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**APPENDIX L**

**CULTURAL RESOURCES PROGRAMMATIC  
AGREEMENT**

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Preserving America's Heritage

April 24, 2009

Matthew T. Margotta  
Colonel, U.S. Army  
US Army Installation Management Command, Pacific Region  
Headquarters, United States Army Garrison, Hawaii  
851 Wright Avenue, Wheeler Army Airfield  
Schofield Barracks, HI 96857-5000

REF: *Programmatic Agreement Among the U.S. Army Garrison-Hawaii, the Hawaii State Historic Preservation Officer, and the Advisory Council on Historic Preservation for Section 106 Responsibilities for Routine Military Training at Makua Military Reservation, Oahu Island, Hawaii*

Dear Colonel Margotta:

Enclosed is the executed Programmatic Agreement for the referenced program. By carrying out the terms of this Agreement, the Army will have fulfilled its responsibilities for this undertaking under Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's regulations.

We appreciate your cooperation in reaching this agreement. If you have any questions, please call Kelly Yasaitis Fanizzo at 202-606-8583.

Sincerely,

Caroline D. Hall  
Assistant Director  
Federal Property Management Section  
Office of Federal Agency Programs

Enclosure

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PROGRAMMATIC AGREEMENT  
AMONG  
THE U.S. ARMY GARRISON-HAWAII,  
THE HAWAII STATE HISTORIC PRESERVATION OFFICER, AND  
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION  
FOR SECTION 106 RESPONSIBILITIES FOR ROUTINE MILITARY TRAINING AT  
MAKUA MILITARY RESERVATION, OAHU ISLAND, HAWAII

WHEREAS, the U.S. Army Garrison-Hawaii (Garrison) has a mission to operate and maintain training areas and ranges in the State of Hawaii in support of the training of military personnel and units; and

WHEREAS, the Garrison has determined that routine military training at Makua Military Reservation (MMR), such as live-fire training, maneuvers, soldiers on foot as defined in Appendix A and defined in Stipulation 3.b of this document are undertakings that may have adverse effects upon historic properties; and

WHEREAS, the Area of Potential Effects (APE) for this training is defined as Makua Military Reservation as shown in Appendix B; and

WHEREAS, the Garrison has consulted with the Hawaii State Historic Preservation Officer (SHPO), and the Advisory Council on Historic Preservation (ACHP), pursuant to 36 CFR Part 800.14(b)(3) and 800.6(a)(1)(i)(C) of the regulations (36 CFR Part 800) implementing Section 106 of the National Historic Preservation Act (16 U.S.C. § 470f) (NHPA) to develop this Programmatic Agreement (PA) for the resolution of adverse effects from routine military training at MMR; and

WHEREAS, the Garrison consulted with the Office of Hawaiian Affairs, Hui Malama I Na Kupuna O Hawaii Nei, the Oahu Island Burial Council, members of Aha Kukaniloko/Koa Mana, Malama Makua, Hui Malama O Makua, and other Native Hawaiian families and individuals who attach traditional religious and cultural importance to historic properties within the APE (consulting Native Hawaiian organizations) (Appendix C) and invited them to participate as concurring parties to this agreement; and

WHEREAS, the identification of historic properties in the APE for routine military training at MMR have occurred through pedestrian survey, subsurface testing, and a survey of traditional religious and cultural properties survey as documented in Appendices D and E (showing survey) in all areas that do not present a threat to human health and safety pursuant to 36 CFR Part 800.4; and the Garrison has determined that all known and future sites will be treated as eligible for inclusion in the National Register of Historic Places (NRHP) until a formal evaluation determines otherwise; and

WHEREAS, 121 historic properties listed in Appendix F and shown in Appendix B were identified within the APE; and

WHEREAS, this PA will not supersede any legal agreements including, but not limited to, the 2001 Settlement Agreement between Malama Makua and the Army; and

NOW THEREFORE, the Garrison, SHPO, and ACHP (signatories) agree that the undertaking shall be implemented in accordance with the following stipulations in order to take into account the effect of the undertaking on historic properties.

## STIPULATIONS

The Garrison shall ensure the following:

### 1. General

a. Should any activity within the APE be proposed that differs from the activities described Appendix A or Stipulation 3, the Garrison shall consult on such undertakings on a case-by-case basis pursuant to Section 106 of the NHPA, as they fall outside the scope of this PA, or seek amendment of the PA pursuant to Stipulation 6 to bring the activity within the scope of this PA.

b. The Garrison will ensure that the treatment actions undertaken pursuant to this PA are performed by or under the direct supervision of the Garrison Cultural Resources Manager (CRM) and in consultation with a person having a minimum of 1 year experience in Hawaiian Archeology as well as familiarity with Native Hawaiian culture.

### 2. Additional Identification and Evaluation

Further identification and NRHP evaluations may occur as a result of post training monitoring, from discovery situations, or when funds are available to formally evaluate currently known "undetermined" sites. Sites identified through the above mentioned situations will be evaluated against criteria found in 36 CFR Part 60.4 and in consultation with SHPO, Native Hawaiian organizations, groups, families, and individuals who ascribe traditional religious and cultural importance to historic properties at MMR, and consulting Native Hawaiian organizations and other consulting parties. Until formal evaluations are completed, all archeological sites within the APE will be treated as eligible for listing in the NRHP.

### 3. Treatment.

a. The Garrison will implement the following measures to ensure protection of historic properties within the APE.

b. Pre-training activities:

(1) The Garrison will mark the boundaries of all known historic properties in areas currently used for training with Seibert stakes. These stakes shall

establish a buffer zone of no less than 15-20 meters from the exterior boundary of a historic property. Garrison will begin consultation with SHPO, and consulting Native Hawaiian organizations and other consulting parties regarding appropriate protective measures for sites within the South Fire Break Road within 4 months from the execution of the PA. Military personnel will use multiple safety checks, as highlighted in Appendix A, to ensure protection of historic properties. The Garrison will report these efforts pursuant to Stipulation 10.

(2) The Garrison, when placing target objectives and training aids in new locations, will ensure avoidance of historic properties. When placing new targets and training aids without ground disturbance, for example portable containers and mockup targets, a cultural resources staff member will accompany range personnel to ensure avoidance of historic properties. The Garrison will report on these new locations pursuant to Stipulation 10.

(3) When placement of new targets requires ground disturbance, the Garrison will request an expedited review by consulting Native Hawaiian organizations and other consulting parties with a 7 day notification about the location.

(4) Together and within 8 months of the execution of this PA, the Garrison and experts from the community identified by the consulting Native Hawaiian organizations, if available, will update cultural awareness training programs for monitors, contractors and military personnel, which will include: grass cutters, maintenance, range personnel, military personnel, trainers and other parties.

(5) Based on the training programs developed, the Garrison will annually educate military personnel, and contractors working at MMR in cultural resource awareness and in the protection and avoidance of historic properties. Cultural awareness training will be required for all new hires and shall take place at least once per year thereafter. Instruction includes field trips, classroom training, and printed literature. Unit commanders and designated staff, who will train at MMR, as well as Range Control personnel, will be briefed by the Cultural Resources staff. The Garrison will report on training given during the year pursuant to Stipulation 10.

(6) The Garrison will provide all relevant offices within the Garrison, including fire fighting personnel and range personnel, information on the site protective measures described in Stipulation 3.b.(1) in place at MMR, maps of site locations, and a summary of their purpose and required actions to ensure their effectiveness.

c. Training Activities:

(1) Garrison training personnel will maintain a record of all artillery and mortar rounds that do not land within the designated impact area.

(2) For unexploded munitions that land outside the designated impact area, the Garrison will identify whether and how the munitions were disposed of. Further details of handling Unexploded Ordnance (UXO) are covered in Stipulation 4.f.

d. Post-training activities:

(1) The Garrison will monitor historic properties within the South Fire Break Road in accordance with Appendix G, Archaeological Site Monitoring Plan. The Monitoring Plan will be carried out by personnel from the Garrison Cultural Resource Program. The monitoring will take place initially every month for the first four months after live fire training commences and then subsequently every two months at appropriate intervals between live fire exercises to assess the effectiveness of the site protection measures and any effects to known or new historic properties. After the first 16 months of live fire training, the Garrison will perform monitoring on a quarterly basis.

(2) The Garrison will provide round out-of-impact area logs and monitoring reports to SHPO and all consulting Native Hawaiian organizations and other consulting parties within 21 days of the monitoring schedule reflected in Stipulation 3d(1). In addition, the Garrison will submit monitoring records, round out-of-impact area logs, fire response activities and photographic documentation in each annual reporting in accordance with Stipulation 10.

(3) Whereupon completion of monitoring, the monitor(s) have identified effects to potential historic properties, the CRM shall initiate consultation with consulting Native Hawaiian organizations and other consulting parties to determine NRHP eligibility of the property and determine any effects to the qualifying characteristics that define the property's significance. If, after such consultation has taken place, the CRM determines that a historic property has been adversely affected, the Garrison will consult with the SHPO and consulting Native Hawaiian organizations and other consulting parties before determining what measures it will implement to mitigate such effects and/or to avoid similar occurrences in the future. The Garrison, to the best of its ability, will endeavor to preserve and protect historic properties considering archaeological data recovery (excavation) measures as a last resort, to be considered only if a property cannot be avoided after all compliance and consultation efforts are followed.

(4) The Garrison will monitor only in areas determined safe to proceed at the time of monitoring by the Safety Officer. Additionally, there will be no monitoring conducted in terrain that is unsafe for general monitoring or outside the South Fire Break Road except in areas cleared of UXO (Appendix H).

(5) In the event UXO is identified, the Garrison will either remove or detonate the ordnance in accordance with Stipulation 4.f. if applicable. If unable to remove or detonate UXO in accordance with 4.f. the CRM will notify consulting Native Hawaiian organizations and other consulting parties and request an expedited (7 days

from notification) consultation to determine the appropriate protection of nearby historic properties prior to the activity. Similarly, the CRM will follow the same notification and consultation procedures if other substances or materials (i.e. fuel spills) that pose a threat to human health and safety are discovered and the removal of such substances will require ground disturbance or have a potential to impact known historic properties.

e. Fire Suppression: In the event that a fire should occur, the Garrison will follow the procedures established in its Fire Management Plan. The Fire Incident Commander/Fire Management Officer (IC/FMO) will notify the CRM. A record of fire occurrences and treatment activities will be provided in the Annual report to consulting Native Hawaiian organizations and other consulting parties in accordance with Stipulation 3.d.(2) and Stipulation 10.

