**31**	**8**	**36**	**24**	**20**	**27**	**58**	**15**
12:45 - 13:00	**9**	**46**	**32**	**21**	**31**	**19**	**53**	**35**	**34**	**24**	**78**	**10**
Count total	92	356	218	106	284	96	262	258	173	231	405	76
12:00 - 13:00	29	171	115	59	151	55	157	141	98	103	236	43
peak hour PHF	0.81	0.78	0.64	0.70	0.76	0.69	0.74	0.80	0.72	0.78	0.76	0.72
PM peak period counts taken by Island Traffic Data Service												
15:00 - 15:15	7	47	87	25	52	7	33	26	11	48	37	9
15:15 - 15:30	7	30	70	18	63	13	31	26	11	38	22	1
15:30 - 15:45	10	42	146	13	121	13	20	26	15	56	21	2
15:45 - 16:00	6	25	41	6	38	6	8	17	6	30	14	4
16:00 - 16:15	**20**	**63**	**161**	**14**	**79**	**9**	**22**	**31**	**23**	**60**	**27**	**4**
16:15 - 16:30	**11**	**50**	**101**	**8**	**57**	**11**	**23**	**44**	**24**	**54**	**18**	**9**
16:30 - 16:45	**8**	**28**	**112**	**22**	**93**	**13**	**30**	**68**	**30**	**54**	**18**	**2**
16:45 - 17:00	**4**	**28**	**25**	**4**	**49**	**7**	**16**	**21**	**6**	**38**	**20**	**2**
17:00 - 17:15	20	47	72	9	55	17	18	39	22	31	31	3
17:15 - 17:30	6	39	26	2	40	9	19	35	20	33	17	9
17:30 - 17:45	5	10	18	10	31	8	17	29	16	34	13	3
17:45 - 18:00	6	12	11	7	48	8	12	38	16	52	21	8
Count total	110	421	870	138	726	121	249	400	200	528	259	56
16:00 - 17:00	43	169	399	48	278	40	91	164	83	206	83	17
peak hour PHF	0.54	0.67	0.62	0.55	0.75	0.77	0.76	0.60	0.69	0.86	0.77	0.47

Intersection of E Street and Third Street (unsignalized) - Thursday 09 September 2010

	parking lot exit only			E Street			E Street			Third Street		
	Eastbound approach (stop)			Southbound approach			Northbound approach			Westbound approach (stop)		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
AM peak period counts taken by Belt Collins Hawaii Ltd												
6:00 - 6:15	0	0	0	2	16			1	10	82		24
6:15 - 6:30	0	0	0	6	26			1	15	114		40
6:30 - 6:45	0	0	0	6	20			3	6	93		55
6:45 - 7:00	**0**	**1**	**0**	10	**19**			**2**	**16**	**136**		**60**
7:00 - 7:15	**1**	**3**	**0**	13	**22**			**6**	**16**	**102**		**68**
7:15 - 7:30	**1**	**4**	**1**	18	**15**			**8**	**29**	**90**		**76**
7:30 - 7:45	**6**	**12**	**4**	24	**10**			**15**	**23**	**84**		**70**
7:45 - 8:00	2	7	1	13	9			11	29	54		49
Count total	10	27	6	92	137	0	0	47	144	755	0	442
6:45 - 7:45	8	20	5	65	66	0	0	31	84	412	0	274
peak hour PHF	0.33	0.42	0.31	0.68	0.75			0.52	0.72	0.76		0.90
Midday counts taken by Island Traffic Data Service												
11:00 - 11:15	**5**	**5**	**1**	**54**	**40**			**19**	**71**	**48**		**34**
11:15 - 11:30	**0**	**4**	**1**	**30**	**38**			**18**	**72**	**41**		**32**
11:30 - 11:45	**2**	**0**	**0**	**27**	**28**			**10**	**46**	**28**		**25**
11:45 - 12:00	**3**	**2**	**0**	**32**	**25**			**19**	**36**	**43**		**27**
12:00 - 12:15	1	2	0	43	35			24	48	49		28
12:15 - 12:30	3	1	1	27	24			17	47	54		29
12:30 - 12:45	3	1	1	29	26			28	38	51		35
12:45 - 13:00	1	0	0	20	18			6	14	54		32
Count total	18	15	4	262	234	0	0	141	372	368	0	242
11:00 - 12:00	10	11	2	143	131	0	0	66	225	160	0	118
peak hour PHF	0.50	0.55	0.50	0.66	0.82			0.87	0.78	0.83		0.87
PM peak period counts taken by Island Traffic Data Service												
15:00 - 15:15	4	0	3	43	21			30	118	48		18
15:15 - 15:30	0	0	0	27	10			12	72	23		18
15:30 - 15:45	3	0	2	29	9			36	127	17		9
15:45 - 16:00	1	0	0	29	6			8	77	21		23
16:00 - 16:15	**7**	**0**	**1**	**59**	**6**			**37**	**168**	**25**		**18**
16:15 - 16:30	**1**	**0**	**0**	**36**	**4**			**24**	**113**	**10**		**9**
16:30 - 16:45	**0**	**0**	**0**	**26**	**6**			**25**	**78**	**11**		**11**
16:45 - 17:00	**0**	**0**	**0**	**45**	**8**			**56**	**139**	**10**		**16**
17:00 - 17:15	1	0	0	15	2			10	35	7		7
17:15 - 17:30	1	0	0	15	4			9	83	14		16
17:30 - 17:45	0	0	0	8	1			3	13	7		6
17:45 - 18:00	2	0	0	15	3			4	39	10		9
Count total	20	0	6	347	80	0	0	254	1,062	203	0	160
16:00 - 17:00	8	0	1	166	24	0	0	142	498	56	0	54
peak hour PHF	0.29		0.25	0.70	0.75			0.63	0.74	0.56		0.75

APPENDIX A

Intersection of E Street and Second Street (unsignalized) - Thursday 09 September 2010

	Second Street			E Street			E Street			Second Street		
	Eastbound approach (stop)			Southbound approach			Northbound approach			Westbound approach (stop)		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
AM peak period counts taken by Belt Collins Hawaii Ltd												
6:00 - 6:15	3		0		80	18	0	8		0	0	0
6:15 - 6:30	3		0		100	36	1	12		2	1	0
6:30 - 6:45	2		0		77	38	0	7		2	1	0
6:45 - 7:00	**6**		**0**		**100**	**53**	**0**	**12**		**3**	**1**	**0**
7:00 - 7:15	**9**		**0**		**84**	**38**	**0**	**13**		**1**	**0**	**0**
7:15 - 7:30	**19**	**2**	**3**		**68**	**39**	**0**	**19**		**0**	**1**	**0**
7:30 - 7:45	**12**	**2**	**1**		**59**	**40**	**1**	**27**		**0**	**0**	**0**
7:45 - 8:00	14		0		38	26	2	25		0	0	0
Count total	68	4	4	0	606	288	4	123	0	8	4	0
6:45 - 7:45	46	4	4	0	311	170	1	71	0	4	2	0
peak hour PHF	0.61	0.50	0.33		0.78	0.80	0.25	0.93		0.33	0.50	
Midday counts taken by Island Traffic Data Service												
11:00 - 11:15	37		1		45	24	14	68		3	2	4
11:15 - 11:30	36		1		41	22	16	51		0	0	1
11:30 - 11:45	25		0		23	12	4	32		1	0	0
11:45 - 12:00	**14**		**2**		**40**	**20**	**9**	**49**		**1**	**0**	**0**
12:00 - 12:15	**28**		**4**		**54**	**20**	**21**	**58**		**3**	**0**	**2**
12:15 - 12:30	**17**		**0**		**53**	**23**	**4**	**42**		**2**	**0**	**3**
12:30 - 12:45	**10**		**1**		**52**	**26**	**2**	**60**		**0**	**0**	**2**
12:45 - 13:00	12		0		42	23	1	36		1	0	0
Count total	179	0	9	0	350	170	71	396	0	11	2	12
11:45 - 12:45	69	0	7	0	199	89	36	209	0	6	0	7
peak hour PHF	0.62		0.44		0.92	0.86	0.43	0.87		0.50		0.58
PM peak period counts taken by Island Traffic Data Service												
15:00 - 15:15	47		0		49	23	2	96		3	0	1
15:15 - 15:30	32		1		27	7	0	54		1	0	1
15:30 - 15:45	44		1		19	7	2	118		0	1	6
15:45 - 16:00	25		2		22	5	2	66		1	0	0
16:00 - 16:15	**61**		**0**		**22**	**7**	**0**	**146**		**0**	**0**	**5**
16:15 - 16:30	**52**		**0**		**7**	**6**	**0**	**68**		**0**	**0**	**2**
16:30 - 16:45	**29**		**0**		**10**	**5**	**0**	**71**		**0**	**0**	**0**
16:45 - 17:00	**52**		**0**		**19**	**2**	**0**	**153**		**1**	**0**	**2**
17:00 - 17:15	10		0		9	0	0	38		0	0	1
17:15 - 17:30	15		1		17	3	0	81		1	0	1
17:30 - 17:45	1		0		3	1	0	17		0	0	0
17:45 - 18:00	6		0		7	3	0	38		0	0	0
Count total	374	0	5	0	211	69	6	946	0	7	1	19
16:00 - 17:00	194	0	0	0	58	20	0	438	0	1	0	9
peak hour PHF	0.80				0.66	0.71		0.72		0.25		0.45

APPENDIX A

Intersection of Harris Avenue and Mokapu Road (signalized) - Monday 13 September 2010

	Mokapu Road			Harris Avenue			Harris Avenue			Mokapu Road		
	Eastbound approach			Southbound approach			Northbound approach			Westbound approach		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
AM peak period counts taken by Belt Collins Hawaii Ltd												
6:30 - 6:45	16	19	7	8	35	36	12	18	13	25	49	0
6:45 - 7:00	18	31	21	11	41	55	8	18	7	33	66	0
7:00 - 7:15	23	27	29	11	29	56	16	17	11	35	66	0
7:15 - 7:30	30	37	17	41	37	87	18	18	19	28	75	0
7:30 - 7:45	30	46	18	63	17	137	14	11	16	23	90	0
7:45 - 8:00	48	42	18	18	26	95	24	18	19	29	98	0
8:00 - 8:15	44	42	14	18	26	38	14	8	19	23	62	0
8:15 - 8:30	35	42	20	10	25	48	18	15	13	16	42	0
Count total	244	286	144	180	236	552	124	123	117	212	548	0
7:00 - 8:00	131	152	82	133	109	375	72	64	65	115	329	0
peak hour PHF	0.68	0.83	0.71	0.53	0.74	0.68	0.75	0.89	0.86	0.82	0.84	
Midday counts taken by Island Traffic Data Service												
11:00 - 11:15	**61**	**46**	**14**	**14**	**29**	**72**	**39**	**27**	**25**	**12**	**45**	**6**
11:15 - 11:30	**45**	**41**	**9**	**28**	**16**	**39**	**34**	**37**	**14**	**14**	**36**	**6**
11:30 - 11:45	**51**	**41**	**19**	**16**	**19**	**39**	**31**	**37**	**28**	**10**	**55**	**6**
11:45 - 12:00	**39**	**40**	**11**	**13**	**22**	**55**	**17**	**17**	**13**	**11**	**57**	**10**
12:00 - 12:15	68	59	24	13	11	47	27	18	12	13	76	9
12:15 - 12:30	40	42	24	14	18	48	15	17	15	13	40	4
12:30 - 12:45	33	38	19	17	29	53	14	13	10	23	52	12
12:45 - 13:00	25	50	31	20	44	91	8	16	12	23	50	11
Count total	362	357	151	135	188	444	185	182	129	119	411	64
11:00 - 12:00	196	168	53	71	86	205	121	118	80	47	193	28
peak hour PHF	0.80	0.91	0.70	0.63	0.74	0.71	0.78	0.80	0.71	0.84	0.85	0.70
PM peak period counts taken by Island Traffic Data Service												
15:30 - 15:45	20	56	14	25	25	46	9	13	13	15	57	14
15:45 - 16:00	22	44	8	21	17	52	12	17	22	9	49	9
16:00 - 16:15	33	55	15	15	21	60	10	21	15	13	51	14
16:15 - 16:30	30	54	12	19	16	45	5	15	9	8	29	5
16:30 - 16:45	42	56	8	24	23	47	25	25	31	13	30	5
16:45 - 17:00	**49**	**68**	**16**	**18**	**19**	**40**	**20**	**48**	**25**	**18**	**54**	**5**
17:00 - 17:15	**43**	**76**	**15**	**22**	**17**	**50**	**23**	**32**	**31**	**4**	**52**	**11**
17:15 - 17:30	**22**	**65**	**14**	**26**	**23**	**52**	**16**	**23**	**26**	**18**	**47**	**8**
17:30 - 17:45	**48**	**74**	**8**	**15**	**19**	**38**	**16**	**28**	**28**	**11**	**41**	**10**
17:45 - 18:00	16	59	8	21	20	68	3	17	8	11	61	12
18:00 - 18:15	18	48	4	14	19	36	8	22	20	8	54	7
18:15 - 18:30	31	50	4	18	13	39	8	17	8	7	43	11
Count total	374	705	126	238	232	573	155	278	236	135	568	111
16:45 - 17:45	162	283	53	81	78	180	75	131	110	51	194	34
peak hour PHF	0.83	0.93	0.83	0.78	0.85	0.87	0.82	0.68	0.89	0.71	0.90	0.77

APPENDIX A

Intersection of G Street, Lawrence Road, and Mokapu Road (signalized) - Tuesday 14 September 2010

	Mokapu Road			Lawrence Road			G Street			Mokapu Road		
	Eastbound approach			Southbound approach			Northbound approach			Westbound approach		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
AM peak period counts taken by Belt Collins Hawaii Ltd												
6:30 - 6:45	3	8	3	9	11	2	3	30	33	30	41	2
6:45 - 7:00	2	12	3	11	18	2	6	22	33	30	57	10
7:00 - 7:15	1	24	0	12	13	3	2	30	48	15	49	12
7:15 - 7:30	1	24	4	16	18	4	5	18	66	33	69	6
7:30 - 7:45	2	49	5	21	17	3	8	12	44	33	60	17
7:45 - 8:00	1	21	4	20	23	4	15	18	42	41	69	27
8:00 - 8:15	1	33	1	5	9	1	18	18	30	27	62	24
8:15 - 8:30	2	32	6	10	17	6	4	6	26	28	44	8
Count total	13	203	26	104	126	25	61	154	322	237	451	106
7:15 - 8:15	5	127	14	62	67	12	46	66	182	134	260	74
peak hour PHF	0.63	0.65	0.70	0.74	0.73	0.75	0.64	0.92	0.69	0.82	0.94	0.69
Midday counts taken by Island Traffic Data Service												
11:00 - 11:15	10	68	4	16	14	4	7	16	66	49	38	25
11:15 - 11:30	9	52	11	12	10	5	8	17	46	49	58	22
11:30 - 11:45	3	77	9	11	11	7	5	12	41	31	61	27
11:45 - 12:00	5	41	5	14	10	5	9	18	51	49	56	31
12:00 - 12:15	2	57	11	13	20	9	4	16	62	32	67	12
12:15 - 12:30	7	63	7	9	13	6	9	19	60	38	55	21
12:30 - 12:45	3	44	4	17	16	12	9	8	34	48	58	12
12:45 - 13:00	3	38	7	29	22	15	9	9	46	48	81	20
13:00 - 13:15	1	41	6	12	18	3	6	8	29	43	74	27
13:15 - 13:30	3	38	5	13	11	4	3	12	32	36	30	13
13:30 - 13:45	4	46	5	14	18	7	4	25	43	47	42	18
13:45 - 14:00	5	24	5	18	10	1	5	10	30	35	35	10
14:00 - 14:15	2	23	2	13	17	2	5	12	34	44	37	10
14:15 - 14:30	3	47	4	13	11	5	5	12	46	47	55	14
14:30 - 14:45	3	51	9	10	11	10	3	16	33	40	55	12
14:45 - 15:00	4	49	9	14	22	4	5	17	32	44	37	17
Count total	67	759	103	228	234	99	96	227	685	680	839	291
11:00 - 12:00	27	238	29	53	45	21	29	63	204	178	213	105
peak hour PHF	0.68	0.77	0.66	0.83	0.80	0.75	0.81	0.88	0.77	0.91	0.87	0.85
PM peak period counts taken by Island Traffic Data Service												
15:30 - 15:45	6	58	14	14	45	6	14	14	57	81	35	17
15:45 - 16:00	3	37	12	5	18	4	5	14	38	73	34	13
16:00 - 16:15	2	56	10	10	23	2	4	14	53	44	32	12
16:15 - 16:30	4	56	10	10	17	2	4	20	51	47	24	17
16:30 - 16:45	3	54	9	9	28	1	8	14	51	46	27	10
16:45 - 17:00	6	54	7	16	23	2	13	12	71	71	38	18
17:00 - 17:15	4	35	6	18	28	1	3	10	44	56	18	10
17:15 - 17:30	2	34	13	12	21	3	8	16	45	65	31	16
17:30 - 17:45	5	34	14	9	19	6	5	10	39	45	13	10
17:45 - 18:00	2	23	9	16	14	3	3	5	29	29	22	13
18:00 - 18:15	2	16	6	12	23	2	2	10	42	46	15	15
18:15 - 18:30	3	11	6	10	13	1	4	17	35	32	13	10
Count total	42	468	116	141	272	33	73	156	555	635	302	161
15:30 - 16:30	15	207	46	39	103	14	27	62	199	245	125	59
peak hour PHF	0.63	0.89	0.82	0.70	0.57	0.58	0.48	0.78	0.87	0.76	0.89	0.87