4. Exempted Undertakings. Certain activities at MMR will be exempt from further Section 106 consultation if the CRM determines, prior to the commencement of the activity, that the activity falls within one of the categories listed below in Stipulation 4.a. through 4.f., and that the proposed activity lacks the potential to adversely affect historic properties. The Garrison shall include information regarding any activity proceeding under this stipulation in the first annual report pursuant to Stipulation 10. Additionally, the Garrison will consult with the Signatories and Concurring Parties regarding the need to continue reporting on exempted undertakings throughout the remaining duration of the PA.

a. Maintenance of previously landscaped areas such as groomed areas and tree trimming, as long as personnel carrying out the activities have received proper training and certification by CRM personnel (Appendix I).

b. Repaving or resurfacing of major firebreak roads, helicopter pads, and dip ponds and internal roads within the South Firebreak Road provided that equipment is restricted to previously disturbed areas and CRM personnel are present to ensure equipment stays within those areas (Appendix J).

c. Maintenance and repair of existing military facilities that are not greater than 50 years old and not determined historically significant, such as buildings and parking areas as identified on map, fencing, and emergency repair of water, sewer, telephone, gas and electric utilities (Appendix K).

d. Replacement of existing targets if determined by CRM that the location of the target is not within boundaries of a known historic property.

e. Stockpiling and staging of road repair and paving materials. Prior to utilizing this exemption, the Garrison shall initiate consultation with consulting Native Hawaiian organizations and other consulting parties within 6 months of execution of this PA to identify those areas where the stockpiling and staging of road repair and paving materials may occur without the potential to adversely affect historic properties.

f. Removal of UXO or other substances or materials (e.g., surface propane tank) that pose a threat to human health and safety where: (a) the removal does not require ground disturbance; or (b) ground disturbance only includes detonation at locations where the explosive safety radius does not include known historic properties.

g. Placing target objectives and training aids in new locations without ground disturbance, for example portable containers and mockup targets (see Stipulation 3(b)(2)).

5. Discoveries. In the event that discoveries of cultural resources are made within the APE, activities related to construction or excavation in the vicinity of the discovery shall cease and the Range Officer will immediately be notified. Upon notification, the Range Officer will in turn immediately inform the CRM of the discovery. The CRM will investigate the discovery. If the CRM determines the discovery may be a cultural resource, the CRM will contact the SHPO, the Office of Hawaiian Affairs, and consulting Native Hawaiian organizations and groups in accordance with 36 CFR Part 800.13(b) and 800.4(c)(2). Archeological resources identified through discovery situations will be evaluated by the CRM pursuant to criteria found in 36 CFR Part 60.4 and in consultation with the SHPO, Native Hawaiian organizations and other consulting parties and the CRM will consult with them in accordance with 36 CFR Part 800.13(b) (3). However, the timeframes in 36 CFR Part 800.13(b) (3) will be extended to accommodate determinations on the resources' eligibility per Part 800.4(c) (2). Any discoveries will also be treated in accordance with other applicable laws and regulations.

6. Emergency Activities. No requirement of this PA shall delay immediate actions required in an emergency to protect human health and safety or avoid substantial damage or loss of facilities. Reasonable and prudent efforts, in coordination with the CRM, shall be made to avoid or reduce adverse effects to historic properties during the implementation of immediate emergency actions, documented in writing after the fact with documentation submitted to signatories within 30 days as notification of actions taken and included in the PA annual report addressed in Stipulation 10.

7. Amendment. Any signatory to the PA may propose to the Garrison that the PA be amended, whereupon signatories and consulting Native Hawaiian organizations and other consulting parties will consult to consider such amendments. The amendment will be effective on the date a copy signed by all of the signatories is filed with the ACHP.

8. Termination. If the Garrison Commander determines that it cannot implement the terms of this PA, or if the SHPO or the ACHP determines that the PA is not being properly implemented, the Garrison, the SHPO or the ACHP may propose to the other signatories of this PA that it be terminated. The party proposing to terminate this PA will notify all signatory and concurring parties to this PA in writing, explaining the reasons for

termination and afford the parties thirty (30) days to consult and seek alternatives to termination. Should such consultation fail and the PA be terminated, the Garrison:

- a. Shall comply with 36 CFR Part 800 with regard to each individual undertaking at MMR; and
- b. May consult in accordance with 36 CFR Part 800.14(b)(3) to develop a new PA; and
- c. Shall notify the signatories as to the course of action it will pursue.

9. Duration. This PA shall take effect on the date it is signed by the last signatory and will remain in effect until five years from that date unless terminated pursuant to Stipulation 8. No extension or modification will be effective unless all signatories have agreed in writing pursuant to Stipulation 7.

10. Reports. The Garrison will provide an annual status report by May 30th beginning May 30, 2010 to the SHPO and consulting Native Hawaiian organizations and other consulting parties. The report will be provided to the ACHP upon request. The report will detail the actions the Garrison has undertaken to fulfill the requirements of this PA including those actions covered under exempt activities in Stipulation 4. A meeting will be held with all consulting parties with the release of the first report to discuss its content.

11. Dispute Resolution.

Should any signatory or concurring party to this agreement object at any time to any actions proposed or the manner in which the terms of this agreement are implemented, the Garrison shall consult with the objecting party (ies) to resolve the objection. If the Garrison determines, within thirty days, that such objection(s) cannot be resolved, the Garrison shall:

- a. Forward all documentation relevant to the dispute, including a recommended resolution, to the ACHP. Upon receipt of this documentation, the ACHP shall review and advise the Garrison on the resolution of the dispute within thirty days from the date of ACHP receipt. Any written comment provided by the ACHP, and all comments from the signatories and concurring parties to the agreement, will be taken into account by the Garrison in reaching a formal decision regarding the dispute.

- b. If the ACHP does not provide written comments regarding the dispute within the above thirty-day period, the Garrison may render a decision regarding the dispute. In reaching its decision, the Garrison will take into account all written comments it has received regarding the dispute from any signatory or concurring party.

- c. During the pendency of any dispute and prior to the resolution of such dispute, the Garrison shall continue to carry out all actions under this agreement that

are not subject to or affected by the dispute. The Garrison will notify all signatories and concurring parties in writing of its decision concerning any dispute processed in accordance with this Stipulation at least ten days before implementing such decision. The Garrison's decision will be final.

This stipulation does not preclude a member of the public from notifying the Garrison of any objection and/or dispute they have as to the manner in which this PA is being implemented.

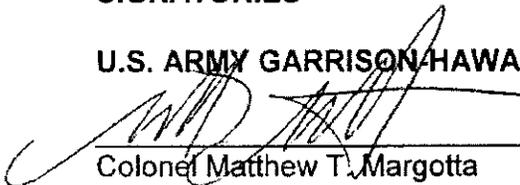
The Garrison shall consider such objections and determine whether any action is necessary to respond to the public.

12. Anti-Deficiency Act. The Garrison's obligations under this PA are subject to the availability of funds and the stipulations of this PA are subject to the provisions of the Anti-Deficiency Act. The Garrison will make reasonable and good faith efforts to secure the necessary funds to implement this PA in its entirety. If compliance with the Anti-Deficiency Act alters or impairs the Garrison's ability to implement the stipulations of this PA, the Garrison will consult with the SHPO and the ACHP in accordance with the amendment and termination procedures outlined in Stipulations 7 and 8, respectively.

Execution and implementation of this PA evidences that the Garrison has afforded the SHPO and the ACHP a reasonable opportunity to comment on the effects of the undertaking on historic properties. Execution and compliance with this PA fulfills the Garrison's Section 106 responsibilities regarding this undertaking at MMR.

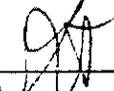
#### SIGNATORIES

##### U.S. ARMY GARRISON HAWAII

  
\_\_\_\_\_  
Colonel Matthew T. Margotta  
US Army Garrison, Hawaii

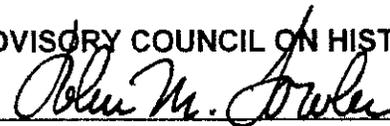
Date: 15 April 09

##### HAWAII STATE HISTORIC PRESERVATION OFFICER

  
\_\_\_\_\_  
Laura Thielen  
State Historic Preservation Officer

Date: 4/22/09

##### ADVISORY COUNCIL ON HISTORIC PRESERVATION

  
\_\_\_\_\_  
John Fowler  
Executive Director

Date: 4/29/09

**OFFICE OF HAWAIIAN AFFAIRS**

\_\_\_\_\_ Date: \_\_\_\_\_  
Clyde Nāmu’o

**HUI MALAMA I NA KUPUNA O HAWAII NEI**

\_\_\_\_\_ Date: \_\_\_\_\_  
Charles Maxwell

**THE OAHU ISLAND BURIAL COUNCIL**

\_\_\_\_\_ Date: \_\_\_\_\_  
Jace McQuivey

**AHA KUKANILOKO/KOA MANA**

\_\_\_\_\_ Date: \_\_\_\_\_  
Tom Lenchanko

**MALAMA MAKUA**

\_\_\_\_\_ Date: \_\_\_\_\_  
Fred Dodge

**HUI MALAMA O MAKUA**

\_\_\_\_\_ Date: \_\_\_\_\_  
William Aila

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## APPENDIX A

### TRAINING REQUIREMENTS AND SCENARIOS AT MAKUA MILITARY RESERVATION (MMR)

**Training at MMR** The Army trains at MMR primarily within the Pilila'au Range Complex Company Combined-Arms Assault Course (CCAAC), which is a 457-acre (185-hectare) training course in the southwestern portion of MMR. The CCAAC is used for both live-fire and non live-fire maneuver training exercises. Vegetation is manicured in the approach corridor and is densely matted with nonnative grasses in other areas. Company Combined Arms Live Fire Exercise (CALFEX) training at MMR uses approximately 1,136 acres (460 hectares) of land, which includes the CCAAC, land north of the CCAAC, and acreage outside the firebreak roads for establishing Surface DangerZones (SDZ). The training area north of the CCAAC, and inside the north firebreak road, includes areas used during training for parking, bivouac (encampment), ammunition storage, and staging. Artillery firing points are located within and outside of the CCAAC, but all ammunition is fired at targets within the CCAAC. The Army does not conduct training exercises on the nearby Makua Beach. The north and south firebreak roads border the training area; the south firebreak road borders the CCAAC, and the north firebreak road borders the northern portion of the training area. The Mokule'ia Forest Reserve, Pahole Natural Area Reserve, and the Makua Kea'au Forest Reserve border the reservation's north, south, and southeastern boundaries. Training exercises are staged throughout the CCAAC in eight areas that are referred to as objectives. Five of the eight objectives—Deer, Fox, Coyote, Wolf, and Badger—are used for maneuver training at the CCAAC. Units are authorized to enter Objective Badger and set up fire support when attacking the final objective. Objective Deeds is used for support-by fire and long-range (sniper) shooting. While Objectives Elk and Buffalo are closed for maneuver training due to the proximity of cultural resources, Objective Buffalo is used as a firing point. In addition to the established objectives, the Army can also create new objectives for training exercises. Any new objectives used by the Army would be located within the same corridor as the existing objectives in the CCAAC.

Training at MMR would be conducted primarily on the 812 acres (329 hectares) situated inside the north and south firebreak roads. The CCAAC would be used for live-fire maneuver training exercises and non live-fire maneuver exercises. The training area north of the CCAAC would be used for bivouac areas (described in the paragraphs below), support for CALFEX training, support for squad, section, and platoon maneuver training, artillery firing points, sniper training, and other non-maneuver training. Areas outside the firebreak roads would be used to establish the required SDZs. Support activities would include conducting reconnaissance of activities at the CCAAC and approach of objectives on the CCAAC by additional troops.

**Artillery firing points** are those locations considered optimal for firing weapons into the ordnance impact area. They are used for weapons such as 105mm and 155 mm rounds.

**Bivouac training** consists of setting up camp for rest, resupply, refit, maintenance, and support. Bivouac sites vary, depending on unit size and mission. Depending on unit size, bivouac sites can contain areas for vehicle and weapons maintenance and parking, general supply, munitions supply, medical service, helicopter landing zones, and vehicle off-loading. A bivouac site consists of a series of tents and temporary structures covered with camouflage nets housing the unit. Bivouac is normally done in level or gently rolling areas that provide vehicle and aircraft access. Open fires are not allowed during bivouac. Munitions used in bivouac typically consist of grenade and artillery simulators and blank ammunition. These weapons are used to defend against an attack.

**Live-fire training** follows the Army standard training methodology in Army Field Manual 7-10. The individual Soldier qualifies with an assigned weapon and then progresses through squad-, platoon-, and company-level live-fire exercises. Live-fire training entails an individual Soldier, a crew of a weapon system, or a collective unit firing at targets from a range facility. Live-fire exercises may incorporate free maneuver within the established safety zones of a range. The requirement for live-fire training varies depending on individual and unit mission, weapons assigned, and ammunition available. Each Soldier must demonstrate proficiency on the assigned weapon system once or twice per year. Unit commanders must ensure that live-fire training meets readiness standards. Weapons proficiency, or qualification, is scored and recorded for each individual or crew and is reported collectively by unit. At MMR, live-fire training includes basic weapons marksmanship ranges, grenade training, urban/village assault and entrenched enemy training, small unit live-fire and maneuvers, artillery and mortar firing, infantry demolition training, and use of mines and Bangalore torpedoes (10-foot [3-meter] tubes packed with explosives).

**Planning Live Fire Training** Surface danger zones are designed for each military range and training event, in accordance with Army Regulation 385-64, *Ammunition and Explosives Safety Standards*. SDZs ensure a proper buffer zone to the range and ordnance impact area and prevent accidental injury and exposure to live weapons outside the designated training area. Prior to training, specific firing points (i.e., firing locations) are designated for the firing of most munitions, including claymore mines and artillery. The company provides the range office with the training scenario in accordance with the US Army-Hawai'i and 25th ID Regulation 210-6, *Installation Ranges and Training Areas* and a range -specific MMR standard operating procedure (SOP). The MMR Range Office builds an SDZ to fit the training scenario and gives the unit a safety card. The safety card specifies the right and left firing limits for mortars as well as the minimum and maximum range for firing to ensure that the mortar falls within the ordnance impact area. CALFEXs conducted at MMR do not include aerial bombardment (dropping bombs from aircraft), use of tracked armored vehicles, or training on Makua Beach but would include the delivery of direct fire aerial munitions from Army helicopters such as .50 Cal machineguns, and 7.62mm machineguns.

Vehicles and aircraft that would be used during training include the following:

- High Mobility Multi-Purpose Wheeled Vehicles (HMMWVs), used on existing roads (approximately six vehicles);
- 2.5-ton or 5-ton cargo trucks (two);
- UH-60 Blackhawk helicopters (up to six);
- OH-58D Kiowa Warrior helicopters (up to four);
- CH-47 Chinook helicopters (two);
- Strykers (up to five);
- Any wheeled vehicle in the Army inventory; and
- Unmanned aerial vehicles (UAVs).

The Stryker is a wheeled vehicle, with a 350-horsepower engine and a weight of 19 to 20 tons. Up to five Strykers would operate primarily from stationary positions on existing roads, trails, and paved areas at MMR. There would be no off-road use of Strykers at MMR. Stationary Strykers would be used to fire MK 19 (40mm), 7.62mm, and .50-caliber machine guns and 120mm mortars from existing trails towards range objectives in the CCAAC and ordnance impact area. The Stryker incorporates an advanced targeting system that gives its weapons improved accuracy and reduces the potential for off-target rounds. Strykers also would be used as command and control vehicles. SBCT forces would conduct six to nine company-level CALFEXs per year.

Although Marine Corps units have used tracked vehicles as transportation to MMR in the past, no tracked combat vehicles would be used in the training area. In the past, the Army, Marine Corps, Navy, Coast Guard, Army Reserve, and Hawai'i Army National Guard have trained at MMR. It would also include Soldiers assigned to the 8th Theater Support Command. It is likely that forces from other countries hosted by the 25th ID as part of the US Pacific Command Theater Security Cooperation Plan would use these training resources from time to time. These military units would be limited to a company-level CALFEX as the maximum level of training and would be required to adhere to the same MMR range-specific training constraints as the 25th ID and . Additionally, these units would adhere to 25th ID and policies regarding transport of ammunition to and from these ranges.

## **SPECIFIC TYPES OF TRAINING**

**1. Intelligence Scenarios** - Military Intelligence (MI) is interested in finding out what an enemy force is doing - essentially who, what, when, where, and why. To this end over the years the MI proponents have developed several ways to obtain this information. At MMR, the most likely scenario to be used by Intelligence personnel is the employment of Surveillance Radar or other electronic intelligence gathering devices to monitor the status of the "enemy" - a bank of electrically operated targets. The radar section would set up on a Hill, where the Radar Dish could "see" the enemy. Once the targets were lifted and visible, the radar section would use radios to communicate the fact that the enemy were approaching to the operational unit charged with defending the area. Another use might be for the radar section to guard key avenues of approach into an area, so that the unit charged with keeping an area secure would not have to post human guards there. If any intruders were present, the radar section would again alert

the operational unit. Unmanned sensors and manned observation posts are used to collect information on the movement and disposition of enemy forces - the electrically operated targets inside MMR with reports provided to the training unit by either voice or digital transmission. Unmanned Aerial Vehicles (UAVs) are also used to gather enemy situational and battlefield awareness and site enemy locations via remote safe operations.

**a. Unmanned Aerial Surveillance (UAS) Training.** UAVs are remotely piloted or self-piloted aircraft that can carry cameras, sensors, or communications equipment. They greatly improve the timeliness of battlefield information while reducing the risk of capture or loss of manned reconnaissance assets. Army UAVs enable the combat commander, from platoon to Joint Task Force, with a means to conduct intelligence, surveillance, and reconnaissance (ISR), battle damage assessment, targeting, persistent stare for continued operations, convoy protection and anti-ambush (C-IED) training. UAVs are digitally linked and provide real-time information to the commander on the ground. UAV systems support land warfare operations across the spectrum of conflict. Infantry, Cavalry, Scout, Intelligence, Aviation, Artillery, and even medical units benefit from the availability of UAVs. Current experience has demonstrated the value of employing UAVs down to lower tactical levels. Tactical UAVs are now organic in many of our Army combat formations. Integrating UAVs into training exercises is an essential element of realistic training and readiness.

**b. Unmanned aerial vehicle (UAV).** The UAV can be likened to a large radio controlled model airplane. The UAV would allow tactical commanders a view into heavily protected battle space that could not be penetrated by other intelligence assets or that presents a high risk to piloted aircraft. It is a remote-controlled, gas-powered vehicle. The UAVs would take off from MMR or would be flown in from Wheeler Army Airfield (WAAF) before a Training Exercise to obtain pictures for reconnaissance and photo observation. The UAV would be used either during training exercises or independently for UAV crew training and testing.

**2. Maneuver Scenarios** - This is the largest type of user; indeed this category accounts for most of the units that come to MMR, for it is a maneuver live fire facility. Infantry, Aviation, Military Police, and other Combat Support/Combat Service Support (CS/CSS) units fall into this category. The most frequent users are Infantry. Infantry can operate at squad (9 men), platoon (27-33 men), company (100 men), or battalion (500 men) at MMR. Typically, Infantry units follow a progressive training regimen, building events on others as they get better at the easier ones. To illustrate these missions, they are listed below. All of these missions may be performed at platoon and company level, though at MMR they are usually done by companies and battalions, for the objectives are very large and require a large number of men to attack and overwhelm them.

**a. Infantry Company/ Platoon/ Squad Attack.** Training exercises are staged throughout MMR in eight areas that are referred to as objectives. Five of the eight objectives—Deer, Fox, Coyote, Wolf, and Badger—are used for maneuver training at the CCAAC. Units are authorized to enter Objective Badger and set up fire support

when attacking the final objective. Objective Deeds is used for support-by-fire and long-range (sniper) shooting. Objectives Elk and Buffalo are closed for maneuver training due to the proximity of cultural resources; however, Objective Buffalo is used as a firing point. In addition to the established objectives, the Army can also create new objectives for training exercises. Any new objectives used by the Army would be located within the same corridor as the existing objectives in the CCAAC.