APPENDIX A

Intersection of Seldon Street at Third Avenue - Wednesday 15 September 2010

	Seldon Street						Third Street			Seldon Street		
	Eastbound approach						Northbound approach			Westbound approach		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
AM peak period counts taken by Belt Collins Hawaii Ltd									*	*		
6:30 - 6:45		10	9				5		89	55	9	
6:45 - 7:00		3	5				5		77	72	2	
7:00 - 7:15		7	8				5		93	61	16	
7:15 - 7:30		10	6				22		115	71	16	
7:30 - 7:45		12	6				10		74	71	17	
7:45 - 8:00		10	9				11		66	67	5	
8:00 - 8:15		11	12				8		64	79	6	
8:15 - 8:30		8	12				10		79	58	12	
Count total		71	67				76		657	534	83	
7:00 - 8:00		39	29				48		348	270	54	
peak hour PHF		0.81	0.81				0.55		0.76	0.95	0.79	
Midday counts taken by Island Traffic Data Service												
11:00 - 11:15	0	4	5	0		0	7		68	80	14	0
11:15 - 11:30	0	13	9	0		0	14		59	60	10	1
11:30 - 11:45	0	18	18	0		1	17		71	75	14	0
11:45 - 12:00	1	15	11	0		0	7		78	66	10	1
12:00 - 12:15	0	7	12	1		0	3		54	64	5	0
12:15 - 12:30	3	7	9	1		0	5		66	67	8	0
12:30 - 12:45	1	9	5	0		0	12		64	68	9	1
12:45 - 13:00	0	4	3	0		0	8		69	78	16	1
Count total	5	77	72	2		1	73		529	558	86	4
11:00 - 12:00	1	50	43	0		1	45		276	281	48	2
peak hour PHF	0.25	0.69	0.60			0.25	0.66		0.88	0.88	0.86	0.50
PM peak period counts taken by Island Traffic Data Service												
15:30 - 15:45	0	11	9	0		0	17		96	83	10	2
15:45 - 16:00	2	9	8	0		0	17		67	61	11	2
16:00 - 16:15	0	12	12	1		0	5		68	52	5	0
16:15 - 16:30	0	16	17	0		0	4		62	74	8	3
16:30 - 16:45	1	16	24	1		0	9		80	94	25	1
16:45 - 17:00	0	13	4	2		0	3		62	55	8	0
17:00 - 17:15	0	12	3	0		1	4		51	54	15	2
17:15 - 17:30	0	10	5	0		0	5		74	52	11	0
17:30 - 17:45	0	16	14	2		0	5		66	60	13	0
17:45 - 18:00	0	9	7	0		0	6		45	35	13	0
18:00 - 18:15	0	10	6	0		0	4		54	63	17	2
18:15 - 18:30	0	12	6	2		0	4		38	42	24	0
Count total	3	146	115	8		1	83		763	725	160	12
15:45 - 16:45	3	53	61	2		0	35		277	281	49	6
peak hour PHF	0.38	0.83	0.64	0.50			0.51		0.87	0.75	0.49	0.50

APPENDIX A

Intersection of Craig Avenue (STOP signs) at Seldon Street - Wednesday 15 September 2010

	Seldon Street			Craig Avenue			Craig Avenue			Seldon Street		
	Eastbound approach			Southbound approach			Northbound approach			Westbound approach		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
AM peak period counts taken by Belt Collins Hawaii Ltd												
6:30 - 6:45	32	62	5	8	1	13	4	0	1	3	47	4
6:45 - 7:00	16	60	4	14	1	16	5	3	3	2	53	6
7:00 - 7:15	35	59	6	9	2	14	10	6	4	5	53	12
7:15 - 7:30	33	78	14	32	7	21	11	2	8	4	55	7
7:30 - 7:45	22	58	6	38	4	30	6	2	2	0	52	16
7:45 - 8:00	28	40	8	21	4	24	4	2	4	5	44	8
8:00 - 8:15	25	44	6	16	3	29	10	9	4	8	46	8
8:15 - 8:30	20	59	8	9	4	23	5	3	3	5	42	10
Count total	211	460	57	147	26	170	55	27	29	32	392	71
7:00 - 8:00	118	235	34	100	17	89	31	12	18	14	204	43
peak hour PHF	0.84	0.75	0.61	0.66	0.61	0.74	0.70	0.50	0.56	0.70	0.93	0.67
Midday counts taken by Island Traffic Data Service												
11:00 - 11:15	26	40	3	12	4	33	11	12	13	3	65	19
11:15 - 11:30	30	39	4	12	3	12	5	4	9	1	51	11
11:30 - 11:45	40	42	5	11	2	15	3	6	10	4	64	10
11:45 - 12:00	45	43	7	13	12	60	12	8	9	10	56	30
12:00 - 12:15	23	32	5	11	9	28	2	1	9	2	47	14
12:15 - 12:30	29	40	2	14	7	33	5	3	10	5	48	8
12:30 - 12:45	32	32	7	23	5	28	5	3	4	5	40	17
12:45 - 13:00	26	39	9	45	9	39	7	4	10	8	42	17
Count total	251	307	42	141	51	248	50	41	74	38	413	126
11:00 - 12:00	141	164	19	48	21	120	31	30	41	18	236	70
peak hour PHF	0.78	0.95	0.68	0.86	0.44	0.50	0.65	0.94	1.03	0.45	0.92	0.58
PM peak period counts taken by Island Traffic Data Service												
15:30 - 15:45	51	54	4	14	5	30	1	4	4	6	57	13
15:45 - 16:00	20	55	3	14	6	32	3	1	4	2	41	18
16:00 - 16:15	27	51	3	15	1	21	8	5	5	5	31	26
16:15 - 16:30	22	51	8	14	5	31	2	2	9	6	51	6
16:30 - 16:45	40	49	5	16	3	36	10	6	8	1	41	29
16:45 - 17:00	19	54	2	11	2	32	7	1	3	5	51	19
17:00 - 17:15	19	48	5	22	3	33	2	3	7	2	38	17
17:15 - 17:30	27	50	4	22	1	25	8	2	2	2	23	11
17:30 - 17:45	27	57	3	14	6	30	5	3	3	5	44	19
17:45 - 18:00	17	33	1	9	1	22	3	1	3	1	23	6
18:00 - 18:15	22	44	2	23	4	27	5	4	1	1	50	16
18:15 - 18:30	15	35	3	7	2	25	4	1	4	5	35	12
Count total	306	581	43	181	39	344	58	33	53	41	485	192
16:15 - 17:15	100	202	20	63	13	132	21	12	27	14	181	71
peak hour PHF	0.63	0.94	0.63	0.72	0.65	0.92	0.53	0.50	0.75	0.58	0.89	0.61

APPENDIX A

Intersection of C Street and Reed Road (STOPs) with Mokapu Road - Thursday 16 September 2010

	Mokapu Road			Reed Road			C Street			Mokapu Road		
	Eastbound approach			Southbound approach			Northbound approach			Westbound approach		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
AM peak period counts taken by Belt Collins Hawaii Ltd												
6:30 - 6:45	5	8	0	1	5	2	0	2	4	10	24	10
6:45 - 7:00	0	9	0	7	7	5	2	0	1	16	43	15
7:00 - 7:15	7	17	1	9	11	5	0	0	7	11	40	10
7:15 - 7:30	4	24	0	10	11	8	3	3	6	13	57	9
7:30 - 7:45	2	19	2	16	7	3	3	1	8	9	42	12
7:45 - 8:00	3	16	0	13	6	9	2	1	5	5	36	11
8:00 - 8:15	4	15	1	10	4	3	3	3	4	6	33	11
8:15 - 8:30	3	14	3	8	5	12	4	3	1	11	31	10
Count total	28	122	7	74	56	47	17	13	36	81	306	88
7:00 - 8:00	16	76	3	48	35	25	8	5	26	38	175	42
peak hour PHF	0.57	0.79	0.38	0.75	0.80	0.69	0.67	0.42	0.81	0.73	0.77	0.88
Midday counts taken by Island Traffic Data Service												
11:00 - 11:15	6	34	2	10	4	5	2	8	12	7	25	10
11:15 - 11:30	6	26	1	11	6	7	3	6	10	8	15	10
11:30 - 11:45	9	38	1	15	11	8	3	13	15	5	28	26
11:45 - 12:00	5	22	3	16	4	9	3	6	5	8	30	18
12:00 - 12:15	6	27	4	14	9	10	1	5	7	9	36	12
12:15 - 12:30	5	18	1	16	6	9	4	7	10	4	26	10
12:30 - 12:45	5	15	3	18	15	17	5	3	3	14	30	10
12:45 - 13:00	4	36	1	10	20	20	1	3	7	20	32	12
Count total	46	216	16	110	75	85	22	51	69	75	222	108
11:30 - 12:30	25	105	9	61	30	36	11	31	37	26	120	66
peak hour PHF	0.69	0.69	0.56	0.95	0.68	0.90	0.69	0.60	0.62	0.72	0.83	0.63
PM peak period counts taken by Island Traffic Data Service												
15:30 - 15:45	6	38	2	8	11	6	3	15	11	5	12	10
15:45 - 16:00	5	27	1	5	2	2	0	4	8	2	16	8
16:00 - 16:15	5	41	1	5	3	2	0	13	5	2	9	10
16:15 - 16:30	5	22	1	3	1	1	0	4	14	4	11	6
16:30 - 16:45	10	38	3	9	2	5	0	4	14	4	26	11
16:45 - 17:00	2	18	1	10	3	2	2	5	3	1	8	6
17:00 - 17:15	11	19	2	6	1	2	2	6	7	1	15	13
17:15 - 17:30	5	23	1	3	0	3	0	3	3	1	15	4
17:30 - 17:45	10	16	0	10	1	2	0	9	7	2	16	14
17:45 - 18:00	7	11	0	1	1	0	0	5	1	1	8	11
18:00 - 18:15	4	15	0	4	1	0	0	3	2	3	4	4
18:15 - 18:30	2	11	0	7	0	1	0	4	4	0	10	5
Count total	72	279	12	71	26	26	7	75	79	26	150	102
15:30 - 16:30	21	128	5	21	17	11	3	36	38	13	48	34
peak hour PHF	0.88	0.78	0.63	0.66	0.39	0.46	0.25	0.60	0.68	0.65	0.75	0.85

APPENDIX A

Intersection of Craig Avenue (STOP signs) at Mokapu Rd. - Thursday 16 September 2010												
	Mokapu Road						**Craig Avenue**			**Mokapu Road**		
	Eastbound approach			Southbound approach			Northbound approach			Westbound approach		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
AM peak period counts taken by Belt Collins Hawaii Ltd												
6:30 - 6:45		35	11				7		35	21	72	
6:45 - 7:00		50	19				10		37	26	98	
7:00 - 7:15		**63**	**23**				**14**		**39**	**37**	**122**	
7:15 - 7:30		**86**	**30**				**9**		**31**	**42**	**124**	
7:30 - 7:45		**105**	**27**				**11**		**38**	**31**	**163**	
7:45 - 8:00		**135**	**16**				**11**		**42**	**38**	**149**	
8:00 - 8:15		106	14				14		34	41	87	
8:15 - 8:30		74	10				12		19	37	83	
Count total		654	150				88		275	273	898	
7:00 - 8:00		389	96				45		150	148	558	
peak hour PHF		0.72	0.80				0.80		0.89	0.88	0.86	
Midday counts taken by Island Traffic Data Service												
11:00 - 11:15		**119**	**20**				**21**		**53**	**29**	**88**	
11:15 - 11:30		**149**	**21**				**14**		**43**	**58**	**143**	
11:30 - 11:45		**140**	**17**				**18**		**48**	**50**	**133**	
11:45 - 12:00		**79**	**21**				**6**		**35**	**42**	**90**	
12:00 - 12:15		77	29				11		25	28	67	
12:15 - 12:30		126	33				3		45	59	132	
12:30 - 12:45		83	15				10		24	36	79	
12:45 - 13:00		108	29				9		48	54	107	
13:00 - 13:15		87	21				8		38	34	94	
13:15 - 13:30		68	12				14		29	27	97	
13:30 - 13:45		86	21				28		30	25	140	
13:45 - 14:00		147	13				16		28	32	102	
14:00 - 14:15		67	8				12		16	23	88	
14:15 - 14:30		68	17				17		32	33	88	
14:30 - 14:45		87	15				5		33	18	88	
14:45 - 15:00		76	8				14		24	29	82	
Count total		1,567	300				206		551	577	1,618	
11:00 - 12:00		487	79				59		179	179	454	
peak hour PHF		0.82	0.94				0.70		0.84	0.77	0.79	
PM peak period counts taken by Island Traffic Data Service												
15:30 - 15:45		**97**	**27**				**9**		**30**	**38**	**127**	
15:45 - 16:00		**92**	**22**				**10**		**23**	**37**	**89**	
16:00 - 16:15		**111**	**12**				**15**		**32**	**30**	**71**	
16:15 - 16:30		**97**	**14**				**12**		**52**	**26**	**80**	
16:30 - 16:45		85	20				11		35	37	104	
16:45 - 17:00		92	14				16		33	42	84	
17:00 - 17:15		77	10				15		14	25	70	
17:15 - 17:30		86	12				11		29	27	71	
17:30 - 17:45		52	21				10		28	37	69	
17:45 - 18:00		71	14				8		27	33	77	
18:00 - 18:15		48	12				14		22	26	47	
18:15 - 18:30		35	9				20		24	21	44	
Count total		943	187				151		349	379	933	
15:30 - 16:30		397	75				46		137	131	367	
peak hour PHF		0.89	0.69				0.77		0.66	0.86	0.72	

APPENDIX B

Machine Count Summary

Machine counts on MCBH Kaneohe Bay - Mokapu Road near Runway

count date	5-Sep-10		6-Sep-10		7-Sep-10		8-Sep-10		9-Sep-10		10-Sep-10		11-Sep-10		12-Sep-10	
day of week	Sunday		Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday	
	to NW	to SE	to NW	to SE	to NW	to SE	to NW	to SE	to NW	to SE	to NW	to SE	to NW	to SE	to NW	to SE
12:00 AM - 12:15 AM			6	2	1	1	0	2	1	1	1	1	2	8	0	1
12:15 AM - 12:30 AM			1	0	0	0	0	0	0	1	2	0	2	0	0	1
12:30 AM - 12:45 AM			3	1	3	0	0	1	0	0	0	0	1	2	0	1
12:45 AM - 1:00 AM			1	2	0	0	1	0	0	0	1	1	1	2	1	1
1:00 AM - 1:15 AM			3	3	0	1	0	0	0	0	1	0	0	1	1	0
1:15 AM - 1:30 AM			0	2	0	0	0	0	0	0	0	1	1	4	0	1
1:30 AM - 1:45 AM			2	4	1	0	1	1	0	0	0	0	1	1	1	1
1:45 AM - 2:00 AM			0	2	0	1	1	0	0	0	0	0	0	0	0	0
2:00 AM - 2:15 AM			1	0	0	0	0	1	0	0	1	0	2	1	1	0
2:15 AM - 2:30 AM			1	2	0	0	0	0	1	0	0	0	0	1	0	0
2:30 AM - 2:45 AM			1	1	0	0	0	0	0	0	0	1	0	0	2	0
2:45 AM - 3:00 AM			0	0	0	0	0	1	0	0	1	0	1	0	0	1
3:00 AM - 3:15 AM			2	0	0	0	0	0	0	0	0	1	1	0	1	1
3:15 AM - 3:30 AM			0	0	1	1	0	0	0	0	0	0	0	0	1	0
3:30 AM - 3:45 AM			0	0	0	0	0	1	2	0	1	0	0	0	0	0
3:45 AM - 4:00 AM			0	1	0	0	0	0	0	1	0	0	1	0	0	2
4:00 AM - 4:15 AM			0	1	1	1	0	0	0	1	5	2	0	1	0	0
4:15 AM - 4:30 AM			0	0	1	1	1	0	0	0	1	1	(1)	1	0	0
4:30 AM - 4:45 AM			0	1	0	1	2	2	0	0	1	2	0	0	0	1
4:45 AM - 5:00 AM			0	0	0	0	0	1	0	0	1	1	0	0	0	0
5:00 AM - 5:15 AM			0	0	0	2	0	1	0	0	5	3	1	0	2	0
5:15 AM - 5:30 AM			1	0	1	1	0	0	0	0	6	0	3	0	10	2
5:30 AM - 5:45 AM			0	0	0	0	3	0	3	0	10	1	7	1	7	2
5:45 AM - 6:00 AM			0	0	2	0	6	1	3	0	10	3	3	1	5	0
6:00 AM - 6:15 AM			3	0	6	1	5	1	2	2	3	2	5	0	2	1
6:15 AM - 6:30 AM			3	1	4	6	19	5	4	2	2	3	9	1	3	0
6:30 AM - 6:45 AM			1	0	6	4	12	5	12	4	15	6	(3)	6	3	0
6:45 AM - 7:00 AM			5	3	18	3	12	5	15	7	13	9	1	1	2	4
7:00 AM - 7:15 AM			6	1	22	7	15	7	16	4	17	2	7	0	4	1
7:15 AM - 7:30 AM			8	2	18	10	24	7	24	10	23	6	9	2	5	5
7:30 AM - 7:45 AM			4	4	9	7	14	14	14	8	10	8	7	8	2	6
7:45 AM - 8:00 AM			2	3	11	10	9	13	18	9	9	7	2	6	2	12
8:00 AM - 8:15 AM			4	8	13	8	17	9	10	11	13	10	7	3	12	5
8:15 AM - 8:30 AM			9	4	16	8	22	12	15	10	18	12	7	5	11	8
8:30 AM - 8:45 AM			5	3	20	5	9	2	13	15	9	10	2	5	3	6
8:45 AM - 9:00 AM			9	4	12	12	10	26	15	11	9	7	6	3	7	2
9:00 AM - 9:15 AM			6	7	14	16	19	7	11	9	11	13	4	5	11	7
9:15 AM - 9:30 AM			6	10	12	11	20	20	23	8	14	16	11	4	6	10
9:30 AM - 9:45 AM			7	15	9	11	11	18	8	8	13	6	12	6	13	5
9:45 AM - 10:00 AM			8	11	13	13	14	8	21	26	16	11	3	9	3	7
10:00 AM - 10:15 AM			11	8	13	12	15	16	12	11	16	8	7	4	9	8
10:15 AM - 10:30 AM			12	13	9	9	17	14	12	11	11	10	17	2	13	11
10:30 AM - 10:45 AM			16	7	9	14	18	12	18	10	25	13	6	7	7	15
10:45 AM - 11:00 AM			16	15	12	14	10	17	14	20	32	19	9	9	16	9
11:00 AM - 11:15 AM			15	16	12	21	14	18	10	23	25	11	10	8	16	11
11:15 AM - 11:30 AM			20	12	21	10	23	13	18	10	16	25	9	12	14	6
11:30 AM - 11:45 AM			22	15	16	15	23	9	9	9	30	12	3	12	19	6
11:45 AM - 12:00 PM			18	10	17	9	15	11	12	5	21	32	9	10	20	18
12:00 PM - 12:15 PM	19	8	25	11	21	10	16	24	13	25	17	8	14	8	8	15
12:15 PM - 12:30 PM	15	13	20	19	11	14	16	9	15	13	27	23	11	8	16	14
12:30 PM - 12:45 PM	20	11	23	17	6	18	14	12	16	10	34	21	15	6	12	15
12:45 PM - 1:00 PM	25	15	18	14	17	17	12	20	18	11	29	17	15	10	16	16
1:00 PM - 1:15 PM	17	11	22	16	19	14	18	10	13	10	29	14	16	14	13	12
1:15 PM - 1:30 PM	14	18	18	20	15	1	16	17	10	13	27	23	10	9	17	22
1:30 PM - 1:45 PM	16	23	26	24	14	21	13	16	14	14	22	26	16	7	21	15
1:45 PM - 2:00 PM	15	14	19	16	15	9	17	0	12	6	22	23	16	10	23	14
2:00 PM - 2:15 PM	17	10	14	25	20	8	7	20	13	20	20	29	14	6	15	16
2:15 PM - 2:30 PM	15	11	22	13	18	24	10	15	13	2	14	27	10	14	18	10
2:30 PM - 2:45 PM	12	24	9	22	24	21	20	8	10	20	12	27	15	14	14	19
2:45 PM - 3:00 PM	13	14	13	22	11	23	7	17	12	8	13	13	9	12	13	11
3:00 PM - 3:15 PM	7	17	10	14	11	9	18	9	12	4	17	24	17	13	15	13
3:15 PM - 3:30 PM	18	13	12	14	13	9	11	17	9	8	14	17	15	19	14	17
3:30 PM - 3:45 PM	18	14	12	16	15	16	14	12	6	18	12	24	10	6	6	12
3:45 PM - 4:00 PM	13	24	15	11	6	10	25	22	12	10	17	13	8	10	15	15
4:00 PM - 4:15 PM	10	11	15	12	7	13	8	9	13	17	10	13	13	7	4	13
4:15 PM - 4:30 PM	6	15	9	19	10	7	7	25	9	10	13	9	14	16	10	17
4:30 PM - 4:45 PM	8	6	18	15	9	18	11	22	8	15	11	12	10	17	9	14
4:45 PM - 5:00 PM	8	16	12	23	9	16	7	10	14	26	9	12	12	11	9	13
5:00 PM - 5:15 PM	18	8	12	8	7	14	5	11	7	15	10	11	10	13	8	16
5:15 PM - 5:30 PM	6	23	1	10	5	14	6	11	3	12	8	23	15	9	11	11
5:30 PM - 5:45 PM	12	15	4	14	3	5	8	10	5	4	9	21	12	10	5	13
5:45 PM - 6:00 PM	7	6	14	22	4	7	6	11	4	7	11	12	8	16	11	16
6:00 PM - 6:15 PM	6	11	7	16	4	6	5	5	7	6	4	12	11	14	3	10
6:15 PM - 6:30 PM	8	4	10	12	8	3	6	11	5	5	6	11	7	12	6	6
6:30 PM - 6:45 PM	10	11	7	7	9	8	2	4	7	10	6	12	7	14	4	7
6:45 PM - 7:00 PM	8	8	5	16	11	14	2	7	7	5	8	3	6	6	4	7
7:00 PM - 7:15 PM	2	9	10	6	3	7	2	7	8	10	8	13	3	7	2	3
7:15 PM - 7:30 PM	2	7	3	7	4	2	2	5	1	6	1	7	5	6	2	4
7:30 PM - 7:45 PM	3	9	5	3	7	9	1	2	4	2	4	5	7	4	7	3
7:45 PM - 8:00 PM	3	4	2	3	5	9	1	0	2	2	5	2	5	6	2	3
8:00 PM - 8:15 PM	3	8	5	1	1	2	3	2	4	5	3	7	5	9	1	2
8:15 PM - 8:30 PM	6	4	5	1	3	4	2	3	1	2	5	6	6	6	3	7
8:30 PM - 8:45 PM	1	8	1	3	2	1	1	0	4	1	5	1	4	4	6	3
8:45 PM - 9:00 PM	4	0	3	1	3	2	5	2	2	2	5	1	3	4	4	3
9:00 PM - 9:15 PM	3	3	3	8	2	3	1	0	2	1	4	7	5	2	1	0
9:15 PM - 9:30 PM	3	1	6	4	3	0	2	2	3	2	8	2	3	2	6	9
9:30 PM - 9:45 PM	1	3	3	4	3	2	3	0	1	2	2	0	3	8	1	2
9:45 PM - 10:00 PM	4	2	1	2	2	0	5	3	2	2	1	1	6	3	2	2
10:00 PM - 10:15 PM	4	1	1	3	4	4	4	3	2	2	10	1	4	5	3	1
10:15 PM - 10:30 PM	2	0	2	2	2	2	1	3	1	0	3	5	3	0	1	5
10:30 PM - 10:45 PM	2	4	2	2	0	0	1	0	0	0	6	2	5	2	1	2
10:45 PM - 11:00 PM	1	2	0	3	1	0	3	0	0	1	1	2	2	2	1	0
11:00 PM - 11:15 PM	2	2	0	0	2	3	0	4	2	2	1	3	1	1	0	1
11:15 PM - 11:30 PM	2	2	0	0	0	0	0	0	1	2	3	0	0	2	0	0
11:30 PM - 11:45 PM	1	0	1	1	0	0	0	0	1	2	4	0	1	1	0	2
11:45 PM - 12:00 AM	1	6	1	0	0	0	1	0	0	1	1	5	1	1	0	0
24-hour			684	696	692	645	727	681	664	618	929	826	593	538	598	609
2-way totals			1,380		1,337		1,408		1,282		1,755		1,131		1,207	
count date	5-Sep-10		6-Sep-10		7-Sep-10		8-Sep-10		9-Sep-10		10-Sep-10		11-Sep-10		12-Sep-10	
day of week	Sunday		Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday	

Machine counts on MCBH Kaneohe Bay - Mokapu Road near Runway

count date	13-Sep-10		14-Sep-10		15-Sep-10		16-Sep-10		17-Sep-10		18-Sep-10		19-Sep-10		20-Sep-10	
day of week	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday		Monday	
	to NW	to SE	to NW	to SE	to NW	to SE	to NW	to SE	to NW	to SE	to NW	to SE	to NW	to SE	to NW	to SE
12:00 AM - 12:15 AM	0	0	0	1	1	0	1	0	1	0	4	1	2	3	0	0
12:15 AM - 12:30 AM	1	0	0	0	1	2	0	0	0	1	1	0	4	1	1	0
12:30 AM - 12:45 AM	0	1	2	1	0	0	2	0	0	0	1	1	2	3	2	0
12:45 AM - 1:00 AM	0	1	1	1	1	2	0	0	1	0	1	2	0	1	0	1
1:00 AM - 1:15 AM	1	0	0	1	0	0	1	2	1	0	1	4	3	2	0	1
1:15 AM - 1:30 AM	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0
1:30 AM - 1:45 AM	0	1	0	2	2	0	0	0	0	0	2	1	1	2	0	0
1:45 AM - 2:00 AM	1	0	0	0	0	2	0	0	1	0	1	0	1	0	0	0
2:00 AM - 2:15 AM	1	0	0	0	0	0	0	0	1	1	1	0	1	2	0	0
2:15 AM - 2:30 AM	0	1	0	0	0	0	0	0	0	1	0	1	0	2	1	0
2:30 AM - 2:45 AM	1	0	0	0	1	1	1	0	1	0	1	3	1	0	0	1
2:45 AM - 3:00 AM	0	0	1	0	0	0	0	0	0	0	0	1	1	1	0	0
3:00 AM - 3:15 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 AM - 3:30 AM	0	1	0	1	0	0	0	0	1	2	0	1	1	0	0	0
3:30 AM - 3:45 AM	0	0	0	0	2	2	1	1	0	0	1	1	0	1	0	0
3:45 AM - 4:00 AM	0	0	3	0	0	0	1	1	0	0	1	1	0	1	0	0
4:00 AM - 4:15 AM	0	0	0	0	0	1	1	1	1	1	2	0	0	1	0	0
4:15 AM - 4:30 AM	1	0	0	0	0	0	1	0	1	1	0	0	2	1	1	0
4:30 AM - 4:45 AM	1	2	0	0	2	1	1	0	0	0	0	0	0	1	0	1
4:45 AM - 5:00 AM	0	2	2	0	3	2	7	1	1	0	1	0	0	0	1	2
5:00 AM - 5:15 AM	1	0	1	1	1	4	8	1	0	0	1	0	2	0	1	2
5:15 AM - 5:30 AM	2	2	1	2	4	2	12	1	2	2	2	1	1	0	4	0
5:30 AM - 5:45 AM	3	2	2	2	1	1	10	1	1	2	3	0	2	0	8	0
5:45 AM - 6:00 AM	3	0	6	2	12	0	12	3	9	2	5	0	6	0	9	4
6:00 AM - 6:15 AM	8	4	7	0	17	4	9	3	7	4	7	1	5	4	7	15
6:15 AM - 6:30 AM	11	1	2	3	17	6	16	5	14	6	3	1	10	5	22	5
6:30 AM - 6:45 AM	9	8	15	7	10	6	12	8	18	4	4	1	6	6	14	10
6:45 AM - 7:00 AM	22	8	18	8	23	7	21	6	19	7	6	3	5	1	17	4
7:00 AM - 7:15 AM	21	7	24	8	30	8	30	15	14	6	9	1	8	15	27	11
7:15 AM - 7:30 AM	23	8	21	8	23	14	32	20	23	7	8	4	7	6	19	9
7:30 AM - 7:45 AM	9	2	11	12	29	8	23	14	16	9	8	3	9	8	15	10
7:45 AM - 8:00 AM	14	22	18	6	15	10	24	11	15	7	4	5	10	7	10	11
8:00 AM - 8:15 AM	11	8	17	4	17	3	19	16	12	5	10	6	8	3	15	7
8:15 AM - 8:30 AM	17	7	26	7	15	14	32	17	15	13	10	15	8	4	17	11
8:30 AM - 8:45 AM	4	6	16	8	13	12	22	10	12	11	6	8	7	18	16	7
8:45 AM - 9:00 AM	16	8	14	17	19	13	21	14	15	9	5	7	13	20	17	13
9:00 AM - 9:15 AM	9	12	14	11	15	22	22	11	10	15	14	8	17	9	12	15
9:15 AM - 9:30 AM	25	17	14	8	11	8	13	10	20	20	20	4	8	3	18	8
9:30 AM - 9:45 AM	16	11	15	6	18	20	21	23	16	10	7	8	17	11	15	14
9:45 AM - 10:00 AM	10	10	7	8	9	14	16	16	19	10	17	15	13	14	14	15
10:00 AM - 10:15 AM	14	8	22	19	8	10	18	6	9	17	11	7	5	4	16	10
10:15 AM - 10:30 AM	11	10	12	23	23	16	28	21	14	15	15	16	16	8	14	11
10:30 AM - 10:45 AM	23	11	15	20	21	10	22	15	11	16	20	11	13	5	18	12
10:45 AM - 11:00 AM	14	16	30	21	14	25	15	28	12	9	11	15	7	11	14	22
11:00 AM - 11:15 AM	21	31	14	27	14	24	10	26	16	21	12	13	10	12	15	26
11:15 AM - 11:30 AM	8	20	18	14	12	20	12	16	16	12	9	9	7	14	20	13
11:30 AM - 11:45 AM	16	8	15	14	26	13	21	23	13	14	22	4	8	12	14	12
11:45 AM - 12:00 PM	12	15	14	16	14	11	31	10	11	13	19	11	7	9	13	18
12:00 PM - 12:15 PM	19	11	12	9	27	16	26	18	11	13	11	13	11	6	28	7
12:15 PM - 12:30 PM	18	15	17	10	22	22	23	13	23	14	14	14	11	4	20	32
12:30 PM - 12:45 PM	21	15	18	11	24	19	23	10	13	6	19	11	11	8		
12:45 PM - 1:00 PM	20	17	34	13	38	25	16	28	22	14	16	9	21	8		
1:00 PM - 1:15 PM	18	15	27	9	36	21	17	38	14	7	5	11	12	19		
1:15 PM - 1:30 PM	18	9	17	14	26	34	16	16	15	8	11	12	17	9		
1:30 PM - 1:45 PM	17	10	20	16	32	14	14	29	18	15	20	10	9	8		
1:45 PM - 2:00 PM	18	15	23	29	28	14	22	22	12	10	12	12	15	20		
2:00 PM - 2:15 PM	13	17	13	26	38	13	26	28	11	13	18	13	8	13		
2:15 PM - 2:30 PM	13	13	17	32	28	11	23	72	23	13	14	16	13	9		
2:30 PM - 2:45 PM	27	19	21	13	20	24	22	28	24	9	12	17	6	15		
2:45 PM - 3:00 PM	9	13	14	12	24	13	16	21	20	30	11	14	17	12		
3:00 PM - 3:15 PM	16	23	10	16	12	19	11	12	13	40	16	10	10	12		
3:15 PM - 3:30 PM	19	15	7	10	8	20	18	19	14	15	19	17	4	13		
3:30 PM - 3:45 PM	7	7	10	19	7	14	16	17	15	19	16	27	13	23		
3:45 PM - 4:00 PM	12	27	9	17	8	7	14	21	10	19	13	25	11	10		
4:00 PM - 4:15 PM	8	11	11	11	12	22	8	17	6	14	15	26	24	10		
4:15 PM - 4:30 PM	12	23	13	16	13	17	9	13	11	9	15	14	16	12		
4:30 PM - 4:45 PM	9	22	6	32	17	24	16	22	7	12	10	17	8	18		
4:45 PM - 5:00 PM	16	11	5	10	20	12	17	14	14	15	12	5	7	8		
5:00 PM - 5:15 PM	8	8	5	11	10	16	13	12	20	14	20	5	7	12		
5:15 PM - 5:30 PM	7	18	5	10	10	10	8	11	14	9	11	8	9	16		
5:30 PM - 5:45 PM	5	8	7	8	10	8	7	15	5	8	10	12	7	6		
5:45 PM - 6:00 PM	3	9	8	4	9	12	6	7	7	12	7	16	5	5		
6:00 PM - 6:15 PM	7	10	7	9	7	12	4	15	5	9	9	13	5	3		
6:15 PM - 6:30 PM	11	6	9	8	8	18	10	6	7	10	10	8	6	10		
6:30 PM - 6:45 PM	2	6	5	11	10	11	11	9	7	21	3	4	3	8		
6:45 PM - 7:00 PM	2	6	3	4	2	7	3	3	5	9	3	6	5	11		
7:00 PM - 7:15 PM	8	3	3	7	2	11	6	11	1	9	7	4	2	5		
7:15 PM - 7:30 PM	1	6	1	3	3	4	4	3	5	0	3	5	4	4		
7:30 PM - 7:45 PM	3	1	4	1	6	5	3	2	5	3	3	2	1	6		
7:45 PM - 8:00 PM	3	4	2	2	8	13	5	4	3	3	1	2	5	3		
8:00 PM - 8:15 PM	5	5	4	1	6	8	2	4	4	3	2	0	3	3		
8:15 PM - 8:30 PM	4	4	2	1	10	6	3	1	5	3	2	6	5	3		
8:30 PM - 8:45 PM	3	1	3	2	5	4	2	6	3	1	5	6	1	8		
8:45 PM - 9:00 PM	3	3	2	4	7	7	2	5	1	5	4	3	1	0		
9:00 PM - 9:15 PM	4	3	3	2	0	3	3	4	2	3	3	7	1	3		
9:15 PM - 9:30 PM	2	3	5	0	3	5	2	3	3	2	5	4	1	1		
9:30 PM - 9:45 PM	3	2	2	3	1	9	1	2	2	0	0	4	3	3		
9:45 PM - 10:00 PM	3	1	2	1	3	7	5	3	3	1	1	1	1	2		
10:00 PM - 10:15 PM	5	0	4	1	3	8	1	2	3	2	5	3	2	2		
10:15 PM - 10:30 PM	4	3	2	1	4	8	1	3	3	0	2	6	1	2		
10:30 PM - 10:45 PM	3	1	0	5	0	4	3	0	1	3	4	2	0	1		
10:45 PM - 11:00 PM	1	3	1	3	4	9	0	2	2	1	1	3	0	3		
11:00 PM - 11:15 PM	0	0	1	2	0	17	2	0	0	3	3	1	2	1		
11:15 PM - 11:30 PM	1	2	2	0	0	3	1	2	3	0	2	1	3	0		
11:30 PM - 11:45 PM	1	1	1	0	0	3	1	5	1	1	0	2	0	0		
11:45 PM - 12:00 AM	1	1	0	0	3	1	0	1	2	3	2	3	1	0		
24-hour	774	697	797	718	1,018	908	1,011	955	787	706	693	624	582	591	455	340
2-way totals	1,471		1,515		1,926		1,966		1,493		1,317		1,173		795	
count date	13-Sep-10		14-Sep-10		15-Sep-10		16-Sep-10		17-Sep-10		18-Sep-10		19-Sep-10		20-Sep-10	
day of week	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday		Monday	

APPENDIX C

Roundabout at Intersection of G Street, Mokapu Road, and Lawrence Road

A conceptual layout of a compact roundabout with a diameter of 100 feet with channelization treatment for the sharp right turn from westbound Mokapu Road to Lawrence Road is shown in Figure C-1.