The most common CALFEX is attacking a strong point, which can be anything from forces defending a built-up area to forces defending from a trench line. The following paragraphs describe a five-day course of events, during which one company uses the training areas at MMR. While this exercise is generally conducted over a five-day period, the Army may modify or compress the schedule of a CALFEX. During a CALFEX event, the infantry company is augmented at a minimum by a combat engineer squad and is supported by at least battalion mortars and direct support artillery. When available, attack and assault lift aviation, primarily helicopters, participate in the exercise.

CALFEXs are conducted at MMR are at the platoon or company-level. CALFEXs are defined by the integration of different arms, such as infantry, aviation, artillery, engineers, and others, to achieve a combined effect on the enemy greater than if each weapon system were used individually. A typical company-level CALFEX would include a maneuver ground force of dismounts with small arms weapons (M4, M16A1/A2, M249 SAW, M240B machine gun, M203 grenade launcher). Weapons used by other military units training at MMR would be substantially similar to those used by the Army. Units conducting a typical CALFEX would be supported by indirect fire and aviation units. Indirect fire support would include the company and battalion mortars (two 60mm mortars, two 81mm mortars, and the 120mm mortar), as well as the platoon 105mm artillery (three howitzers); 155mm howitzers would be used interchangeably with the 105mm weapons. Aviation units would provide aerial fire support using 50 cal machinegun, 7.62mm machineguns from OH-58Ds (Kiowas), UH-60s (Blackhawks), or CH-47s (Chinooks). In the case of the USMC using AH-1Ws (Cobras) it would include 20mm Cannon as well.

### ***Planning for the Exercise***

In accordance with the 25th ID and Regulation 210-6, *Installation Ranges and Training Areas*, planning a typical training exercise at MMR begins at least eight weeks prior to the event. The unit commander provides a detailed written plan of the exercise scenario, which includes the following:

- A maneuver and fire support plan;
- Weapons, ammunition, and targets to be used;
- Control measures and means of communication;
- Limits of advance; and
- SDZs for all weapons systems.

The unit commander also provides a risk assessment for the exercise. The risk assessment provides analysis of safety threats to Soldiers in combat situations. The unit commander's superiors (the battalion and brigade commander—a lieutenant colonel and colonel, respectively) and the division commander's range safety supervisors and range officer must approve the exercise plan.

### ***Movement to Makua Military Reservation***

Moving an infantry company to MMR typically involves a maximum of 150 Soldiers and supporting elements, which depart Schofield Barracks Military Reservation (SBMR) with up to 30 military vehicles or in multiple serials of lift helicopters. Aviation units fly out in helicopters at scheduled times prescribed in the training scenario. While a maximum of one company conducts a single training exercise at MMR, as many as three companies (one battalion) may be transported to MMR at one time. Movements are scheduled to avoid peak commute times and school transit hours. Travel may be in convoys or individual vehicles dispersed throughout the traffic flow. The bulk of the unit moves down public highways (including Interstate Highways H-1 and H-2) from SBMR and then up Farrington Highway, with participating artillery and engineering units following the same route. The unit ammunition section from the battalion support platoon draws ammunition to be used for the exercise at the ammunition storage point at Wheeler Army Airfield (WAAF), at the naval magazines at Lualualei, or at West Loch, where ammunition types for military units in Hawai'i are stored in specially designed facilities. Section leaders sign for the exact quantities of ammunition issued, and any unused ammunition is accounted for and returned at the end of the exercise.

When possible (i.e., weather permitting), ammunition (and even personnel) are flown into MMR to avoid transporting them through the local community. The Army airlifted all ammunition used for CALFEX training from 2001 to 2003. Vehicles used to transport ammunition must pass a rigorous safety inspection before they are allowed to enter any ammunition storage facility. All personnel involved in transporting ammunition are trained in accordance with Army, federal, and state standards and are certified to transport hazardous materials. Artillery and mortar ammunition are packed separately from ignition fuses to preclude accidental detonations. In addition, all ammunition is stored in specialized packing materials designed to withstand an impact 15 times greater than the force of gravity, further minimizing the risk of accidental explosion. All vehicles used in moving ammunition are powered by diesel fuel or JP-8 (kerosene), fuels that are much less volatile than gasoline.

If ground transport of ammunition is required, the ammunition is transported with a front and back escort at a maximum speed of 45 miles (72 kilometers) per hour, in accordance with all State of Hawai'i Department of Transportation (HI DOT) rules and regulations for the transport of explosive materials. Vehicles transporting explosives, grenades, mines, artillery rounds, anti-tank rounds, and mortar rounds avoid using Farrington Highway from 5:00 AM to 7:00 PM. Vehicles transporting other munitions and ordnance on Farrington Highway avoid using the highway during peak traffic hours and at times when children are traveling to and from school (5:30 AM to 8:30 AM).

and 12:30 PM to 6:30 PM). These restrictions combine to substantially reduce the risk of vehicle accidents involving ammunition transport vehicles and public exposure to potential accidental explosion of munitions should a vehicle accident ever occur.

### ***Preparation and Dry Fire***

Training units arrive at MMR and bivouac in designated areas. Their ammunition is stored at the ammunition supply points in the vicinity of the exercise and is guarded throughout the exercise. Soldiers subsist on packaged meals-ready-to-eat or on delivered hot foods, and they use portable toilets. Planning and instruction generally lasts two days. Unit personnel practice their exercise without live-fire and conduct other tasks associated with preparing for the actual live-fire exercise. Popup targets and blast simulators are sometimes placed in the training area to replicate enemy contact. Unit leaders (Captains, Lieutenants, and Sergeants) receive briefings from the US Army Garrison, Hawai'i (USAG-HI), Directorate of Plans, Training, Mobilization, and Security (DPTMS), Range Division and from USAG-HI Directorate of Public Works (DPW) Environmental Division staff on the locations of threatened and endangered species and habitat, locations of known cultural resource sites, fire hazards, and fire prevention measures and procedures. Where necessary, the scenario is modified to reduce the risk of fire and other damage to the environment. The unit leaders brief every Soldier in the unit on the importance of protecting endangered species and habitat and cultural sites and of preventing wildfires.

Twenty Soldiers from the unit are designated as firefighters and remain on standby during CALFEXs, and in the event of a fire they assist the five permanent professionally trained firefighters who are on-site during all CALFEXs. A helicopter dedicated to firefighting is always present on the range during live-fire exercises, with an additional helicopter at WAAF available for backup and additional support. Safeguards contained within the Integrated Wildland Fire Management Plan IWFMP are designed to reduce the likelihood of fires. Fires contained within the firebreak road that circumscribes the actual training site do not imperil any threatened or endangered species and habitat. Smoking may be permitted only in the administrative bivouac site or other designated areas. In the event of a fire at any location, training is stopped immediately and the unit takes all appropriate actions to put out the fire.

### ***Live-Fire Exercise***

On days three and four, unit personnel conduct their actual training exercise. On day three, only blank ammunition is fired, and live mortars and artillery are aligned, calibrated, and fired. Training exercises conducted on both days typically last approximately three hours and begin at dawn. The company generally moves with three platoons of approximately 30 to 40 Soldiers (or nine squads of five to ten Soldiers, plus personnel operating machine guns and support personnel) toward the objectives. Soldiers in the lead platoon fire their rifles and machine guns at the objective or target. The mortar section fires 60mm mortars at the objective, while the lead platoon moves toward it. When the lead platoon makes contact with the objective, the platoon leader

moves squads to a position of advantage and, by spreading out Soldiers to ensure they can hit every target, gains fire superiority over the “enemy.” In an operation called fire and maneuver, the platoon leader advances the lead squad, while the squad behind observes the area and provides fire cover for other maneuvering units. The platoon continues to fire and maneuver across the objective until there are no more targets to shoot. The platoon leader consolidates the troops, reorganizes by determining the number of Soldiers wounded and the amount of ammunition remaining, and organizes the forces to defend the land just taken. The unit is on the first objective, with another objective in front of it. The company commander may elect to continue moving the first platoon forward or to hold the lead platoon and bring another platoon forward.

Most exercises present advancing platoons with the problem of trench lines, mine fields (simulated), and concertina-wire obstacles. Confronted with these situations, platoons must practice the skills required to enter and clear a trench line, to conduct a company deliberate attack, to conduct a platoon and squad attack, to knock out a bunker, and to conduct an initial breach of a mine field/obstacle. Some simulated minefields would be cleared with the aid of engineers attached to the company. Bangalore torpedoes may be used to blast routes through such locations. A simulated minefield and a concertina wire obstacle usually protect the bunker entrance. The company commander would order the engineer squad to reduce the obstacle with a Bangalore torpedo designed to focus the blast in a cutting line that explodes mines, cuts wire, and allows Soldiers to walk over the site. Several Bangalore torpedoes may be combined to clear a wider path. After the minefield and wire obstacle have been cleared, the Soldiers run through the breach to the trench complex. Two Soldiers roll into the trench and fire down its length to engage any enemy present. The squads and platoon follow, and as each lead Soldier comes to a turn in the trench line, other Soldiers provide shield. The unit Soldiers continue down the trench to the first bunker or room, where four-person fire teams clear the bunkers with fragmentation hand grenades. The lead Soldier guards the opposite approach, and the remaining three Soldiers position themselves close to the door in a “stack.” The lead Soldier tosses a grenade in, and the three Soldiers rush the room following detonation, pointing their rifles at different prearranged locations in the bunker, covering any “enemy” remaining. Soldiers continue clearing the trench in this manner. Upon seizing their objectives, units must prepare for any counterattack. A company commander may direct the emplacement of claymore mines (small, command-detonated antipersonnel mines) in front of the unit. If artillery is employed in the scenario, the company commander may distribute its fire in advance of an attack or direct its fire toward a target to suppress counterattack. The commander may also direct the company’s anti-armor section to position its missile launchers to prevent any enemy tanks from overrunning the just-taken objective (e.g., the trench line). Once the enemy counterattacks and is repelled by the company, the exercise is over.

### ***Cleanup***

On day five and sometimes at the end of day four, units remove any target equipment they may have provided, gather brass casings from spent rounds, remove

litter, and otherwise make every effort to restore the range to its condition prior to their use. Explosive ordnance disposal (EOD) specialists destroy all identified (UXO). Ordnance normally is destroyed where it is found, whether it resulted from the training being conducted or from earlier exercises; no known unexploded rounds are left in place at the conclusion of a training exercise. These procedures ensure that training would not increase the amount of UXO on the site and may reduce it, if possible.