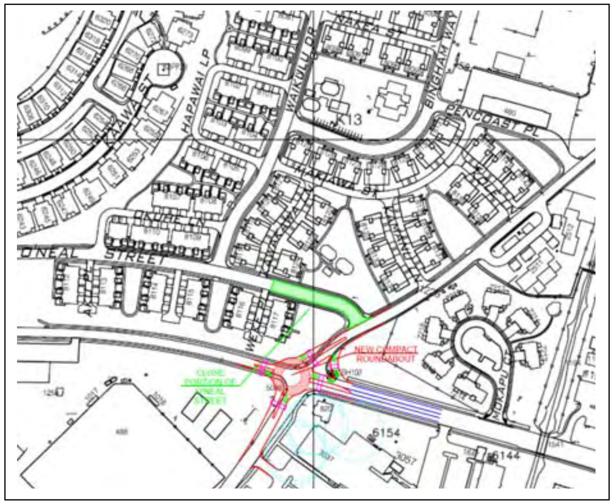

Figure C-1 – Compact Roundabout at G Street, Mokapu Road, and Lawrence Road

This small roundabout would have a design speed of 15 miles per hour and will minimize delays and be able to provide acceptable levels of service. However, pedestrian and bicycle provisions would need to be carefully considered. The layout includes relocation of the G Street approach slightly to the west to provide adequate clearance to the existing gymnasium (Building 3037). Termination of the O'Neal Street connection to Lawrence Road and conversion to a cul-de-sac would necessary since it would be too close to the roundabout (connections to Lawrence Road are available via Waikulu Drive, Bingham Way, and Pencoast Place).

DESIGN POPULATIONS FOR WATER & SEWER SYSTEM ANALYSIS
MCBH KANEOHE

July 7, 2010

A. BASIS

1. General

Water system source capacity and storage volume requirements are generally sized based upon per capita usage basis plus industrial and other water use demands. Sewer system collection and treatment system sizing is also generally based on per capita sewage generation plus industrial discharges, and infiltration and inflow for the collection system. Thus population basis will be established to determine overall general impacts/requirements to the base water and sewage systems adequacy.

General basis and considerations are as follows:

- Percentage increases for base resident and non-resident populations to the base
- Anticipated new industrial demands due to new facilities for incoming units
- Existing water use and sewage treatment data – i.e. annual daily/annual average day/annual maximum day demands and flows
- Anticipated changes to operational tempo that may influence water usage and sewage flows

Base population varies constantly. The breakdown between assigned military, dependents, and civilian employees varies with time. Population numbers from various sources differ. Projects to support on-base population change or are revised. Thus design populations for use in utility analyses are estimated based upon analysis of various data bases available and referenced herein.

While the population numbers and basis developed and used herein may differ somewhat from that used for other analyses such as socio-economic and traffic, they allow analyses to provide a good indication of the expected potable water usage and wastewater generation, and estimation of anticipated impacts to the various on-base and off-base utility systems.

2. References:
   - Master Plan Volume 1 – Land Use Plan; 15 December 2006
   - Final Planning Charrette Summary Report FY13 MCON P-886, Bachelor Enlisted Quarters, MCBH Kaneohe Bay, Hawaii; November 19, 2010
   - DD 1391 FY2003 MCON Bachelor Enlisted Quarters P-886; 29 Nov 2010

B. EXISTING POPULATION

1. EIS traffic study basis: March 2010 population
   - Total population by assignment 20,895
     Includes military, dependents, civilian employees

   - Total population on base 16,145
     As provided by MCBH Kaneohe – considers deployed military

2. Approximate dependent to military ratios.
   - From December 2006 Master Plan: 8,775 dependents and 8,837 military. Dependent to military ratio = 0.993 dependent to one military.

3. Civilian Employees per 15 December 2006 Master Plan = 2,340

C. EXISTING RESIDENT BASIS

1. Base Billeting & Family Housing Available
   - Bachelor Housing Officer & Enlisted: 2,044 units
   - Family Housing (FH)
     - Existing - 2,216 units Estimated based on number of military in housing per MCBH-Kaneohe data on current on base housing residents – see C.3 below
     - Total by 2014 2,592 units Planned end state FH units
     - Increase - 376 units 17.0%

2. On-base Military Residing in Base Bachelor Housing
   - Officer & Enlisted - 3,398 personnel

3. On-base Family Housing – data provided by MCBH-Kaneohe

	Military	Dependents	Totals
• PPV Housing	1,946	3,823	5,769
• 802 Housing	270	435	705
Totals	2,216	4,258	6,474

Discussion & Notes:

- Dependent to military ratio in housing per above = 4,258/2,216 = 1.92
- Average persons/unit = 6,474/2,216 = 2.92
- Number of 802 units is 276. Occupancy is 705/270 = 2.61 persons/unit assuming 270 units occupied based upon one military per FH unit. Not all 276 units are occupied at any one time due to repairs, maintenance etc. being done.
- Percentage of military with dependents vs. total assigned military – unknown since number of families exceeds available base housing units.
- Number of PPV (privatization housing operated by Forest City) housing units currently available varies with FH renewal program where existing units are being demolished and replaced over time.

D. PROJECTED POPULATION

1. EIS traffic study basis: March 2010 population
   - Total assigned base population 23,690

I-2 Design Populations for Water and Wastewater System Analysis

includes military, dependents, civilians

- Total population on base 18,981
  assumes 1:2 deploy-to-dwell ratio

2. Incoming Aviation Unit Population (MV-22, AH-1 and UH-1 Squadrons)
   - Military 1,000
   - Dependents 1,106
   - Civilian Employees 22

   Dependent to military ratio = 1,106/1000 = 1.1
   Existing dependent to military ratio per B.2. above = 0.993 – includes bachelor military
   Average Use 1.0:1.0 dependent to military ratio for utility analyses

3. Design Resident Population
   - Family Housing:
     - Existing population using 2.9 persons average per housing unit x 2,592 units = 7,517 Say 7,520
     - Change in resident population in family housing – due to planned additional housing. No additional family housing to be constructed after 2014 and not enough on-base housing available for current number of families; thus all new incoming families will be non-resident living off base.
   - Change in enlisted (E1 – E45) billeting by FY13 MCON P-886 Bachelor Enlisted Quarters project: +224
   - Change in officer and senior enlisted bachelor resident population = zero. No additional bachelor officer and senior enlisted quarters will be constructed under proposed action.

4. Design Non-Resident Population
   - Additional families for new units will be all housed off post and thus will be non-resident
     - Using 2.0 dependents per military with dependents, number of military with dependents is 1,106/2.0 = 553
     - Assume off-base dependent school age children will attend nearby off-base schools.
     - Assume off-base dependent school age children will use on and off-base facilities for shopping, entertainment, etc.
     - Off-base dependent pre-school children will use on-base pre-school and child care centers.
     - Assume off-base spouses will use both on and off base shopping and entertainment facilities, and working spouses will have jobs both on and off-base.
   - Off-base bachelor military = 1,000 – (553 +224) = 223 (officers and enlisted) where 553 is number of military with families and 244 is net increase in enlisted billeting spaces due to new construction available to accommodate additional enlisted personnel. Consider all as non-resident for base population purposes since expected to work on base. Off-base military expected to use base recreational and support facilities at higher level than civilian employees; however, degree of use that impacts on base utilities are unknown.

E. DESIGN POPULATION SUMMARY

1. Projected Design Population and Increases

	Existing	Additional	Total	% Increase
• Resident				
o Bachelor Military	5,614	224	5,838	4.0%
o FH	6,474	(1,046)	7,520	(16.2%)*
Subtotals	12,088	(1,270)	13,358	(10.5%)*
• Non-Resident				
o Military	3,010	+776	3,786	25.8%
o Dependents	1,752 **	+553 ***	4,056	15.8%
o Civilians	2,294 (?)	+ 22	2,316	1.0%
Subtotals	8,807	+1,351	10,158	15.3%

* Numbers in (--) are due to completion of FH upgrade program and NOT due to MAG plus-up. The MAG new incoming units are expected to increase the total base resident population by 224 personnel or 224/13,358 = 1.7% due to bachelor housing unit increase by the MCON project related to the MAG plus-up.
** Based on 50% of 3,503 off base dependents assumed to use on-base facilities daily to be considered non-resident for utility purposes.
*** Based on 50% of the 1,106 new incoming Marine Aviation dependents using on-base facilities to be considered non-resident for utility purposes.

The 50% of off-base dependent as non-resident population is conservative (estimated on the high side) since off-base housed dependents are expected to spend most of their time off base to include schooling as well as for entertainment and shopping. Off-base housed dependents are expected to spend some time on-base mainly during evenings, weekends and holidays utilizing base eating, shopping, recreational, and family services facilities. They are expected to use base support facilities such as the commissary, base exchange stores, child care and after school youth activities.

2. Discussion

The above presents design population increases for the new MAG aviation units to be added to the base. It does not consider other potential increases due additional staffing for expansion or addition of support services that may occur such as family services, recreational facilities, shopping and eating establishments.

Base population at any time varies constantly due to rotation of marine units for deployments to sea, training, and combat missions such as to Afghanistan. These variations should be reflected in existing utility usage and load data.

I-2 Design Populations for Water and Wastewater System Analysis

WATER SYSTEM ANALYSIS FOR MAG NEW UNIT BASING AT MCBH – KANEOHE BAY

July 7, 2011

A. GENERAL

This analyzes the general impacts of the addition of aviation units to MCBH – Kaneohe Bay. New basing includes two MV-22 Osprey squadrons, and AH-1 and UH-1 helicopter squadrons. Projected total personnel increases are: 1,000 military; 1,106 dependents; and 22 civilian employees.

Other population increase that may impact on water usage is the Marine grow the force plus up. New grow the force units have arrived at the base with most of the population plus up realized. Thus, the water usage impacts due to this should be reflected in recent existing water usage data.

The following analysis looks at the net impacts by the MAG new incoming units to the water system supply, storage and distribution systems. The general adequacy is reviewed for water supply, water storage volume and system flows/pressures.

B. WATER SUPPLY

1. Existing Water Usage

The following table provided by MCBH Kaneohe Bay presents FY07 thru FY10 monthly water purchases from the Honolulu Board of Water Supply (BWS) supply to the base. The base is supplied with water from the BWS Kapaa reservoir to the back gate at Mokapu Road by a 20 inch main.

The data indicates the following in million gallons (mg) or million gallons per day (mgd).

	FY07	FY08	FY09	FY10
• Average monthly	59.98 mg	56.19 mg	51.05 mg	62.42 mg
• Lowest monthly	50.06 mg	43.59 mg	39.38 mg	46.05 mg
• Average day - lowest month	1.61 mgd	1.57 mgd	1.27 mgd	1.64 mgd
• Highest monthly	80.46 mg	96.14 mg	68.58 mg	77.21 mg
• Average day - highest month	2.68 mgd	3.20 mgd	2.29 mgd	2.49 mgd
• Annual average day	1.97 mgd	1.85 mgd	1.68 mgd	2.05 mgd

Data show variations in monthly water usage. The four years of record show a low of 39.38 mg for January FY09 to a high of 96.14 mg for September FY08. The 96.14 mg seems to be an anomaly since the second highest is only 80.46 mg for June 2007. The second highest for FY07 was only 62.77 mg. The average monthly for the four fiscal years is 57.52 mg. June thru September for FY10 was four consecutive months with high usage of 73.21 to 77.21 mg. No clear trends are indicated by the data.

Two current temporary conditions affect water usage.

- Temporary Suspension of Treated Sewage Effluent Reuse. About 0.5 mgd of treated R1 wastewater has been reused to irrigate portions of the base Klipper Golf Course. Reuse has been temporarily suspended, reportedly since September 2009 or so to the present. Potable water is being used until treated effluent reuse is resumed after repairs at the sewage treatment facility. The monthly water usage data does not indicate increase but actually reduction in BWS water usage in months following September 2009, though records indicate October thru February or so to have generally lower water usage than preceding months. The 0.5 mgd is limited to limited safer reuse of R1 treated effluent quality. A project was being considered in the 2007 time frame to upgrade the base WRF (Water Reclamation Facility – wastewater treatment plant) to R2 treated water quality that would allow more reuse of treated effluent. That project has not pursued.
- Reconstruction of Family Housing. Existing family reconstruction program has been on-going for a number of years. Units are being demolished and reconstructed in phases. Water usage is reduced as units are taken out of use. The reconstruction program is expected to be completed in 2014.

The temporary increased use of potable water for golf course irrigation offsets this temporary reduction in housing water use. The 0.5 mgd of irrigation water use equates to 1,250 units at 400 gallons per day per unit. Fewer FH units are expected to be under reconstruction at any time. Analysis water usage will not be adjusted since the existing usage base should reflect higher usage than is expected under normal system conditions reflecting a conservative analysis approach.

Annual average day water use of 2.0 mgd is adopted for this analysis based upon the usage records. This is total base water usage including domestic and industrial water demands.

Annual maximum day water usage is normally the minimum required water supply capacity. Existing maximum day water use calculated based upon a maximum day to average day factor of 2.0 per UFC 3-230-19N Design – Water Systems is 2.0 x 2.0 mgd = 4.0 mgd. The monthly data show average day for highest month to annual average day ratio varies from 1.21 for FY10 to 1.73 for FY08. The FY08 1.73 for September appears to be an anomaly with a ratio of 1.27 with the September data deleted. The 2.0 maximum day factor may be high understanding that the annual average maximum day will be higher than the average day for the highest month. BWS uses a 1.5 factor in planning water systems. Actual daily water usage records are not available to determine actual annual maximum 24 hour or maximum day usage.

2. BWS Allowances and Capacity

MCBH Kaneohe Bay advised that NAVFAC contract N62742-77-C-0209 with BWS does not specify a limit on the amount of water that can be drawn from the BWS system.

The 2006 Master Plan notes that BWS can supply water at 5,200 gpm or 7.5 mgd at a minimum pressure of 60 psi. Pumps on base are available to boost operating pressure when the BWS system pressure is inadequate. The 20 inch main supply main from the BWS system has a capacity of 7.0 mgd at a design flow velocity of 5 feet per second which is in line with the 7.5 mgd stated.

3. Projected Water Usage Increases and Impacts

The base population from the design population analysis and corresponding projected water use increases are as follows:

	Population Increase	Usage Rate	Water Usage
Resident Population	224	150 gpdpc	33,600 gpd
Non-Resident Population	1,351	45 gpdpc	60,795 gpd

* gpdpc = gallons per day per capita; gpd = gallons per day

Annual average day water usage increase = 94,395 gpd or 0.094 mgd

Existing population base water use:
(12,088 + 1,046 residents) x 150 gpdpc = 1,970,100 gals
8,807 non-resident x 45 gpdpc = 396,315 gals
Total = 2,366,415 gals or 2.366 mgd

Percent water use increase = 0.094/2.366 = 0.0397 or 4.0%

Projected Annual maximum day water usage = 2.0 + 0.094 = 2.094 mgd
Overall average day usage increase is 4.7%
Projected maximum day water usage = 2.0 x 2.094 mgd = 4.19 mgd

The BWS supply capacity of 7.0 to 7.5 mgd is adequate to meet base needs with the MAG plus-up.