Sometimes, due to unexpected occurrences, the EOD specialists are not available to dispose of UXO immediately after a training exercise. In this case, UXO would be disposed of once the specialists are available and prior to use of the area for new training. Excess propellant charges from mortars and artillery is burned in a burn pan. Any ash generated from powder burn operations is removed from the burn pan and collected in a 55-gallon (208-liter) drum. Unexpended ammunition is repackaged and returned to the ammunition supply point from which it was drawn. When the cleanup is complete, the units load their equipment on their vehicles and return to SBMR via the same route described above, again avoiding peak traffic hours to the extent possible. **Army personnel also conduct surveys of archaeological/cultural resources after the clean-up has been completed to determine if they have been disturbed.**

#### **b. Convoy Live-Fire Training (CLFX)**

Convoy LFXs have become an increasingly important pre-deployment training requirement based on lessons learned in Iraq and Afghanistan. Live-fire convoy training provides realistic training for convoy operations and an opportunity to employ direct and limited point and area fires in support of tactical movements. Convoy live-fire training is designed to train units to react to enemy contact during tactical movement. This training is required for all types of units including combat arms, combat support (CS) and combat service support (CSS). Units in a formation must be able to react to direct fire, indirect fire, and Improvised Explosive Devices (IEDs) attacks on convoys. IEDs are the enemy's preferred asymmetric weapon against U.S. forces while deployed in a hostile environment.

Company-level training that allows commanders to train adequately and evaluate their units while integrating and controlling combined arms assets in a realistic training environment is critical to success on the modern battlefield. Collective live-fire training provides this critical training. Threats against a moving convoy may include, but are not limited to, the following:

- 1) Blocked Ambush (Daytime or Nighttime) with direct and indirect fires.
- 2) Unblocked Ambush (Daytime or Nighttime) with direct and indirect fires.
- 3) Snipers
- 4) Mines (any type)
- 5) IEDs/VBIEDs: Homemade explosive devices (can be found any time, any where).
- 6) Human intervention: This may include a crowd or individuals of a hostile or desperate nature looking for food, etc.

- 7) Suicide bombers: May include one person, many people, or a vehicle.
- 8) Hostile aircraft

In keeping with the crawl/walk/run concept, each squad or platoon will first conduct a dry-fire iteration. The purpose is to familiarize soldiers with the range and the safety procedures for conducting a convoy live-fire training scenario. After successfully completing the dry-firing, the squads and platoons may execute a Multiple Integrated Laser Engagement System (MILES)/blank fire iteration. The soldiers wear MILES gear and are armed with blank ammunition only. The opposing forces (OPFOR) will also wear MILES gear and will be armed with blank ammunition. Hits and near misses are recorded by the observers/controllers (O/Cs) moving with each vehicle in the serial. After successfully completing the MILES/blank-fire iterations, the units are prepared to conduct the live fire portion.

A training event can consist of 5 to 20 wheeled vehicles (usually five to six due to space limitations) in a convoy formation with at least two individuals per vehicle. Convoy will be lead by either an officer or non-commissioned officer. Vehicles will have communications and possess small arms mounted and soldier held weapons. Vehicles will start down an existing road or trail and will be attacked either via simulated enemy fire, mine, or IED. At a pre-arranged signal, the leader in the convoy pushes a button on an electronic remote control box that sends a signal to a bank of target lifters that are positioned very close to the road that the vehicles are traveling on. The lifters spring up, bringing e-type silhouette targets with them that look like enemy Soldiers holding rifles. This can be accompanied with a signal to a pneumatic machine gun, a simulator that faithfully produces the sound of an enemy machine gun being fired at you. Once that occurs, the rest of the Soldiers in the column of trucks know that their convoy has been ambushed. They dismount their vehicles very quickly, and immediately return fire and overwhelm the enemy with superior firepower. Once the counter-ambush is over, the leaders exit the area.

Also, an IED can be simulated to explode with an approved air compressed IED simulator. This simulator replicates a large "boom" and gives off a small cloud of smoke. These devices produce no fire hazards. A blocked ambush scenario will cause the convoy to stop and create a defensive perimeter and return fire. Return fire will be at designated targets that serve as "enemy" forces with approved SDZs for vehicle mounted and dismounted small arms fire. Several of the dismounted soldiers may engage in an offensive scenario by advancing towards the enemy in order to neutralize the threat. The "enemy" will be targets downrange. An unblocked ambush scenario would dictate that the convoy continue through the area, and return defensive fire from the vehicles until reaching a safe distance. Once the counter-ambush is over, the leaders exit the area.

Aviation gets incorporated into CLFX as well, usually in the form of Close Combat Attacks in support of convoys once in contact and then Medical Evacuation training to evacuate simulated casualties.

### c. Additions/modifications to the above scenarios:

**Air assault.** When air assault is part of a CALFEX, Soldiers board helicopters (either six UH60s or two CH47s) at SBMR and fly to the approved landing zone north of the range control buildings. The helicopters land one or two at a time, discharge their loads and fly off. Some vehicles and equipment may be rigged for external transport beneath the helicopters (a practice known as sling-loading), allowing the aircraft to transport both the Soldiers and their equipment to a given location at the same time. Sling loads are not generally carried over populated areas.

**Aviation support.** A typical scenario includes four attack helicopters fighting in two teams of two. One team is typically maneuvering, providing observation and attack support to ground forces while another team is rearming and refueling. When firing, aircrews direct all fire including .50-caliber and 7.62mm machine guns and 20 mm cannon fire into the ordnance impact area and are in constant radio contact with Soldiers on the ground to ensure that the correct targets are engaged.

**Artillery support.** Artillery, in this case weapons no larger than 155mm, is an integral part of combined-arms training. A typical exercise involves at least two gun sections, with four Soldiers per section. Firing is conducted from a point at the valley's western edge at targets within the southern firebreak road. In some scenarios, gun sections may be transported by UH-60 Blackhawk helicopters, with the guns sling-loaded below the helicopters and flown forward into the CCAAC. Such a scenario also includes up to six HMMWVs and two five-ton trucks to haul ammunition. **All ordnance fired at MMR is aimed to fall within the impact area.**

### d. Aviation

**Air Assault:** The 25th ID would use MMR as a possible air assault objective. The components of the air assault are similar to the CALFEX, the primary exception being that artillery and troops would be brought in by air, moments before the attack begins, to practice the element of surprise. The objective would be suppressed with aviation fire (.50-caliber), and troops would be airlifted into the valley in close proximity to the objective. Actions on the objective might include conducting a breach (use of a Bangalore torpedo), then entering and clearing a trench. The actual objective may vary but is not likely to require any other weaponry. Another typical scenario for the aviators is the same as outlined in air support section above. Typically, the helicopters will fly-in from the ocean direction and occupy an attack by fire position (hover in place) and acquire (find) their target. Once they find the target, they will alternately fire, first one helicopter then the other, to suppress or neutralize the target. The pilots are in communication with the soldiers on the ground at all times via FM radios, and the leaders on the ground tell the pilots when to leave or what to suppress next in support of the ground attack

**Aircraft Lasing.** Aircrews may employ their aiming, locating, and designating lasers while maneuvering. Aiming lasers are employed on the .50 Cal MGs of OH-58Ds as

well as on the 7.62mm Door Guns of UH-60s and CH-47s. They are a visual sighting aid to aircrews under NVGs and help the crews accurately deliver aerial machine gun fire. OH-58Ds also employ a powerful target location and designation laser in its Mast Mounted Sight (MMS) during its reconnaissance and attack roles. This laser can be used to locate targets and determine their grid coordinates relative to the aircraft's known location. Crews can then report the targets to ground forces for intelligence and targeting by direct or indirect fire. The MMS laser can also be used to designate targets and steer laser guided munitions such as Hellfire missiles. In MMR, live Hellfire missiles are not employed. However, OH-58D aircraft sometimes carry inert training missiles that are capable of receiving laser energy, allowing the aircrew to practice all the steps to fire a Hellfire missile properly without ever firing any missiles from its rails. This type of activity can be done safely in support of both live fire and non-live fire maneuver training, and with no impact to environmental or archeological sites.

***Aircraft Maneuvers.*** There are two primary corridors or flight patterns between WAAF and MMR used by helicopters participating in exercises at MMR: 1) due north from WAAF to the east of Hale'iwa, a left turn over Waialua Bay paralleling the north coast of O'ahu to off Ka'ena Point, and then south to MMR and the restricted area complex; 2) due west from WAAF over the Kolekole Pass Highway and then straight to MMR (see Figure 3-4). When weather conditions prevent use of the primary flight corridors, a third corridor is used; from WAAF, the helicopters fly due south over Kunia Road to Ewa Beach, then north along the coast to MMR. Altitudes flown are 2,000 feet (640 meters) above ground level (AGL), except over the water where the helicopters fly at a 300-foot (91-meter) minimum altitude above the ocean. Over land, helicopter traffic pattern altitudes, in accordance with AR 95-1, Aviation Flight Regulations, are at least 700 feet (213 meters) AGL, but may be set at different altitudes based on noise abatement, "fly neighborly" policies, or other safety considerations. Flight schedules are not provided to the community in advance.

When transiting the north shore off DMR and around Ka'ena Point, helicopters fly one or two nautical miles (two to four kilometers) offshore; if they are flying into Dillingham Airfield to stop before an exercise, or to stop at the Forward Area Rearm and Refuel Points (FARRP), they would typically fly at 1,000 to 1,500 feet (305 to 457 meters) offshore. During these flights, the aircraft altitude would be 700 feet (213 meters) both day and night when flying without aids and 300 feet (91 meters) when using night vision goggles. The Dillingham FARRP is south of the runway in the "Boondocks" training area close to the northern boundary of the R-3110 B & C restricted area. During CALFEXs, OH58 (Kiowas) and UH60 (Blackhawks) are used. The exercise typically requires four OH58s and one helicopter for standby with a water bucket in case of a wildfire, with one exercise in the morning and one in the afternoon. During the exercise, there is typically a ground rehearsal, a fly by rehearsal, and then the actual close-air support firing exercise with the regular .50-caliber M-2 rounds. Over the five-day CALFEX, there would be up to five helicopter approaches during the non live-fire day and up to five approaches during each of the daytime and nighttime live-fire iterations. In addition, two CH-47 Chinook helicopters would transport troops and equipment from SBMR to MMR.

During the exercises, the helicopters would depart MMR and re-arm and refuel at the FARRPs located at DMR and at SBMR just off the Kolekole Pass Highway, approximately five miles (eight kilometers) west of WAAF. On average, each helicopter flies to the FARRP four times during each exercise. On the way to MMR for a live-fire exercise, the helicopters typically stop to pick up ammunition at either the DMR FARRP, or at the Kolekole Pass Highway FARRP. They would then proceed to MMR, participate in the exercise, and fly back to one of the FARRPs to rearm and refuel. Fuel and ammunition temporarily stored at the FARRPs for the duration of the exercises is brought in by truck from the fuel depot and permanent ammunition storage areas. The command and control helicopter typically flies orbits (to conserve fuel) over the ocean at 300 to 400 feet (91 to 122 meters) above sea level. Its distance from shore ranges from about one-quarter 0.25 mile (0.4 kilometer) to one-half 0.5 mile (0.8 kilometer), and at times one mile (1.6 kilometer) offshore. The pilots watch for marine mammals and avoid them when spotted. At no time do they go beyond the jurisdictional waters of the United States. Typically, air assault exercises are conducted less frequently than CALFEXs. There is also ongoing basic training of new pilots assigned to Hawai'i, involving one or two flights per day familiarizing them with the terrain and training areas. OH58s, CH-47's or UH60s are used for this training. About 45 percent of this training is conducted at night. Inclement weather (ceiling visibility and wind turbulence) affects flying about 25 percent of the time.

**e. Other Types of Training.** The following training exercises would be conducted independently or in conjunction with a CALFEX.

***Military Operations on Urbanized Terrain (MOUT).*** MOUT training provides troops with the opportunity to train in a realistic urban environment (e.g., using bunkers and other man-made structures) and to experience as much realistic stress as possible. MOUT training may include limited use of short-range training ammunition (SRTA, also known as blue-tip ammunition), which uses a plastic projectile. Although SRTA is classified as live-fire training in accordance with AR 385-63, the maximum range of this ammunition is only 300 to 700 yards (274 to 640 meters), depending on the caliber used.

***Sniper Training.*** Due to the limitation of sniper ranges on SBMR, MMR is the place to support static sniper firing. In general, this includes using a M24 sniper rifle firing a 7.62mm round at targets up to 3,281 feet (1,000 meters) away. The M107 heavy sniper rifle that fires .50-caliber ammunition also can be used. Snipers would frequently participate in CALFEXs at MMR. For stationary target practice, snipers would position themselves near range control while shooting toward targets at Objective Deer.

***Demolitions Training.*** Demolitions training at MMR would take place at the ordnance impact area and could include a range of activities, such as the following:

- Use of low levels of explosives to destroy such materials as steel and wooden structures.

.-Use of explosives to gain entry to buildings.

.-Placement and detonation of shape charges at the ordnance impact area.

Shape charges are composed of C4 plastic and would be used as 15-pound (6.8-kilogram) charges (up to 80 times a year) and 40-30 pound (18-kilogram) charges (up to 36 times a year). The shape charge would create a narrow hole in the ordnance impact area.

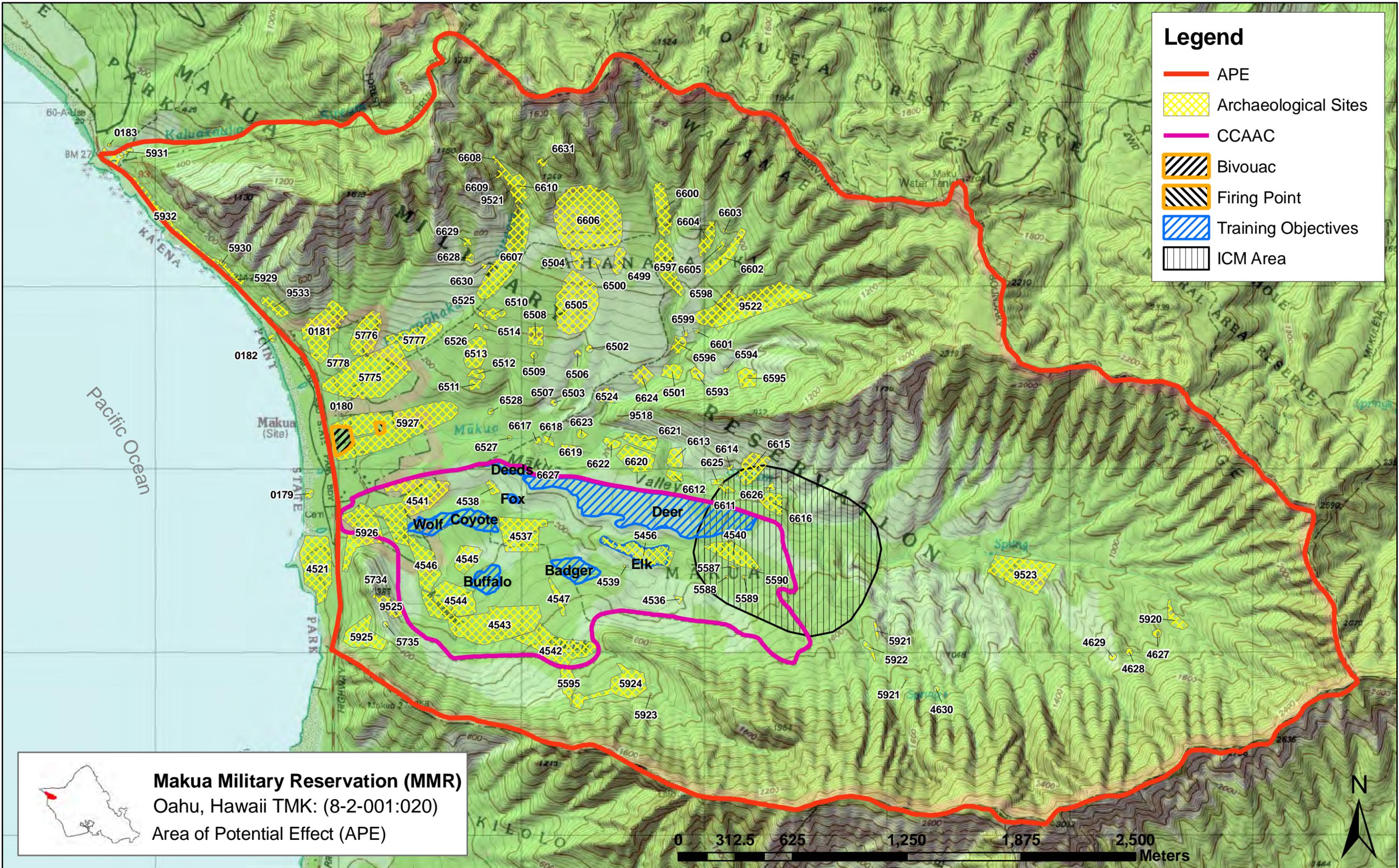
-Detonation of cratering charges at the ordnance impact area following the detonation of the shape charge. The M039 cratering charge, filled with ammonium nitrate, is placed within the hole created by the shape charge. The typical maximum amount of ammonium nitrate that would be used at any one time would be up to 150 pounds (68 kilograms), and possibly up to 300 pounds (136 kilograms). Training using cratering charges would occur up to twice a month (24 times a year).

**Staging Base for Ground or Air Movement.** MMR can also be used as a staging base for ground or air movement. Army training is normally conducted in a dispersed or distributed fashion to better reflect fighting over a large battlefield with extended distances between organizations.

**Ground Movement.** MMR would be used as a staging base for ground movement (Field Manual 21-18). An infantry Soldier's primary means of mobility is by foot, and all infantry units train heavily on foot movements while carrying heavy loads. The 25th ID would use MMR as a staging base to begin foot movements and to provide a final destination. The unit size conducting foot movements can range anywhere from platoons to battalions.

**Air Movement.** The 25th ID is also likely to use MMR as a possible pickup zone for air assault operations conducted at other training areas (FM 90-4). The size of the units would be platoons and companies. Air assaults, depending on the size, can include moving not only troops, but also artillery pieces and vehicles.

# APPENDIX B



**Makua Military Reservation (MMR)**  
 Oahu, Hawaii TMK: (8-2-001:020)  
 Area of Potential Effect (APE)



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## APPENDIX C

### List of Section 106 Consultations Undertaken in the Development of Current Programmatic Agreement

1. Draft PA based on previous PA sent to 16 consulting parties on 21 November 2007.

Responses:

Hawaii State Historic Preservation Office 12/18/07

Earthjustice 12/20/07

Email from William Aila 12/24/07

Advisory Council on Historic Preservation 1/10/08

2. First revised PA (revisions based on comments) sent to all consulting parties on 10 April 2008.

Responses:

Earthjustice 5/14/08

Hawaii State Historic Preservation Office 5/16/08

Advisory Council on Historic Preservation 5/19/08

Hawaii State Historic Preservation Office 6/20/08

3. Second revision of PA based on further comments sent to all consulting parties on 23 July 2008.

Responses:

Earthjustice 8/29/08

Advisory Council on Historic Preservation 8/29/08

Email from William Aila 9/05/08

4. USAG-HI sent out third revised draft PA to consulting parties on 11 February 2009. USAG-HI received comments on draft PA from ACHP on 23 February. Comments were provided to consulting parties on the 26 February consultation meeting.

Consultation meeting held 26 February 2009. All consulting parties invited to attend. Attendees included representatives of the Office of Hawaiians Affairs, Malama Makua, Hui Malama Makua, The Hawaii State Historic Preservation Division, US Army Garrison, Hawaii, Earthjustice, the Advisory Council on Historic Preservation (telephonically) and the Army Environmental Command (telephonically).

Responses:

Earthjustice 3/11/09

Office of Hawaiian Affairs 3/12/09

Ahu Kukaniloko/Koa Mana 3/11/09

5. Fourth version of the PA based on comments received after 26 February 2009 meeting is sent out on 23 March 2009.

Responses:

Advisory Council on Historic Preservation 3/30/09

Office of Hawaiian Affairs 4/6/09

Earthjustice 4/7/09

Koa Mana 4/7/09

6. Fifth version of the PA based on comments received after 7 April 2009. Matrix showing all comments and Army response and PA sent to HI-SHPD and ACHP for final review. Matrix posted on USAG-HI website on 20 April 2009.