The projected water usages above are based on design populations developed for this analysis which addresses domestic water usage. Industrial water usage increases is not considered. The water usage increase per population is a different basis than the historic water usage used as the base for calculating projected water usage. The water usage for existing resident and non-resident population using the 150 and 45 pcpd respectively totals more than 2.0 mgd historic average day water usage. The projected usage increase based upon population added to historical total base water usage basis for average and maximum day usage is considered conservative since the 4.7% overall increase percentage is higher than the population 8.7% increase expected with additional family housing and proposed action BEQ space increases. The 4.7% should account for industrial and other non-population based use increases.

Other considerations.

- The design population basis is not expected to accurately account for variations in overall base population due to deployments for any given period.
- The projected increases assume that 100% of the MAG plus up population is at home at the base. It is anticipated that some of the MAG plus up units will be deployed

during the year. Thus the projected annual average day water usage should be lower than that used for this analysis.

- There may be other new support facilities that have not yet been determined but may be added to support the MAG and other base wide needs. These may include child care centers, MWR facilities, and eating establishments.

The BWS supply capacity greatly exceeds the projected needs, and thus the existing system is adequate to support the MAG plus-up.

C. STORAGE

1. Existing Storage Tanks & Storage Volumes – ground level providing flow and pressure to the base by gravity.
   - 1.0 mg Bldg. 4087 at Puu Hawaii Loa
   - 1.0 mg Bldg. 550 at Puu Hawaii Loa
   - 0.2 mg Bldg 549 at Puu Hawaii Loa
   - 0.5 mg at Ulupau Crater
   - 0.5 mg at Ulupau Crater

   Total existing storage available = 3.5 mg

2. Required Storage

   - Per UFC 3-230-19 Design – Water Systems
     Required storage = one half of average day consumption (domestic and industrial) = 0.5 x 2.0 mg = 1.0 mg

   - Per UFC 3-600-01 Fire Protection Engineering For Facilities
     Required storage = maximum fire flow demand for durations indicated

   The hangar projects to support the MAG plus-up generally have large fire flow requirements. Per programming documents, hangars will use on-site storage specifically to provide fire protection. Thus those projects will not depend upon base water storage.

   Other MAG plus-up facility projects that will be critical to fire protection will be several large warehouse and industrial type buildings that will have sprinklers. Other projects such administrative and barracks facilities which are also expected to have sprinklers with light hazard classification will not be critical for the water system.

   Fire flow for warehouse and industrial type facilities using extra hazard is estimated as follows:
   Sprinkler flow of 3,000 s.f. x 0.30 gpm = 900 gpm
   Hydrant flow of 750 gpm
   Total fire flow = 1,650 gpm for 120 minutes

Water volume = 0.198 mg

The BWS water supply capacity of 5,200 gpm is generally adequate to meet fire protection, thus fire protection is not dependent upon base water storage. In any case, existing base storage volume of 3.5 mg is adequate to support fire protection without supply. Thus base storage volume is adequate to support the MAG plus-up.

It is anticipated that existing base facilities have similar or higher fire protection flow requirements than what the facilities planned for the MAG plus-up will require. Only one fire is considered for any given time.

D. DISTRIBUTION SYSTEM – flow capacity and service pressure

The various facility projects for the MAG plus-up have DD Form 1391 programming documents completed and projects reviewed for utility adequacy. These projects are to insure adequate domestic and fire protection water supply in terms of flow rates and pressures.

WASTEWATER SYSTEM ANALYSIS FOR MAG NEW UNIT BASING AT MCBH - KANEOHE BAY

July 7, 2011

A. GENERAL

This analyzes general impacts of the addition of aviation units to MCBH - Kaneohe Bay. The new basing includes two MV-22 Osprey squadrons, and AH-1 and UH-1 helicopter squadrons. Projected total personnel increases for these units are: 1,000 military; 1.106 dependents; and 22 civilian employees.

This considers the net impacts by the MAG new incoming (plus-up) units to the base wastewater systems. General adequacy is reviewed for collection systems, wastewater treatment at the base wastewater reclamation facility (WRF), and disposal of the treated effluent to the C&C Kailua regional treatment facility.

Other base changes include the Marine grow the force plus up in addition to the MAG plus up. Impacts to the base utility systems due to the other plus up are mitigated by most of the personnel for the new units for the Grow the Force plus up have already arrived and should be reflected to a degree in the base utility loads data used.

B. COLLECTION SYSTEM

1. Existing System. The base main sewage collection system consists of a network of 6 inch thru 30 inch size gravity sewer mains and a number of sewage pump/lift stations which discharge to the base Water Reclamation Facility (WRC) for treatment.

2. MAG Plus-Up. A number of planning charrettes and DD Form 1391 programming documents have been completed for the various major projects and programs supporting the MAG plus-up. These included preliminary engineering analyses to define sewerage improvements to support the new facilities. The various projects will be required to connect the new and renovated facilities to the WRF with new and replacement gravity sewers, pump stations and force mains.

C. WATER RECLAMATION FACILITY (WRF) & DISPOSAL OF TREATED WASTEWATER EFFLUENT

1. Existing WRF

The existing WRF is located near and to the northwest of the main base gate. The 15 December 2006 Master Plan notes the following:

- Treatment capacity = 2.0 mgd
- Average day flow to the WRF = 1.45 mgd
- 0.5 mgd of treated effluent reused for irrigation of the base golf course

- Treated effluent discharged to the City & County (C&C) of Honolulu Kailua Regional WWTF for deep ocean disposal thru the City's Mokapu ocean outfall.
- Contract agreement for base discharge to the C&C system of but not limited to 450 mg annually. Peak flow is limited to 5 MGD.

2. Wastewater Flows

a. Existing Discharges to C&C. Potable water usage and sewage influent flows to the WRF for FY07 thru FY10 are shown in the attached table provided by MCBH-KB. The data indicates the following in million gallons (mg) and million gallons per day (mgd).

	FY07	FY08	FY09	FY10
Average monthly	36.81 mg	37.04 mg	29.99 mg	31.18 mg
Lowest month	33.38 mg	32.25 mg	27.51 mg	27.51 mg
Average day lowest month	1.08 mgd	1.15 mgd	0.98 mgd	0.98 mgd
Highest month	40.53 mg	43.54 mg	41.17 mg	33.62 mg
Average day highest month	1.30 mgd	1.40 mgd	1.32 mgd	1.12 mgd
Annual average day	1.21 mgd	1.22 mgd	0.99 mgd	1.03 mgd

The annual average day flows are much less than the 1.45 mgd stated by the December 2006 master plan which may reflect treated effluent reuse which would reduce the treated effluent discharged to the City as compared to on-base untreated sewage influent at the WRF. Temporary and other factors that influence wastewater discharges are the same as discussed for the water system analyses. That discussion related to temporary suspension of R1 treated effluent reuse for golf course irrigation, on-going reconstruction of family housing units that removes units from use, and variations in deployments applies to wastewater discharge flows.

Daily sewage flow data for the base was provided by base staff for the period June 2010 thru May 2011. This data indicates the following for treated effluent discharged to the City ocean outfall:

- Annual average day flow = 1.024 mgd
- Lowest daily flow for year = 0.490 mgd
- Highest daily flow for year = 3.110 mgd (second highest was 2.650 mgd)
- Highest daily to average day flow ratio for year = 3.04
- Irrigation reuse of treated effluent during this 12 month period was irregular and minimal (zero to less than 0.18 mgd with several months of no reuse). Thus discharge to City ocean outfall is indicative of without base reuse.

b. Projected Flows. A simplified basis for the projected increase is sewage flow to the WRF is to match the 4.7% overall projected water use increase percentage used for the water system analysis. This water use increase is considered conservatively high, and thus would also be conservatively high for sewage generation projections.

The projected increase assumes 100% of the MAG plus up population is home at the base. It is expected that some of the new units will be deployed part of the time annually, which will result in actual lower annual average daily utility load increases.

The existing discharge data indicates an annual average day wastewater flow of about 1.22 mgd based upon the FY08 high year. The 4.7% flow increase calculates to a projected average day flow of about 1.28 mgd.

c. Existing System Adequacy to Handle Projected Flows.
   - The WRF capacity of 2.0 mgd is adequate to handle the projected annual average day flow of 1.28 mgd.
   - The discharge to the C&C regional treatment plant general limit of 450 mgd annually calculates to 1.23 mgd. The 1.28 mgd is somewhat higher which is assumed not to be a problem since the discharge limit is not absolute.
   - The peak discharge limit of 5 mgd to the C&C system should not a problem. The WRF should be designed to dampen the incoming peak sewage flows with plant capacity generally sized for annual average day sewage flows plus additional wet weather inflow and other infiltration to the collection system.

Resumption of golf course irrigation reuse of 0.5 mgd that is temporarily suspended since September of 2009 will significantly reduce effluent discharge to the C&C system for current conditions. Considered should be given for further WRF treatment improvements for R2 water reuse to allow increased reuse for the normal golf course irrigation demand of 0.8 to over 1.0 mgd. Golf course reuse irrigation is limited due to restrictions in reuse of current R1 quality water.

I-4 Wastewater System Analysis

APPENDIX J

ESA Section 7 Documentation

J-1
Department of the Navy Section 7 Consultation Letter

J-2
Department of the Interior Section 7 Consultation Letter

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND, PACIFIC
258 MAKALAPA DR., STE. 100
PEARL HARBOR, HAWAII 96860-3134

11015.4A8B
Ser EV2/792
14 NOV 2011

Dr. Loyal Mehrhoff
U.S. Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
300 Ala Moana Blvd., Room 3-122
Honolulu, HI 96850

Dear Dr. Mehrhoff:

SUBJECT: INFORMAL CONSULTATION UNDER SECTION 7 OF THE ENDANGERED SPECIES ACT FOR OPERATION OF MV-22 AIRCRAFT IN SUPPORT OF THE III MARINE EXPEDITIONARY FORCE ELEMENTS IN HAWAII

This letter is a request by the Department of the Navy to the U.S. Fish and Wildlife Service (Service) for informal consultation pursuant to section 7 of the Endangered Species Act (ESA). The Naval Facilities Engineering Command (NAVFAC) Pacific is authorized by the U.S. Marine Corps (USMC) to conduct consultation regarding the operations of the tilt-rotor MV-22 Osprey and rotary-wing H-1 Cobra/Huey aircraft in training areas on Oahu and Hawaii. The USMC proposes to use U.S. Army –owned or leased ranges and training areas at Pohakuloa Training Area (PTA), Hawaii Island, and in central Oahu (collectively known as the Tactical Flight Training Area (TFTA)). Because training operations would be conducted on Army land, the U.S. Army agreed to be a cooperating agency in the development of this project.

NAVFAC Pacific has prepared a Draft Environmental Impact Statement (DEIS) to evaluate the potential environmental impacts of the proposed basing of and training with these aircraft in Hawaii. The DEIS is available at http://www.mcbh.usmc.mil/mv22h1eis/. The aircraft are proposed to be based at Marine Corps Base Hawaii, Kaneohe Bay. Training and/or administrative operations would occur at eight locations among Oahu, Hawaii, Kauai, Maui, and Molokai. Protected species are either not present within these military installations or other facilities, or are present within these installations but not present in the proposed action area. No ESA-listed species are expected to be impacted by the proposed training operations at the locations on Kauai, Maui, or Molokai. Therefore, the focus of this informal consultation is the Army-controlled land on Oahu and on Hawaii Island, identified above. Enclosed is a Biological Evaluation (BE) providing information on the proposed project description, action area, and ESA-listed species occurring within the action area; a letter describing the fire risk from the MV-22 exhaust system; a NAVAIR System Safety Risk Assessment Matrix; and a natural resource survey report for PTA and TFTA.

The Department of the Navy has determined that the proposed action would have no effect on the plant species *Stenogyne angustifolia* present at landing zone (LZ) X-Ray at PTA, and no effect on *Branta sandvicensis* or nene. The Department of the Navy requests service

concurrence with its determination that the proposed action may affect but is not likely to adversely affect the Hawaiian hoary bat (*Lasiurus cinereus semotus*). The proposed action would not result in the destruction or adverse modification of federally-designated critical habitat at either PTA or TFTA because no designated critical habitat is located within the proposed action area.

On August 2, 2011, the Service published a proposed rule to list 23 species as endangered. This list includes 10 species that may occur in the Koolau Mountains within the Army's TFTA. Based on the habitat and locations of populations of the species proposed for listing, the Department of the Navy determined that these species will not be affected by the proposed action.

If there are any questions, please contact Mr. Justin Fujimoto of the Environmental Planning Product Line at (808) 472-1407 or by email at Justin.Fujimoto@navy.mil.

Sincerely,

KAREN SUMIDA
Business Line Manager
Environmental

Enclosures: 1. Biological Evaluation
2. Risk of Fire From V-22 Exhaust 2008
3. NAVAIR System Safety Risk Assessment Matrix
4. SWCA Survey Report 2011

Biological Evaluation
Basing and Operation of MV-22 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

1.0 Background
The purpose of this biological evaluation (BE) is to address the effects of the tiltrotor (MV-22) Osprey, and H-1 Cobra and Huey helicopters on species listed as endangered or threatened under the Endangered Species Act (ESA), or their designated critical habitat. The U.S. Marine Corps (USMC) proposes training exercises involving MV-22 and H-1 aircraft at U.S. Army-owned or leased training areas located at Pohakuloa Training Area (PTA), Hawaii Island, and within Army training areas in central Oahu collectively known as the Tactical Flight Training Area (TFTA) (Figures 1 and 2). The Naval Facilities Engineering Command (NAVFAC) Pacific has been authorized to consult on this action by the USMC. Since the majority of training operations would be conducted on Army land, the U.S. Army has agreed to be a cooperating agency in the development of this project.

NAVFAC Pacific is developing an Environmental Impact Statement (EIS) to evaluate the potential environmental effects of the proposed basing of the aircraft in Hawaii, as well as proposed training operations involving these aircraft. The aircraft are proposed to be based at Marine Corps Base Hawaii, Kaneohe Bay. Training operations would take place on Oahu and Hawaii Island and administrative landings would occur on Kauai, Maui, and Molokai. No ESA-listed species are expected to be impacted by the proposed training operations at the locations on Kauai, Maui or Molokai. Therefore, the focus of this informal consultation is the Army-controlled land on Oahu and on Hawaii Island, identified above.

On August 2, 2011, the Fish and Wildlife Service published a proposed rule in the Federal Register to list 20 plants and 3 animal species as endangered. This includes 10 plant species and 3 damselfly species that occur at the Army's TFTA. Based on the species' habitat and existing population information for TFTA, we have determined that these species would not be impacted by the proposed action.

The purpose of the proposed basing and operation of the MV-22 and Marine light attack/utility helicopter (HMLA) aircraft is to support III Marine Expeditionary Force (MEF) training and readiness operations in Hawaii. The need for the proposed action is to support the Marine Air-Ground Task Force (MAGTF) consisting of four core elements: a command element, a ground element, an aviation combat element, and a logistics combat element. The MV-22 and H-1 aircraft support and complete the task force by providing the aviation combat element and medium lift capabilities.

A total of 24 MV-22 aircraft and one squadron of 27 Cobra and Huey H-1 helicopters would be introduced to support III MEF operations in Hawaii.

Figure 1. Surveyed landing zones at Pohakuloa Training Range, Hawaii Island.

Figure 2. Surveyed landing zones at Tactical Flight Training Area, Oahu.

This BE of the proposed action was prepared by NAVFAC Pacific, to fulfill consultation requirements with the Service under section 7 of the ESA. Section 7 assures that, through consultation with the Service, Federal actions do not jeopardize the continued existence of any threatened or endangered species, or result in the destruction or adverse modification of designated critical habitat.

The proposed action area contains or may contain the ESA-listed plant and animals listed in Tables 1 and 2. No designated critical habitat is located within the area of the proposed action. Determination of ESA-listed species that may occur in the action areas was based on the U.S. Army Garrison (USAG) Hawaii natural resource database, the *2004 Stryker Brigade Combat Team EIS* (U.S. Army 2004), 2008 PTA Biological Opinion for routine military training, discussion with Army Garrison natural resource staff and consultant surveys (SWCA Environmental Consultants 2011) in preparation for the EIS for Basing of MV-22 and H-1 Aircraft in Support of III MEF Elements in Hawaii.

Table 1. PTA ESA-listed species that may occur near landing zone areas.

	Scientific Name	Common Name	Federal Status
Plants	*Stenogyne angustifolia*	Creeping mint	Endangered
Mammals	*Lasiurus cinereus semotus*	Opeapea, Hawaiian hoary bat	Endangered
Birds	*Branta sandvicensis*	Nene, Hawaiian Goose	Endangered

Table 2. TFTA ESA-listed species that may occur near landing zone areas.

	Scientific Name	Common Name	Federal Status
Mammals	*Lasiurus cinereus semotus*	Opeapea, Hawaiian hoary bat	Endangered

2.0 DESCRIPTION OF THE PROPOSED ACTION AND LOCATIONS

The proposed action includes takeoff and landing exercises at existing landing zones (LZs) at PTA, Hawaii Island, and in the TFTA, Oahu. Ranges within the TFTA include East Range, and Kawailoa and Kahuku training areas. These LZs have been used by existing Army and USMC aircraft such as the CH-47, UH-60, and Ch-53.

The LZs within these ranges generally consist of one or more aircraft landing points (LPs), surrounded by a 350-foot buffer zone around each LZ. Some LZs have up to four or more LPs, and result in various shaped and sized LZs. During takeoff and landing, the MV-22 produces a high-velocity air current below the aircraft due to rotor wash. This air current has the potential to impact the area surrounding the LZ. The area of greatest potential impact is within the 100-ft by 100-ft clear-zone surrounding each LP, where the aircraft hovers before landing and takeoff. The USMC has defined a 350-foot buffer zone around each LZ that is subject to MV-22 rotor wash, with lower wind force with distance from the LP. The proposed action area includes each LZ and its contiguous 350-foot buffer zone, measured from the outer edge of the LZ, to account for rotor wash. The H-1s do not produce significant rotor downwash that would affect anything outside the confines of the existing 350-foot buffer for the MV-22. The MV-22 is essentially the most significant contributor to rotor downwash effects, followed by the CH-53, and then the H-1.

The proposed sites at the TFTA on Oahu are located on the north-central side of the Koolau Mountains. The area is characterized by deep, meandering ravines, dense vegetation, and tropical rainforest. These areas are covered by native *Metrosideros*, *Acacia*, and *Dicranopteris* forest (SWCA 2011). The LZs in the training range are on mountain ridges that sometimes form plateaus. Landing zone surface conditions consist of bare soil or grass groundcover. The buffer zones in this area are down-slope from the LZs, with tall trees below the level of the LZ (Bell-Boeing 2010).

The proposed sites at PTA are located in the north-central portion of Hawaii Island between Mauna Loa and Mauna Kea, between 800 and 3,000 meters elevation. The LZs at PTA support ruderal vegetation and/or bare ground with remnant patches of native vegetation on old `a`a lava flows. Surface conditions at the LZs primarily consist of barren lava or crushed rock substrate. Some of the LPs are improved with concrete pads. The surrounding buffer zones consist of moderately tall shrub land and grassy areas. Fountain grass (*Pennisetum setaceum*) is the dominant ground cover with native species of *Myoporum* and *Dodonaea*. Overall, most of the native plant habitats have been disturbed by ungulate browsing (SWCA 2011)

In addition to the TFTA and PTA, proposed operations will take place at eight other locations over five islands (Table 3). Operations at these sites would be conducted on already-existing airstrips or LZs. Based on information contained in the base INRMPs for these locations, protected species are either not present within these military installations or other facilities, or

are present within the installation but not present in the proposed action area. Therefore, informal consultation is not requested for these locations.

Table 3. Training and administrative sites proposed to be used by the MV-22/H-1 aircraft.

Island	Location
Oahu	Dillingham Military Reservation (DMR)
	Marine Corps Training Area Bellows (MCTAB)
	Marine Corps Base Hawaii (MCB Hawaii)
Kauai	PMRF Pacific Missile Range Facility (PMRF)
Hawaii	Upolu Airport
Maui	Hawaii Army National Guard (HIARNG) Puu Nene
Molokai	Molokai Training Support Facility (MTSF)
	Kalaupapa Airport

3.0 LISTED SECIES AND CRITICAL HABITAT

The following three ESA-listed species occur or may occur within the proposed action area, including the 350-ft buffer zone. The LZ sites are not within ESA-designated critical habitat. No designated critical habitat is located within the area of the proposed action.

Plants: Listed in 1979, *Stenogyne angustifolia* only occurs on the island of Hawaii in the Army's Pohakuloa Training Area. Limiting factors include human disturbance to habitat, alien plant competitors, introduced herbivores, fire, and pathogens. Critical habitat rules have not been established for this species (USFWS 1998). *Stenogyne angustifolia* is widespread across western PTA, with the population estimated at 1,500-5,000 plants. The highest concentration of plants is located in the Kipuka Kalawamauna East management area, where 3,178 ha (7,853ac) are fenced (U.S. Army July 2010). Approximately 100 plants have been outplanted into four sites between 2002 and 2007. Survival averages 83% (U.S. Army 2010).

Mammals: The Hawaiian hoary bat, *Lasiurus cinereus semotus* is the only native Hawaiian terrestrial mammal. This solitary species has been recorded on Kauai, Oahu, Maui and Hawaii Island, with the largest populations on Kauai and Hawaii Island. Accurate estimates of bat populations are not available, but it is suspected that the hoary bat is absent from portions of its historical range. The decline of the species has been attributed to loss of tree cover in historical habitats and the use of pesticides. Most observations of bats have been made between sea level and 2,286 meters in elevation, but their presence has been documented at up to 4,023 m in elevation (Gon et al. 1993). Roosting has not been observed at PTA, but the species roosts in forested areas (USFWS 1993). At night, bats forage on native and non-native insects. Bats have been observed using a wide variety of habitat at PTA, from bare lava fields to open forests of *Metrosideros* (U.S. Army July 2010). However, they are frequently associated within native forests rather than open habitat (Jacobs 1994)

Birds: The Hawaiian goose (*Branta sandvicensis*), or nene was listed in 1967. Currently, there are wild populations on the islands of Hawaii, Maui, and Kauai. The largest populations of nene on the island of Hawaii occur at Hawaii Volcanoes National Park, Puu Waawaa, and Hakalau National Wildlife Refuge, Kahuku, and Keahou areas. Within the areas of PTA, nene are known to occupy various habitat and vegetation community types including non-native grasslands, sparsely vegetated high-elevation lava flows, native alpine shrubland, and shrubland-woodland community types. A Draft Revised Recovery Plan for the nene was published in 2004 and recommended a shift in recovery efforts toward habitat management and release of captive-reared birds at lower elevations (USFWS 2004). Nene are browsing grazers and the composition of their diet depends largely on the vegetative structure of their surrounding habitat (USFWS 2008). Nene appear to be opportunistic in their choice of food plants as long as they meet nutritional demands. Nene may seasonally move to grasslands in periods of low berry production in search of food sources with higher protein content (USFWS 2008).

3.1 SPECIES PROPOSED TO BE LISTED AS ENDANGERED

Recently, 20 plant and 3 damselfly species on Oahu were proposed to be listed as endangered under the Endangered Species Act. Ten of these species have been identified to occur in the Army's TFTA. To evaluate the potential presence of these species at the LZs, an assessment of the species range and current populations were made. The following is a list of the species that are proposed to be listed as endangered and an evaluation of their potential presence at the LZs.

Cyanea lanceolata
This species occurs in lowland mesic and lowland wet ecosystems, at elevations generally between 300 and 760 m (1000 and 2500 ft) (Wagner et al. 1999). There are seven occurrences of this species in the north and south Koolau Mountains. The two north Koolau populations are located north of Kawaiiki stream, at Poamoho, and at Peahinaia. This species would not occur within the buffer zone of LZ Ku Tree and LZ Black due to training disturbances in the area and the dominance of non-native species. *C. lanceolata* would not occur at LZ Elephant's Foot because the LZ is below the species' elevational range. LZs Nixon, Italy, and Red are within dense *Dicranopteris-Acacia* (Uluhe and Koa) habitat which would not support this proposed species. Furthermore, the LZs are not located at Poamoho, Peahinaia, and Kawaiiki stream.

Cyrtandra sessilis
This species occurs in lowland wet and wet cliff ecosystems at elevations ranging from 490 to 670 m (1600 to 2200 ft) (Wagner et al. 1999). *C. sessilis* is known to occur along the Schofield-Waikae Trail in Kahana valley (USFWS 2011). LZ Red is within the species' elevational range but is not near known populations of *C. sessilis*. Therefore, this species would not be impacted by training operations. All other LZs are below the elevational range of this species.

Melicope hiiakae
This species occurs in wet forest in the lowland wet ecosystem in the Koolau Mountains, between elevations of 396-698 m (1300-2260 ft) (Wagner et al. 1999). There are 40 individuals scattered form Kawailoa to Waimalu in the upper Koolau mountain range (USFWS 2011). All of the LZs except for LZs Red and Black are outside of the species' elevational range. LZ Black is highly disturbed and does not support any native vegetation. LZ Red sits on a mountain plateau with *Dicranopteris-Acacia* (Uluhe-Koa) dominated gulches on all sides and would not support *M. hiiakae*.

Pleomele forbesii
This species mainly occurs in the Waianae Mountains from Mokuleia to Nanakuli and a few individuals occur in the Koolau Mountains (USFWS 2011). It occurs in mesic and dry forest and shrubland in the dry lowland, lowland mesic, lowland wet, and dry cliff ecosystems between 244 and 890 m (800 and 2920 ft) (Wagner et al 1999). This species would be absent at LZ Ku Tree and LZ Black because this area is highly disturbed and dominated by non-native grasses. LZ Nixon, Elephant's Foot, and Red are on mountain ridges with steep gulches surrounding the LZs. These areas are covered by dense *Dicranopteris-Acacia* (Uluhe-Koa) vegetation that would not support *P. forbesii*. LZ Italy is surrounded by non-native trees that would not support native vegetation. Due to the vegetation communities in these buffer zones, *P. forbesii* is unlikely to occur.

Psychotria hexandra ssp. *oahuensis*
Generally located in wet forests and shrubland in the lowland wet and wet cliff ecosystems at elevations ranging from 329 and 610 m (1080 and 2000 ft) (Wagner et al. 1999). Present in 3 lcoations: Maakua gulch in Hauula, Opaeula gulch, and between Kaipapau and Kalaunui, just south of Maakua gulch. This species would not be present at LZ Ku Tree or LZ Black because the habitat is highly disturbed by training and non-native species. It also would be absent at LZ Nixon and Elephant's Foot because these are below the species' elevational range. The buffer zone at LZ Red slopes downward into steep gulches and is dominated by *Dicranopteris-Acacia* (Uluhe-Koa) vegetation. The buffer zone at LZ Italy is dominated by non-native trees that would not support any native vegetation especially *P. hexandra* ssp. *oahuensis*.

Pteralyxia macrocarpa
This species occurs in the Waianae and Koolau Mountains, in lowland mesic, lowland wet, dry cliff, and wet cliff ecosystems, at elevations between 335 to 850 m (1100 2800 ft) (Wagner et al. 1999). This species would be absent at LZ Ku Tree and LZ Black because this area is highly disturbed and dominated by non-native grasses. LZ Nixon and Elephant's Foot are outside of the species elevational range and would have no impact to the proposed species. LZ Red, dominated by dense *Dicranopteris-Acacia* (Uluhe-Koa) vegetation in the buffer area, would not support *P. macrocarpa*. The buffer zone at LZ Italy consist of non-native trees that does not support any native vegetation. Due to the vegetation communities at these buffer zones, *P. macrocarpa* is unlikely to occur within the action area.

Megalagrion nigrohamatum nigrolineatum, *M. leptodemas*, *M. oceanicum* (blackline, crimson, and oceanic Hawaiian damselflys)
Hawaiian damselflies breed in the slow reaches of streams and seep-fed pools. The aquatic life stage known as naiads, frequent open water, resting horizontally, submerged below the surface, or on submerged vegetation. Adults perch on streamside vegetation and patrol along the stream corridor, staying close to breeding pools (USFWS 2011). *M. oceanicum* has been recorded at the Kawailoa training area in a small stream (Army 2010). None of the LZs or buffer zones are near streams or pools that would support crimson Hawaiian damselfly habitat. All of the LZs are located on mountain ridges or plateaus. Therefore, there would be no impact to this species by the proposed action.

Based on the species' elevational range, *Cyanea calycina*, *Cyanea purpurellifolia*, *Platydesma cornuta* var. *cornuta*, and *Zanthoxylum oahuense* all exist near the summit of the north Koolau Mountains. No LZs are present near the summit and therefore it is not likely that these species would not be impacted by the proposed action.

4.0 ENVIRONMENTAL BASELINE CONDITIONS

In support of the proposed action, natural resource surveys were conducted to determine the presence of Endangered Species Act (ESA)-listed species within the action area of the U.S. Army Garrison Hawaii Pohakuloa Training Area on Hawaii Island, and the Tactical Flight Training Area (TFTA) on Oahu. USAG Hawaii natural resource surveys and GIS data were reviewed to identify ESA-listed species, location of species, as well as critical habitat within PTA and TFTA. This preliminary data showed that the MV-22 operations would be outside of any critical habitat and ESA species locations. Additionally, nene survey data from PTA natural resource staff were used to identify locations where nene have been observed. The natural resource surveys conducted in support of the current EIS supplement the existing USAG Hawaii survey data to ensure that no listed species are present in the action area.

4.1 PTA

Plants
The *2004 Stryker Brigade Combat Team EIS* (U.S. Army 2004) was used to initially evaluate the potential presence of ESA-listed species within the action area at PTA, along with complete natural resources surveys. Eighteen PTA LZs were surveyed for all possible endangered plant, bird, and bat species. An endangered plant, *Stenogyen agnustifolia*, and the Hawaiian hoary bat (*Lasiurus cinereus semotus*) were the only endangered species identified to occur at the LZs. Two individual plants of *Stenogyen agnustifolia* were found at a distance of 300 feet (91 meters), within the buffer zone, of Landing Zone X-Ray.

The presence of endangered plants at LZs in the Keamuku area of PTA was evaluated using an Army-furnished PTA GIS database. Mapped endangered species were not in the location of the LZs. Existing conditions in the Keamuku parcel also make it extremely unlikely that any endangered plant species would be present: cattle, which would likely have consumed any endangered species existing in the Keamuku parcel, were recently removed and the groundcover is predominantly kikuyu grass (*Pennisetum clandestinum*), an invasive species that prevents the growth of any native species.

Bats
Wildlife Acoustic Song Meter (SM2) detectors were used to detect the presence of bats at the LZs. These acoustic detectors have the ability to detect bats up to a distance of 300 feet. The presence of bats was confirmed at twelve PTA LZs. A probable presence of bats was determined at three other LZs, and no bat detections were made at the remaining three LZs (SWCA 2011).

Birds
Army monitoring data were used to identify locations at PTA that nene frequent. From 2004 through 2008, PTA natural resource personal systematically surveyed large tracts of PTA for nene presence, abundance, and habitat use. No nene were observed during this systematic survey. However, nene have been reported from various locations at PTA by employees conducting routine work activities (Figure 3). The LZs proposed for use of MV-22 by USMC occur in the Action Areas A, B, C, and G of Figure 3.There have been no nene sightings at the LZs

within PTA. Except for LZ X-Ray, the LZs at PTA are barren and not suitable habitat for nene.

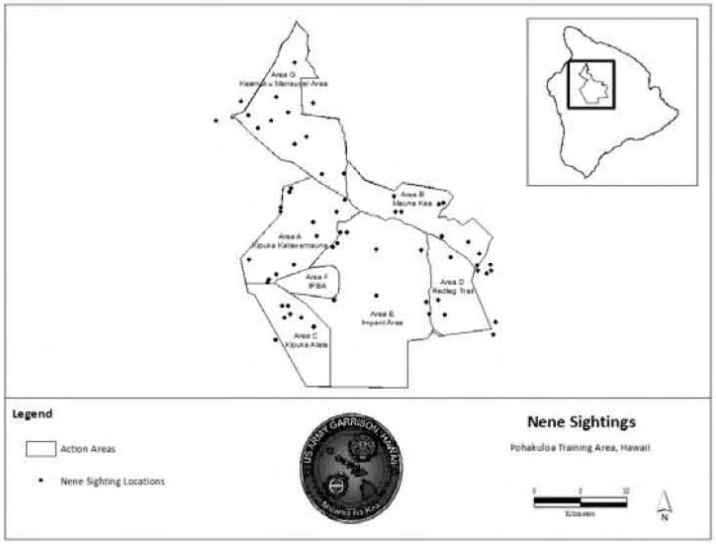

Figure 3. All nene sightings over time at PTA and in the Keamuku parcel.

Nene are occasionally observed flying over Sections A and C shown in Figure 3, but they have been observed on the ground only a few times. No high-use areas or areas regularly frequented by nene are known to exist within Areas A and C.

Very few nene sightings occur in Section B, indicating that this is not a high-use area. Occasional use of Section B does occur, such as one noted fly over and two instances in which a nene landed for part of the day (U.S. Army Garrison Hawaii Natural Resource Office unpublished data 2011).

Use of section G by nene was primarily centered in the past on cattle watering troughs that attracted nene for water, vegetation, and shelter. Since the removal of all cattle from the Keamuku parcel, the water has been turned off to the troughs, removing the attractant for nene. The LZs in the Keamuku parcel are not in the vicinity of the water troughs, and no nene are present at the LZs (Peter Peshut, USAG Hawaii, personal communication).