7. Sixth and Final version of PA based on minor comments received from HI-SHPD and ACHP was sent to ACHP and HI-SHPD on 15 April 2009.

### **Public Notice**

Notice sent to Honolulu Advertiser and Star-Bulletin notifying public of availability of PA either by request or in public libraries in July 2008. Published in August 2008 version of Westside Stories.

### **Site visit**

Site visit to Makua with Nancy McMahon from Hawaii State Historic Preservation Office on 18 August 2008.

### **Conference Call**

Army Cultural Resources Manager, Nancy McMahon from Hawaii State Historic Preservation Office and Kelly Yasaitis-Fanizzo of Advisory Council on Historic preservation 1 September 2008.

## APPENDIX D

### Archaeological Investigations in the Area of Potential Effect (APE)

Anderson, Lisa

- 1998 Assessment and Analysis of Historic Properties at U.S. Army Training Ranges and Areas, Island of O`ahu, Hawaii, for Preparation of a Cultural Resources Management Plan. Prepared for U.S. Army Engineer Division, Fort Shafter, HI. Ogden Environmental and Energy Services Co., Inc., Honolulu, HI.

Carlson, I. P. Cleghorn, F. Eblè, T.L. Jackson, and M. Weisler

- 1996 Archaeological Reconnaissance Survey of Proposed Firebreak Road at Makua Valley, Wai`anae District, Island of O`ahu, Hawai`i. Prepared for U.S. Army Engineer Division, Fort Shafter, HI. Biosystems, Kailua, HI

Cleghorn, P., J. Robins, T. Torres, S. Clark, and T. Moorman

- 2000 Initial Implementing activities for the Historic Preservation Plan at Ukanipo Heiau and Intensive Surface Survey and Mapping of Archaeological Sites, Ukanipo Heiau Vicinity, Makua Military Reservation, Makua Valley, O`ahu. Prepared for U.S. Army Engineer Division, Fort Shafter, HI. Ogden Environmental Services, Honolulu, HI.

Cox, D.

- 1983 "Trip Report for Field Reconnaissance to Makua Military Reservation, Makua Valley, Oahu." In State Historic Preservation Division Library, Kapolei, HI.

Eblè, F. J., P.L. Cleghorn, et al.

- 1995 Archaeological Investigations at Proposed MK-19 Range, Makua Military Reservation, Wai`anae District, O`ahu. Prepared for the U.S. Army Corps of Engineers, Fort Shafter, HI. Biosystems Analysis Inc., Kailua, Hawai`i.

Eidness, J. and P. Cleghorn

- 2001 Final Report Site Preservation Plan for Ukanipo Heiau, Site 50-80-03-0181. Prepared for U.S. Army Engineer Division, Fort Shafter, HI. Biosystems, Kailua, HI.

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## APPENDIX D

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## APPENDIX D

### Archaeological Investigations in the Area of Potential Effect (APE)

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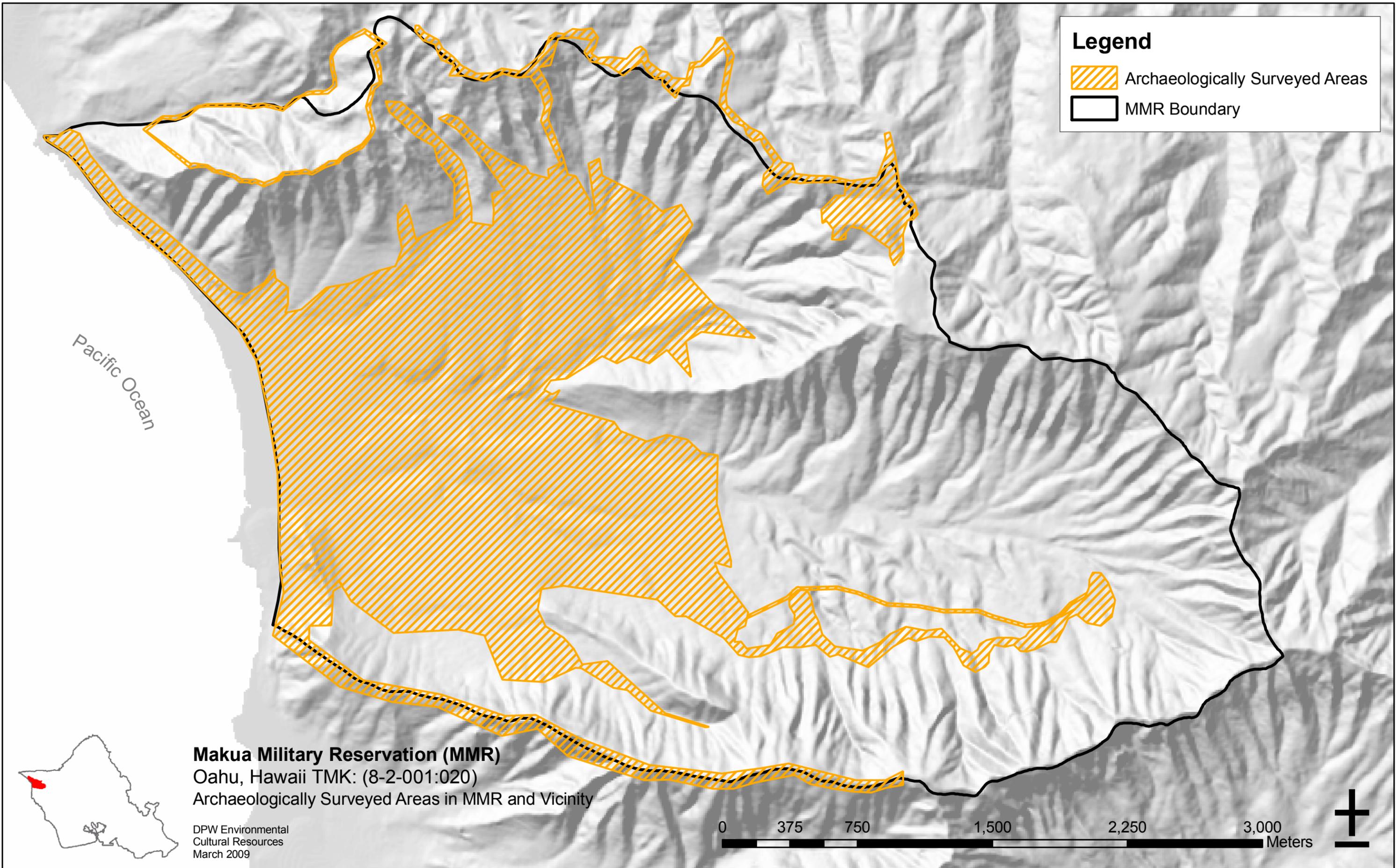
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APPENDIX E

**Legend**

-  Archaeologically Surveyed Areas
-  MMR Boundary



Pacific Ocean

**Makua Military Reservation (MMR)**  
Oahu, Hawaii TMK: (8-2-001:020)  
Archaeologically Surveyed Areas in MMR and Vicinity

DPW Environmental  
Cultural Resources  
March 2009

0 375 750 1,500 2,250 3,000 Meters



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## APPENDIX F

### List of Known Archaeological Sites in MMR and Vicinity

<b>Site #50-80-03-xxxx</b>	<b>Description</b>	<b>Source</b>
177	Kaneana	McAllister 1933
178	Kumuakuopio Heiau	Thrum 1906
179	Koa fishing shrine	McAllister 1933
180	Kaahihi Heiau	Thrum 1906
181	Ukanipo Heiau	Thrum 1906
182	Swimming Pool	McAllister 1933
183	Koa fishing shrine	McAllister 1933
4536	Walls/well	Eble et al. 1995
4537	Complex	Eble et al. 1995
4538	Complex	Eble et al. 1995
4539	Wall Section	Eble et al. 1995
4540	Complex	Eble et. al 1995
4541	Complex	Eble et al. 1995
4542	Complex	Eble et al. 1995; Zulick and Cox 2001
4543	Complex	Eble et al. 1995; Williams et al. 2002
4544	Complex	Eble et al. 1995; Williams et al. 2002
4545	Complex	Eble et al. 1995
4546	Complex	Eble et al. 1995; Williams and Patolo 2000
4547	Complex	Eble et al. 1995; Williams et al. 2002
4627	Complex	Carlson et al. 1996
4628	Mound	Carlson et al. 1996
4629	Mounds	Carlson et al. 1996
4630	Complex	Carlson et al. 1996
5456	Imu complex	Williams and Patolo 2000
5587	Complex	Williams and Patolo 2000
5588	Terrance	Williams and Patolo 2000
5589	Terrace-platform	Williams and Patolo 2000
5590	Complex	Williams and Patolo 2000
5595	Wall complex	Williams et al. 2002
5734	Enclosure	Williams et al. 2002
5735	Lithic scatter	Williams et al. 2002
5775	Complex	Cleghorn et al. 2000
5776	Complex	Cleghorn et al. 2000
5777	Mound	Cleghorn et al. 2000
5778	Complex	Cleghorn et al. 2000
5920	Complex	Zulick and Cox 2001
5921	Complex	Zulick and Cox 2001