4.2 TFTA

Army Garrison Hawaii GIS database information identified locations of ESA-listed plant, animal, and designated critical habitat in relation to the TFTA LZs. ESA-listed plants, animals, or critical habitat were absent from the proposed action area. However, these data did not provide information on the presence of the ESA-listed *Lasiurus cinereus semotus*. Therefore, bat surveys were conducted to fill this data gap. The presence of Hawaiian hoary bats was confirmed at only one LZ (Elephants Foot). A bat call was detected at LZ Ku Tree, indicating a probable, though unconfirmed, presence of the bat in the area (SWCA 2011).

5.0 EFFECTS OF THE ACTION

This section provides an analysis of the potential direct and indirect effects on listed species resulting from the use of LZs within the training areas.

5.1 OPERATIONAL IMPACTS

Plants
The expected main effect from the operation of the MV-22/H-1 on ESA-species would be disturbance by rotor wash. This downwash would have the potential to disturb species within the LZ’s buffer zones. No ESA-listed plants were identified within any LZs during the natural resource surveys. Two *Stenogyna angustifolia* plants were located at the 300-foot mark of a buffer zone. However, at this distance from the rotor wash, downwash would have an insignificant strength to cause any damage. Furthermore, this sprawling herb grows in a prostrate manner within rocky crevasses, protecting it from high winds and firmly rooting it to the ground. Therefore, the operations of the MV-22/H-1 would have no effect on any ESA-listed plant species at proposed LZs at PTA.

Bats
Hawaiian hoary bats were also monitored during the natural resource surveys using SM2 bat detector units at both training ranges. At PTA, the presence of bats was confirmed near twelve LZs, and three LZs had the possibility of bat presence. At the TFTA, the presence of bats was confirmed at one LZ, and one LZ had the possibility of bat presence. In the event that a bat is present within a buffer zone, the greatest anticipated disturbance by rotor wash would be the bat leaving the area of rotor wash in the buffer zone. Rotor wash will not be strong enough to knock bats from roosting sites within the buffer zone. No clearing of trees or brush will be carried out at the LZs in conjunction with MV-22 operations, such that pupping bats and juveniles will not be impacted.

Nene
Airstrike is not considered to be of concern for nene. Bird airstrikes are extremely rare for aircraft in the Army training ranges in Hawaii overall, with only two airstrikes documented

between 2001-2010 for all Army aircraft flights in the state of Hawaii (HAMET 2011). Nene are large bodied and highly visible when in flight such that they can be avoided by helicopter pilots, particularly at low altitudes. Nene are known to transit PTA, and while the possibility exists that a nene may be near an LZ when an aircraft is in the vicinity, PTA natural resource staff believe nene will vacate the area if an aircraft approaches. If the nene does not vacate the LZ, the aircraft will move to another LZ. PTA does not have conservation measures for actively managing nene at LZs, other than avoidance. PTA does manage for nene in the live-fire ranges, where birds are potentially in danger (Peter Peshut, USAG Hawaii, personal communication). The live-fire ranges are not part of the action area proposed for use by USMC for MV-22 training.

5.2 Wildland Fires

The Department of the Navy (DoN), Naval Air Systems Command (NAVAIR), has assessed the risk of grass fire due to hot exhaust of the MV-22 (see Enclosure 2) (NAVAIR Memo 2008). When in the tiltrotor configuration ("helicopter mode"), the MV-22 aircraft's engine exhaust is directed downward. This places the engine exhaust exit 4.33 feet (1.32 meters) above the ground. To reduce heating of the ground and aircraft components, the MV-22 incorporates an exhaust deflector system, which directs the exhaust outward, away from the aircraft and the ground. With exhaust deflectors off, the MV-22 exhaust temperature at the exit plane is 515° F (268° Celsius [C]) above ambient temperature, decreasing to 150° F (66°C) above ambient temperature at a distance of 4.33 feet (1.32 meters) above the ground. At the time of the NAVAIR assessment in 2008, there had been one documented grass fire attributed to MV-22 exhaust. The probable cause of the fire was an inoperative exhaust deflector. NAVAIR conducted a safety assessment of grass fire risk caused by hot exhaust, taking into account circumstances such as rigid (woody) vegetation extending higher into the exhaust stream, and leaking fuel or hydraulic fluid after an extended period with the engines shut down. NAVAIR assessed the predicted frequency of a catastrophic grass fire event as Remote (see Enclosure 3). Hazard categorizations, from lowest to highest frequency, are as follows: Improbable, Remote, Occasional, Probable, Frequent. Available data indicate that under normal operations, with exhaust deflectors operating, MV-22 exhaust should not heat the ground to a temperature high enough to support combustion of plant-based materials. As of July 22, 2011, after approximately 110,000 MV-22 and CV-22 (Airforce version of the MV-22) combined flight hours and operations at numerous unprepared (unpaved) LZs, the rate for reported grass fires ignited by MV-22 exhaust is categorized as Occasional (Pers. Com. Don Bein 2011). Additional operational measures such as avoiding vegetation directly beneath the aircraft and limiting time the aircraft is on deck at unprepared LZs would further minimize this risk of fire. U.S. Army Garrison Hawaii has an Integrated Wildland Fire Management Plan that provides a comprehensive approach to address and reduce the frequency of wildfires, impacts of training-related fires, and associated costs and damages. The plan, which covers the Army's Oahu and Pohakuloa training areas, complies with all applicable laws, regulations, and U.S. Fish and Wildlife Service (USFWS) Biological Opinions issued for these areas. It also fulfills requirements of the Army Wildland Fire Policy Guidance of September

2002. Within the Integrated Wildland Fire Management Plan are Standing Operating Procedures for Oahu and PTA. During training operations at PTA, a standby crew will be called depending on the type of training, prevailing weather conditions and location of training. This crew includes a helicopter fire-bucket response team (Pers. Com. Erick Moller 2011). At the TFTA, LZs are monitored to determine the height of the vegetation, especially before any training event. Range management will cut vegetation/brush when needed. In the unlikely event that a fire should start at an LZ, a helicopter fire-bucket is ready to respond (Pers. Com. Frank Raby 2011). Many of these procedures focus on the protection of ESA-listed species and their habitats. Each Oahu and PTA training area has specific Fire Danger Rating System restrictions that those using the training areas must be aware of and adhere to. Fire breaks and fuel management are part of the fire control system (U.S. Army July 2010).

6.0 Conservation Measures

The Army currently implements Conservation Measures issued by the USFWS in the 2003 and 2008 Biological Opinions to prevent nene interaction during training (USFWS 2003, USFWS 2008). This section describes the U.S. Army nene Conservation Measures, which the U.S. Marine Corps will follow in use of MV-22s.

Personnel Education

• Military units will be briefed regarding ranges that experience nene visits. Pamphlets will be provided outlining the Army's responsibility under the ESA.

• Range Control and military units will alert the PTA natural resource staff if a dead nene is found, in which case the USFWS will be informed within 48 hours. The dead bird will be collected by PTA natural resource staff and submitted to the appropriate authority for necropsy.

• Range Control will provide unit commanders with a nene information packet if/when units schedule a range frequented by nene (45 days out).

Aviation Training

• Pilots will be briefed on potential air strikes and nene.

PTA Support Systems and Functions

• All nene sightings will be reported to the PTA natural resource staff daily via the telephone.

• Units will coordinate with the PTA natural resource staff if nene are in or adjacent to work areas.

• A minimum distance of at least 30 m (100 feet) will be maintained from nene.

•Natural resource staff will develop a "no-go" area where nene nests are discovered. This no-go area includes the nest site plus a 200 m (600 ft) buffer in all directions around the nests. The buffer area will be marked with Seibert stakes. No training will be allowed in these no-go areas. The airspace above the 200 m (600 ft) buffer will also be off-limits to helicopter training. If there is a road adjacent to the nest that bisects the no-go area, the road will be off limits to all traffic until the birds have left the area. Natural resource staff will develop and distribute maps that clearly show the no-go areas and educate incoming military units of the no-go areas during the nesting season.

• All military units as well as range maintenance and operations personnel will be briefed about disposing of rubbish and food waste properly.

7.0 Conclusion

The DoN has determined that the proposed action would have no effect on the ESA-listed plant species *Stenogyne agustifolia* or bird species *Branta sandvicensis*. DoN also concludes that the proposed action may effect, but is not likely to adversely affect (NLAA), *Lasiurus cinereus semotus*. DoN requests USFWS concurrence with this NLAA determination. The proposed action would not result in the destruction or adverse modification of federally-designated critical habitat because federally-designated critical habitat is not present in the proposed action area.

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Enclosure 2, SWCA Survey Report see Appendix F-3, Natural Resource Survey

Enclosure 3, Risk of Fire From V-22 Exhaust see Appendix F-1, Memorandum: Risk of Fire from V-22 Exhaust

NAVAIR System Safety Risk Assessment Matrix

HAZARD CATEGORIZATION		SEVERITY			
		CATASTROPHIC (I)	CRITICAL (II)	MARGINAL (III)	NEGLIGIBLE (IV)
FREQUENCY	FREQUENT (A) > 100/100K flt hrs	1	3	7	13
	PROBABLE (B) > 10 to ≤ 100/100K flt	2	5	9	16
	OCCASIONAL (C) > 1.0 to ≤ 10/100K flt	4	6	11	18
	REMOTE (D) > 0.1 to ≤ 1.0/100K flt	8	10	14	19
	IMPROBABLE (E) ≤ 0.1/100K flt hrs	12	15	17	20

Risk level	Acceptance / Approval
HIGH	Risk Acceptance: ASN (RDA) User Concurrence (Acquisition): OPNAV Nx User Concurrence (In Service): TYCOM Technical Approval: AIR-00
MEDIUM	Risk Acceptance: PMA Technical Approval: AIR-4.1
SERIOUS	Risk Acceptance: PEO/AIR-00 User Concurrence (Acquisition): OPNAV Nxy User Concurrence (In Service): TYCOM Technical Approval: AIR-4.0
LOW	Risk Acceptance: PMA Technical Approval: AIR-4.1

Severity is the worst credible consequence of a hazard in terms of degree of injury or property damage as defined below:

Catastrophic - Class A* (Equipment/Environment Damage ≥ $10M / DoD aircraft destroyed / fatality / permanent total disability)
Critical - Class B ($500K ≤ Equipment/Environment Damage < $10M / permanent partial disability / hospitalization of 3 or more personnel)
Marginal - Class C ($50K ≤ Equipment/Environment Damage < $500K / injury results in 1 or more lost workdays)
Negligible - Less than Class C (Equipment/Environment Damage < $50K / Injury results with no lost workdays)
* Dollar Threshold for Catastrophic Severity is Tailored for NAVAIR Process

Probability *of occurrence for discrete events may replace* ***Frequency*** *based on the chart below*

Frequent	Probable	Occasional	Remote	Improbable
$P > 10^{-3}$	$10^{-3} \geq P > 10^{-4}$	$10^{-4} \geq P > 10^{-5}$	$10^{-5} \geq P > 10^{-6}$	$10^{-6} \geq P$

Enclosure 1

5

NAVAIR

Enclosure 4, NAVAIR System Safety Risk Assessment Matrix

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

TAKE PRIDE IN AMERICA

In Reply Refer To:
2012-I-0085

FEB 17 2012

Ms. Karen Sumida
Business Line Manager - Environmental
Naval Facilities Engineering Command, Pacific
258 Makalapa Drive, Suite 100
Pearl Harbor, Hawaii 96860-3134

Subject: Informal Section 7 Consultation for Operation of U.S. Navy and U.S. Marines MV-22 Aircraft on U.S. Army Training Areas on Oahu and Hawaii

Dear Ms. Sumida:

The U.S. Fish and Wildlife Service (Service) is in receipt of your letter and biological evaluation, dated November 18, 2011, requesting our concurrence with your determination that the proposed project is not likely to adversely affect the federally endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*). The proposed project is the operation of two squadrons of the tilt-rotor MV-22 Osprey and one squadron of H-1 Cobra/Huey aircraft on U.S. Army (Army) training areas on the islands of Oahu and Hawaii. Previous Biological Opinions with the Army covered this type of aircraft training; however, rotor wash from the MV-22 exceeds aircraft currently used by the Army so an increased area of effect (350 foot radius) was evaluated for each existing landing zone. The U.S. Navy (Navy) agrees to follow existing minimization and avoidance measures outlined in the Army's Biological Opinions: Routine Military Training and Transformation of the 2nd Brigade 25th Infantry Division U.S. Army Installations Island of Oahu and Routine Military Training and Transformation of the 2nd Brigade 25th Infantry Division U.S. Army Installations Island of Hawaii. Your biological evaluation also makes a no effect determination for the plant species *Stenogyne angustifolia* and Hawaiian goose (*Branta sandvicensis*) found at Pohakuloa training area (PTA). We reviewed the proposed project and based on the locations of the landing zones we requested additional information on listed species not considered in the biological evaluation. This information was provided via telephone and electronic mail from your staff between December 20, 2011 and February 13, 2012. The Navy, after discussion with the Service, changed the determination of the Hawaiian goose and requested our concurrence that the proposed project is not likely to adversely affect via telephone and electronic mail on February 13, 2012. This response is in accordance with section 7 of the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 *et seq*.).

Hawaiian Hoary Bat

The Hawaiian hoary bat is a medium-sized [0.5-0.8 ounces (14-22 grams)], nocturnal, insectivorous bat. The Hawaiian hoary bat is known from the islands of Hawaii, Maui, Oahu, Kauai, and Molokai. Population numbers are not known, but Hawaiian hoary bats are observed regularly on Hawaii, Kauai, Maui and North shore of Oahu. There is a general lack of historical and current data on this subspecies, and its present status is not well understood. Habitat requirements for the Hawaiian hoary bat are also not well known. Bats are most often observed foraging in open areas, near the edges of native forests, or over open water, although this may be due to the ease of detection in these habitats. Hawaiian hoary bats roost solitarily in the foliage of trees.

Threats to the Hawaiian hoary bat include historical habitat destruction (elimination of roosting sites), and possibly direct and indirect effects of pesticides, introduced insects, and disease. Additionally, there is evidence that fences with barbed wire result in bat mortality from entanglement. Vegetation clearing potentially impacts the Hawaiian hoary bat. Clearing woody vegetation greater than 15 feet (4.6 meters) tall during the bat-birthing and pup-rearing season (June 1 - September 15) could potentially cause harm to bats. During the pupping season, females carrying their pups may be less able to rapidly vacate a roost site as the vegetation is cleared; additionally, adult female bats may leave their pups in the roost tree while they themselves forage, leaving very small pups unable to leave a tree that is being felled. Potential adverse effects from such disturbance can be avoided or minimized by not clearing vegetation between June 1 and September 15, the period in which bats are at greatest risk.

Project Impacts to Hawaiian Hoary Bat

The potential indirect impacts from helicopter flight training on Hawaiian hoary bat includes: 1) rotor wash from helicopters; and 2) ignition of a wildfire due to a helicopter exhaust or crash landings.

Based on data provided by the Navy, rotor wash is not of sufficient strength to knock roosting bats from trees, nor are there roosting trees within the 350 foot perimeter of established landing zones. As outlined in the Navy draft Environmental Impact Statement (EIS) for Basing of MV22 and H1 Aircraft in Support of III MEF Elements in Hawaii, only two percent of the total flight operations would be during the nighttime period, which would be the times hoary bats could be foraging. Therefore, the likelihood of hoary bat interaction is minimal.

Since the MV-22 aircraft has become operational there has been one incident of a grass fire as a result of an exhaust deflector system failure that occurred in Troy, Alabama on May 2007. The U.S. Naval Air Systems command assessed the overall operation of V-22 type aircraft and the vegetation conditions at landing zones in Hawaii, and based on history of V-22 training, determined threats of a grass fire is less than one event per million flight hours. In addition, according to the draft EIS, since 2004, the MV-22 has flown for 73,917 hours with one Class A mishap in 2007, resulting in a mishap rate of 1.35 mishaps per 100,000 flight hours. Your staff has estimated that annual flight operations will be approximately 2,500 hours per squadron, with two squadrons of MV-22s (24 total aircraft) and the squadron of H-1s (27 total aircraft) planned in the Hawaiian Islands. Combined annual flight hours would be 5,000 for the two squadrons.

This information supports the assessment and that the threat of wildfire due to training with MV-22 aircraft is discountable.

In addition, maintenance for these established landing zones is not expected to remove large woody vegetation suitable for bat roosting; however, if woody vegetation taller than 15 feet tall must be cleared it will not be cleared between June 1 and September 15 each year.

Therefore, based on above information and additional information provided by the Navy, the Service concurs with your determination this proposed training may affect, but is not likely to adversely affect the Hawaiian hoary bat.

Hawaiian Goose

The Hawaiian goose is a medium-sized goose, with an overall length of approximately 63 to 69 cm (25 to 27 in). This species is adapted to a terrestrial and largely non-migratory lifestyle in the Hawaiian Islands with limited freshwater habitat. Hawaiian goose wings are 16 percent smaller and their flight is weaker than the closely related Canada goose. Nonetheless, Hawaiian geese are capable of both interisland and high altitude flight. For the Hawaiian geese in the wild nesting season is considered October thru March. Fossil evidence indicates Hawaiian geese historically occurred on all the main Hawaiian Islands. Currently, there are wild populations of Hawaiian geese on the islands of Hawaii (480 individuals), Maui (386 individuals), Molokai (112 individuals), and Kauai (910-1000 individuals. After narrowly avoiding extinction in the 1940s and 1950s, Hawaiian geese populations have been slowly rebuilt through captive-breeding programs. As a result of such programs, Hawaiian geese have been reintroduced onto four of the main Hawaiian Islands (Kauai, Maui, Molokai, and Hawaii).

The Hawaiian goose was listed as endangered in 1967. The Hawaiian Goose Recovery Plan was first written in 1983. A Draft Revised Recovery Plan for the Hawaiian Goose (2004) incorporated a considerable amount of new information in the fields of genetics, paleontology, nutrition, behavior, effects of predation, and predator control. The primary limiting factors currently affecting Hawaiian goose recovery are predation by introduced mammals, insufficient nutritional resources for both breeding females and goslings, limited availability of suitable lowland habitat, and human-caused disturbance and mortality.

In order for Hawaiian goose populations to survive, they must be provided with relatively predator-free breeding areas and sufficient food resources, human-caused disturbance and mortality must be minimized, and genetic and behavioral diversity maximized. At the same time, it is recognized that Hawaiian geese are highly adaptable, successfully utilizing a gradient of habitats, ranging from highly altered to completely natural, which bodes well for the recovery of the species.

Project Impacts to Hawaiian Goose

The potential indirect impacts from helicopter flight training on Hawaiian geese includes: 1) helicopter training activity disturbing nesting birds; and 2) bird strike from helicopters. In the

biological evaluation the following avoidance and minimization measures were discussed:

- All Hawaiian goose sightings will be reported to PTA Natural Resource staff daily via telephone.
- Units will coordinate with PTA natural resources staff if Hawaiian geese are adjacent to training areas.
- A minimum distance of 100 feet will be maintained from Hawaiian goose.
- Natural resources staff will develop a "no-go" area where nests are discovered. This no-go area includes the nest site plus a 600-foot buffer in all directions around the nests. The buffer area will be marked with Seibert stakes. No training will be allowed in these no-go areas until nests have fledged. The airspace above the no-go area will be off-limits to helicopter training. If there is a road adjacent to the nests that bisect the no-go area, the road will be off limits to all traffic until the nest fledges or birds have left the area. Natural Resources staff will develop and distribute maps that clearly show the no-go areas and educate incoming military units of the no-go areas during nesting season (October thru March).
- To avoid attracting mammalian predators all military units as well as range maintenance and operation personnel will be briefed about disposing of rubbish and food wastes properly.

Bird airstrikes are considered rare in Army training areas in Hawaii. According to the draft EIS between 2001 and 2010 there have been two collisions with Army training aircraft. It is anticipated that pilots will be able to avoid birds in flight because Hawaiian geese are large bodied easily visible when in flight and helicopters are highly maneuverable. If Hawaiian geese occupy a landing zone and do not flush during training, then the landing zones will be avoided.

Based on the above minimization and avoidance measures and information provided, the Service concurs this proposed training may affect, but is not likely to adversely affect the Hawaiian goose.

Recent satellite telemetry work collected by U.S. Geological Survey on Hawaiian geese indicates they are prevalent throughout training areas of PTA. In addition, it is our understanding the Hawaiian goose population at PTA may increase as a result of the April 19, 2011, Governor Proclamation relocating endangered Hawaiian geese from Kauai Lagoons Resort. It is anticipated that 200 to 300 geese will be released on the Big Island in the vicinity of PTA as a result of the relocation in the next three years (2012-2014). The Army is currently proposing to reinitiate the Biological Opinion for PTA. The Navy proposed training actions may change as a result of potential new conservation measures to minimize potential adverse effect to Hawaiian goose. Your future actions would be subject to implementation of any revised conservation measures for Hawaiian goose at the conclusion of that consultation. We look forward to working with you and your staff on this issue.

We appreciate your efforts to conserve listed species. If you have further questions regarding this letter, please contact Aaron Nadig, Fish and Wildlife Biologist (phone: 808-792-9400; fax: 808-792-9581).

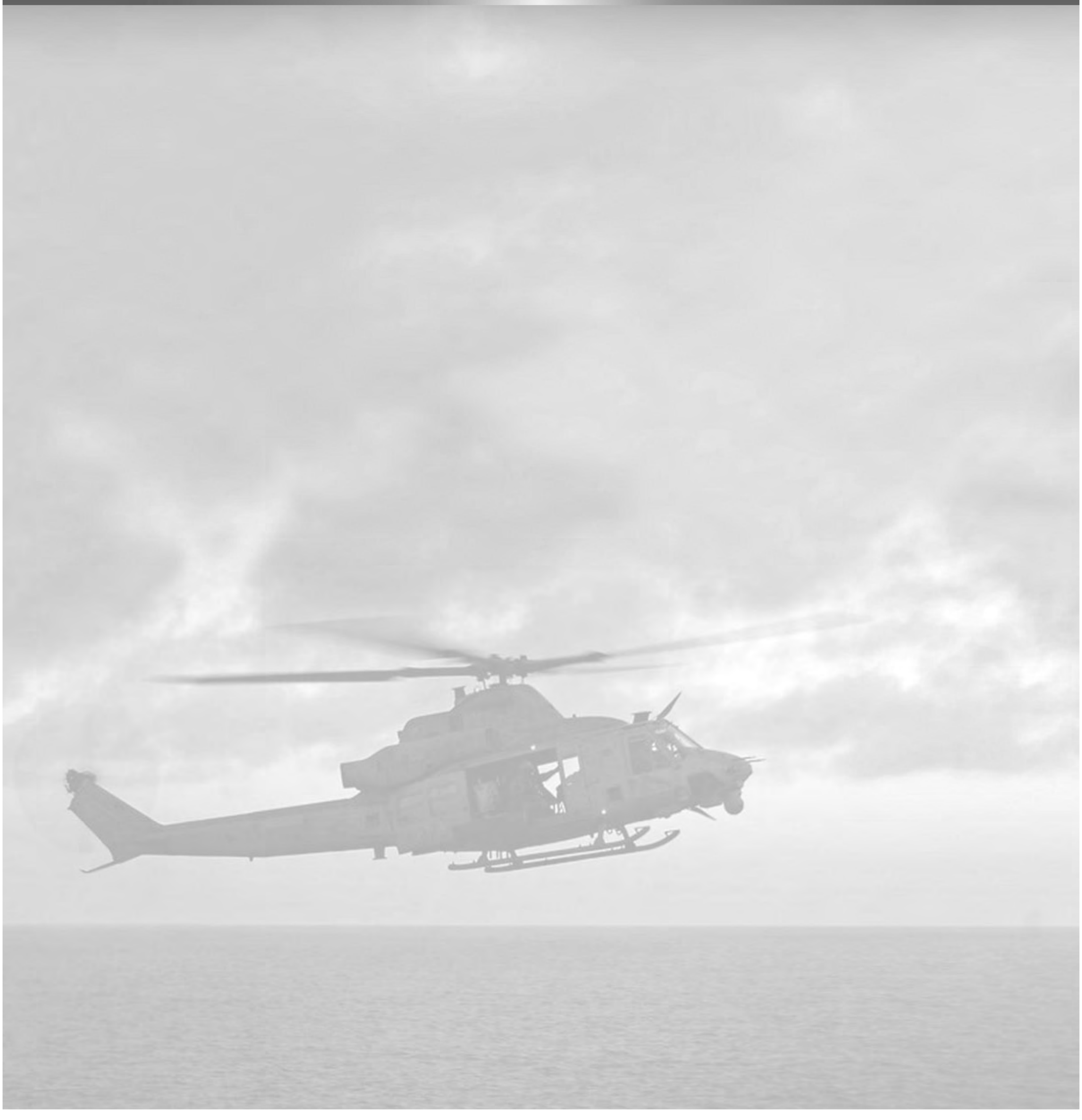
Sincerely,

for Loyal Mehrhoff
Field Supervisor

cc: Dr. Diane Drigot, USMC Base Hawaii
Michelle Mansker, Army Environmental

APPENDIX K

NHPA Section 106 Documentation



Consulting Party List

Consulting Party	Consulting Party Representative
‘Aha Kukaniloko/Koa Mana	Mr. Tom Lenchanko
Advisory Council on Historic Preservation (ACHP)	Ms. Louise Brodnitz
Aloha First	Ms. Kaui Maukele
Boyd ‘Ohana	Ms. Nau Kamalii
Cheryl Lovell-Obatake	Ms. Cheryl Lovell-Obatake
Diamond ‘Ohana	Mr. Van Horn Diamond
Flores-Case 'Ohana	Mr. Kalani Flores
Hawaii’s Thousands Friends	Ms. Donna Wong
Hawaiian Civic Club of Waimanalo	Ms. Kuulei Laughlin
Historic Hawaii Foundation (HHF)	Ms. Kiersten Faulkner
Ho`okipa Network -Kaua`i	Ms. Puanani Rogers
Hui Malama I Na Kupuna O Hawai’i Nei	Mr. Halealoha Ayau
Ka Lahui Hawaii	Ms. Clara Sweets Matthews
Ka 'Ohana O Kalaupapa	Ms. Valerie Monson
Kahu Ku Mauna	Mr. Chad Kālepa Baybayan
Kalaupapa National Historic Park (NHP)	Mr. Steve Prokop (Superintendent)
Kekoolani ‘Ohana	Ms. Terrilee Napua Kekoolani Raymond
Kekumano ‘Ohana	Mr. Cy Harris
Keohokalole 'Ohana	Ms. Emalia Keohokalole
Koolauloa Hawaiian Civic Club	Ms. Cathleen Mattoon
Ko'olaupoko Hawaiian Civic Clubs	Ms. Mahealani Cypher
Ku Ching	Mr. Ku Ching
Lori Buchanon	Ms. Lori Buchanon
Moanike'ala Akaka	Ms. Moanike'ala Akaka
Na Ohana Papa O Mana	Mr. Kunane Aipoalani
Nation of Hawaii	Mr. Dennis Kanahele
National Trust for Historic Preservation (NTHP)	Ms. Elizabeth Merritt
Native Hawaiian Researchers Ohana	Mr. Fred Cachola
NHL Program Manager National Park Service (NPS)	Ms. Elaine Jackson-Retondo
Oahu Island Burial Council	Chairperson
Office of Hawaiian Affairs (OHA)	Mr. Keola Lindsey
Olds ‘Ohana	Ms. Nalani Olds
Ortiz ‘Ohana	Ms. Delilah Ortiz
Paguyo ‘Ohana	Ms. Ella Pagauyo
Paoa Kea Lono ‘Ohana	Ms. Donna Ann Camvel
Prince Kuhio Hawaiian CC	Ms. Chasmin Sokolovski
Pu’uhonua O Waimanalo Neighborhood Board	Ms. Regina Makai
Richard Likeke Papa	Mr. Richard Likeke Papa
Sec of Interior, NPS Pacific Western Regional Office (PWRO), Regional Director	Ms. Christine Lehnertz
State Historic Preservation Officer (SHPO)	Mr. William Aila
Temple of Lono	Mr. Clive Cabral
Waimanalo Neighborhood Board	Mr. Wilson Kekoa Ho

APPENDIX L

CZM Consistency Determination

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND, PACIFIC
258 MAKALAPA DR., STE. 100
PEARL HARBOR, HAWAII 96860-3134

5090P.1F14C
Ser EV2/56
February 28, 2012

Mr. Jesse K. Souki, Director
State Office of Planning
PO Box 2359
Honolulu, HI 96804

Dear Mr. Souki,

SUBJECT: FEDERAL CONSISTENCY ASSESSMENT FOR THE BASING OF MV-22 AND H-1 AIRCRAFT IN SUPPORT OF III MARINE EXPEDITIONARY FORCE ELEMENTS IN HAWAII

In response to requests from your office (Mr. John Nakagawa's e-mails of January 9, 11, and 20, 2012) for additional information regarding our submittal of a Federal Consistency Assessment form covering the proposed action, the Department of the Navy (DoN) is providing additional information herein. We understand that your request for additional information originated from three of the public responses to your notice regarding the subject assessment, published in the January 8, 2012 Office of Environmental Quality Control *Environmental Notice*. Said notice specified that Coastal Zone Management review was limited to aviation training operations proposed to occur at Upolu Airport on the island of Hawaii, and at Kalaupapa Airport on the island of Molokai.

Two of the comment letters which your office received during the CZM public review process were also among those received by us during the public comment period for the Draft Environmental Impact Statement (DEIS) for the Basing of MV-22 and H-1 Aircraft in Support of III MEF Elements in Hawaii, the subject of our CZM consistency assessment. The third letter (e-mail) included comments common to others that we received. All comments received during our DEIS public comment period are part of the public record for the proposed action. Following National Environmental Policy Act (NEPA) regulations and/or common practice, DoN will review each of these public comments to determine if additional analysis is required before publication of the Final Environmental Impact Statement (FEIS) and conduct that analysis where warranted. Responses to comments received during the public comment period, to include a description of how the comment was handled, will be included in the FEIS, scheduled for public availability at the end of March 2012.

Please note that, since the publication and public review of the DEIS, the Marine Corps has re-evaluated the proposed use of Upolu Airport. The Marine Corps now intends to use the airport primarily for infrequent, routine flight operations, with Upolu serving as a divert landing area when use of the Army's Pohakuloa Training Area is temporarily disrupted (for example, during adverse weather conditions). The Marine Corps does not intend to conduct Confined Area Landing training as originally proposed in the DEIS. For occasional specific, short-term

exercises, the Marine Corps would follow the procedures for requesting approval to use Upolu Airport from the State of Hawaii Department of Transportation (DOT), Airports Division.

Regarding Upolu Airport in general, the figure of 800 annual flight operations in 2011 cited in the DEIS was provided by the State DOT and is an estimate, since the airfield does not have an air traffic control tower. This estimate represents flights by all users (including military training operations), with each landing and take-off by an aircraft normally counted as two operations. Military training has occurred at Upolu on an irregular and infrequent basis for many years, most recently in August 2011, when the U.S. Army conducted two days of training under a State permit.

Aircraft noise contours at Upolu Airport are expected to be consistent with those in the State's Upolu Airport Master Plan and Final Environmental Assessment (EA) of March, 1999. The noise analysis in the EA included military use of the airfield at the time, including mostly helicopters (e.g., UH-60 Blackhawks) and a few fixed-wing, C-130, operations. Estimated annual operations noted in our DEIS were comparable with those analyzed in the 1999 noise model. The State's noise analysis showed that for the base year (1997) and the projected year (2020), the 55-decibel day-night average sound level contour falls within the existing airport property and eastern aviation easement.

In accordance with the National Historic Preservation Act, the Marine Corps is conducting Section 106 review and consultation for the proposed undertaking of basing and training with MV-22 and H-1 aircraft in Hawaii. The proposed operations at Upolu Airport would occur on the paved runway within the fenced portion of the property. No cultural or archaeological features or historic resources are known or expected to occur within or near the airport area or to be affected by aircraft rotor downwash. The DEIS disclosed the relative proximity of the Kamehameha Birthsite (about 0.75 mi) and Mo'okini Heiau (about 1.25 mi) to the airport. The sites are not likely to be physically affected by the Marine Corps' use of Upolu Airport, since Marine Corps aircraft would normally approach and depart over water to the maximum extent possible. The proposed use of these aircraft would not adversely affect traditional use of those sites, since there would be no increase in overall noise or significant increase in operations.

The DEIS analysis also indicated that use of the airport would not significantly affect existing public access, local economy, lifestyle or tourism.

With respect to natural resources such as soil, water, reef, flora and fauna (including whales), NEPA specifies that impacts should be discussed in proportion to their potential significance; criteria are used to determine the appropriate level of analysis. Given normal flight operations within the context of an existing airport with a paved runway, new surveys or detailed analyses were unwarranted. Community efforts to restore native coastal vegetation, retard soil erosion, or to acquire coastal land for cultural preservation and public access would not be affected by infrequent use of the airport by Marine Corps aircraft. The DEIS disclosed the apparent use of

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February 28, 2012

Upolu Airport as a roosting site for a small number of Pacific golden plover (*Pluvialis fulva* or kolea) that remain during the summer in North Kohala. Bird Aircraft Strike Hazard risk would be managed through compliance with procedures by air crews to avoid high-hazard situations and determine whether to alter or discontinue operations. Weather conditions such as rain and high winds in the vicinity of Upolu would be taken into account as they would at any time Marine Corps pilots fly. As transient users of the airport, the air squadrons would not be expected to require water or wastewater facilities.

Regarding public participation, the DoN followed NEPA and Council on Environmental Quality regulations, as well as typical practices when planning and publicizing public scoping meetings prior to the start of the EIS, and public meetings following release of the DEIS. The DoN believes that the Waimea meeting venue for the DEIS public meeting was appropriate and accessible to residents interested in the proposed action. Waimea is in a centralized location and serves as North Kohala's commercial hub. The distance between Hawi/Kapa'au and Waimea (approximately 25 miles) is not considered unreasonable - for example, Kailua-Kona residents who attended the meeting drove about 40 miles.

If you have any questions, please contact Mr. John Bigay of our EV planning product line at 808-472-1196, or email john.bigay@navy.mil.

Sincerely,

KAREN SUMIDA
Business Line Manager
Environmental