## APPENDIX F

### List of Known Archaeological Sites in MMR and Vicinity

<b>5922</b>	Complex	Zulick and Cox 2001
<b>5923</b>	Complex	Zulick and Cox 2001
<b>5924</b>	Complex	Zulick and Cox 2001
<b>5925</b>	Complex	Zulick and Cox 2001
<b>5926</b>	Complex	Zulick and Cox 2001
<b>5927</b>	Retaining wall	Zulick and Cox 2001
<b>5928</b>	Retaining wall	Zulick and Cox 2001
<b>5929</b>	Bunker/gun emplacement	Zulick and Cox 2001
<b>5930</b>	Platforms	Zulick and Cox 2001
<b>5931</b>	Wall	Zulick and Cox 2001
<b>5932</b>	Path	Zulick and Cox 2001
<b>9518</b>	Trail	Rosendahl 1977
<b>9520 (reassigned to 5775-5778 in Robins et al. 2005)</b>	See above	Rosendahl 1977
<b>9521 (reassigned to 6607 in Robins et al. 2005)</b>	See below	Rosendahl 1977
<b>9522 (reassigned to 6601, 6596, 6598 in Robins et al. 2005)</b>	See below	Rosendahl 1977
<b>9523 (reassigned to 4627-4629, 5920 in Robins et al. 2005)</b>	See above	Rosendahl 1977
<b>9524 (reassigned to 4542, 4547, 5923 in Robins et al. 2005)</b>	See above	Rosendahl 1977
<b>9525</b>	Wall	Rosendahl 1977
<b>9526</b>	Complex	Rosendahl 1977
<b>9533</b>	Terrace	Rosendahl 1977
<b>6499</b>	Complex	Robins et al. 2005
<b>6500</b>	Complex	Robins et al. 2005
<b>6501</b>	Complex	Robins et al. 2005
<b>6502</b>	Mound	Robins et al. 2005
<b>6503</b>	Complex	Robins et al. 2005
<b>6504</b>	Complex	Robins et al. 2005
<b>6505</b>	Complex	Robins et al. 2005
<b>6506</b>	Complex	Robins et al. 2005
<b>6507</b>	Wall	Robins et al. 2005
<b>6508</b>	Complex	Robins et al. 2005
<b>6509</b>	Complex	Robins et al. 2005
<b>6510</b>	Complex	Robins et al. 2005
<b>6511</b>	Complex	Robins et al. 2005
<b>6512</b>	Complex	Robins et al. 2005

## APPENDIX F

### List of Known Archaeological Sites in MMR and Vicinity

6513	Complex	Robins et al. 2005
6514	Enclosure	Robins et al. 2005
6525	Complex	Robins et al. 2005
6526	Complex	Robins et al. 2005
6527	C-shape	Robins et al. 2005
6528	Complex	Robins et al. 2005
6593	Complex	Robins et al. 2005
6594	Mound	Robins et al. 2005
6595	Complex	Robins et al. 2005
6596	Complex	Robins et al. 2005
6597	Complex	Robins et al. 2005
6598	Complex	Robins et al. 2005
6599	C-shape	Robins et al. 2005
6600	Complex	Robins et al. 2005
6601	Enclosure	Robins et al. 2005
6602	Complex	Robins et al. 2005
6603	Complex	Robins et al. 2005
6604	Complex	Robins et al. 2005
6605	Complex	Robins et al. 2005
6606	Complex	Robins et al. 2005
6607	Complex	Robins et al. 2005
6608	Enclosure	Robins et al. 2005
6609	Wall	Robins et al. 2005
6610	Complex	Robins et al. 2005
6611	Complex	Robins et al. 2005
6612	Complex	Robins et al. 2005
6613	Complex	Robins et al. 2005
6614	Terraces	Robins et al. 2005
6615	Complex	Robins et al. 2005
6616	Complex	Robins et al. 2005
6617	Complex	Robins et al. 2005
6618	Complex	Robins et al. 2005
6619	Complex	Robins et al. 2005
6620	Complex	Robins et al. 2005
6621	Complex	Robins et al. 2005
6622	Mound	Robins et al. 2005
6623	Complex	Robins et al. 2005
6624	Complex	Robins et al. 2005
6625	Complex	Robins et al. 2005
6626	Complex	Robins et al. 2005
6627	Gun emplacement	Robins et al. 2005
6628	Complex	Robins et al. 2005
6629	Complex	Robins et al. 2005

## APPENDIX F

### List of Known Archaeological Sites in MMR and Vicinity

<b>6630</b>	Complex	Robins et al. 2005
<b>6631</b>	Wall	Robins et al. 2005
<b>DPW32</b>	Terrace	DPW 2005
<b>DPW33</b>	Alignment-enclosure	DPW 2005
<b>Unrecorded site identified during 2006 DPW-ENV subsurface survey</b>	Terraces and Mounds	DPW 2007
<b>Unrecorded site identified during 2006 DPW-ENV subsurface survey</b>	Terraces and Mounds	DPW 2007
<b>Unrecorded site identified during 2006 DPW-ENV subsurface survey</b>	Historic kiawe fence posts and wire fencing	DPW 2007

## APPENDIX G

### ARCHAEOLOGICAL SITE MONITORING PLAN MAKUA MILITARY RESERVATION (MMR)

**Monitoring Sites for Major Training Exercises.** Archaeological sites located in safely accessible areas of troop concentrations and training activities will be inspected to identify those sites having the highest impact risk. Site protection measures will be implemented for threatened sites (e.g., flagging, fencing) and the sites will be monitored during periods of training to assess the effectiveness of such measures. Determining which sites will be monitored will be based on the US Army Garrison, Hawaii Cultural Resources Manager's (CRMs) review of maneuver overlays for planned training operations regularly submitted to the MMR Range Officer. The monitor, designated by the CRM, may accompany Range Control personnel in their regular performances of the clearance inspection before the units depart the field (U.S. Army 1993: Chapter 2, Section 2-4b).

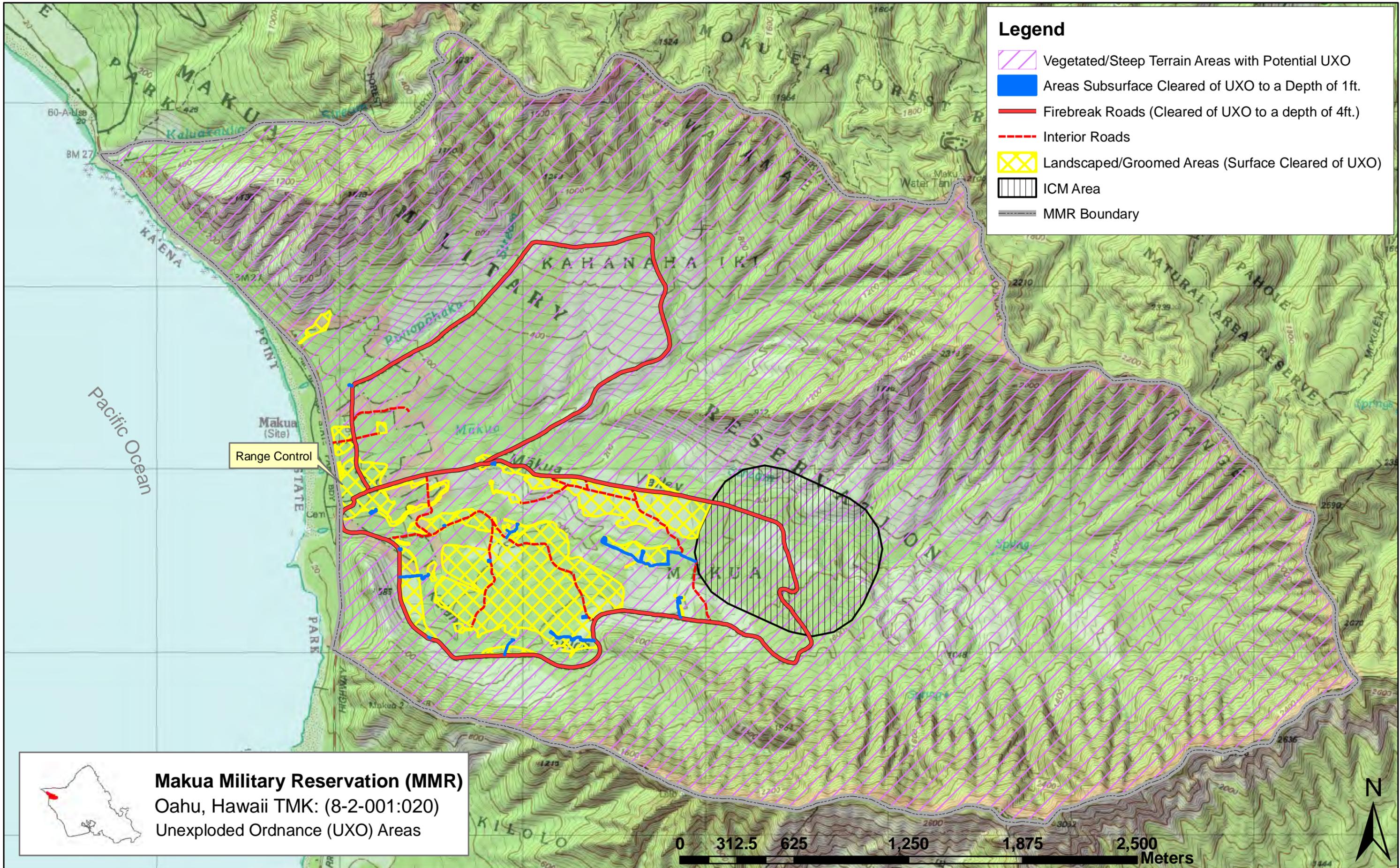
**Monitoring Sites for Other Reasons.** Monitoring of archaeological site conditions at MMR will be scheduled for other actions that will permit large numbers of personnel into areas of concentrated archaeological sites for a protracted period of time (e.g. construction of a new firebreak road or upgrading facilities), or in response to any report of non-permitted site access or vandalism.

**Monitoring Records.** All site monitoring will be documented, including date, name and title or rank of inspector, reason for inspection (e.g., name of military training unit and/or maneuver), sites visited, observed site conditions, and recommended site protection actions as appropriate. Sketch maps and/or photographs showing changes in site conditions will be included in the monitoring documentation record. For particular sites it may be advantageous to establish photographic vantage points, with photographs taken during each monitoring episode.

**Reporting Site Damage.** The CRM will report to the Range Officer within 48 hours of his or her notice that humans or natural agents have damaged an archaeological site. The CRM's report will include (1) the circumstances of the site damage such as how and when the damage occurred and who was responsible; (2) assessment of the nature and extent of site damage including first-hand observations made by the CRM and/or his or her representative, with reference to site conditions documented prior to the damage; (3) recommendations for treatment of the damaged site such as data recovery excavation or site fencing; and (4) suggestions to avoid damage to other sites potentially threatened by similar circumstances. Acting as the Garrison Commander's representative, the CRM will notify the Hawaii State Historic Preservation Division, the Office of Hawaiian Affairs and consulting Native Hawaiian organizations and groups within five working days of the discovery to consult about treatment of the damaged resource.

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APPENDIX H

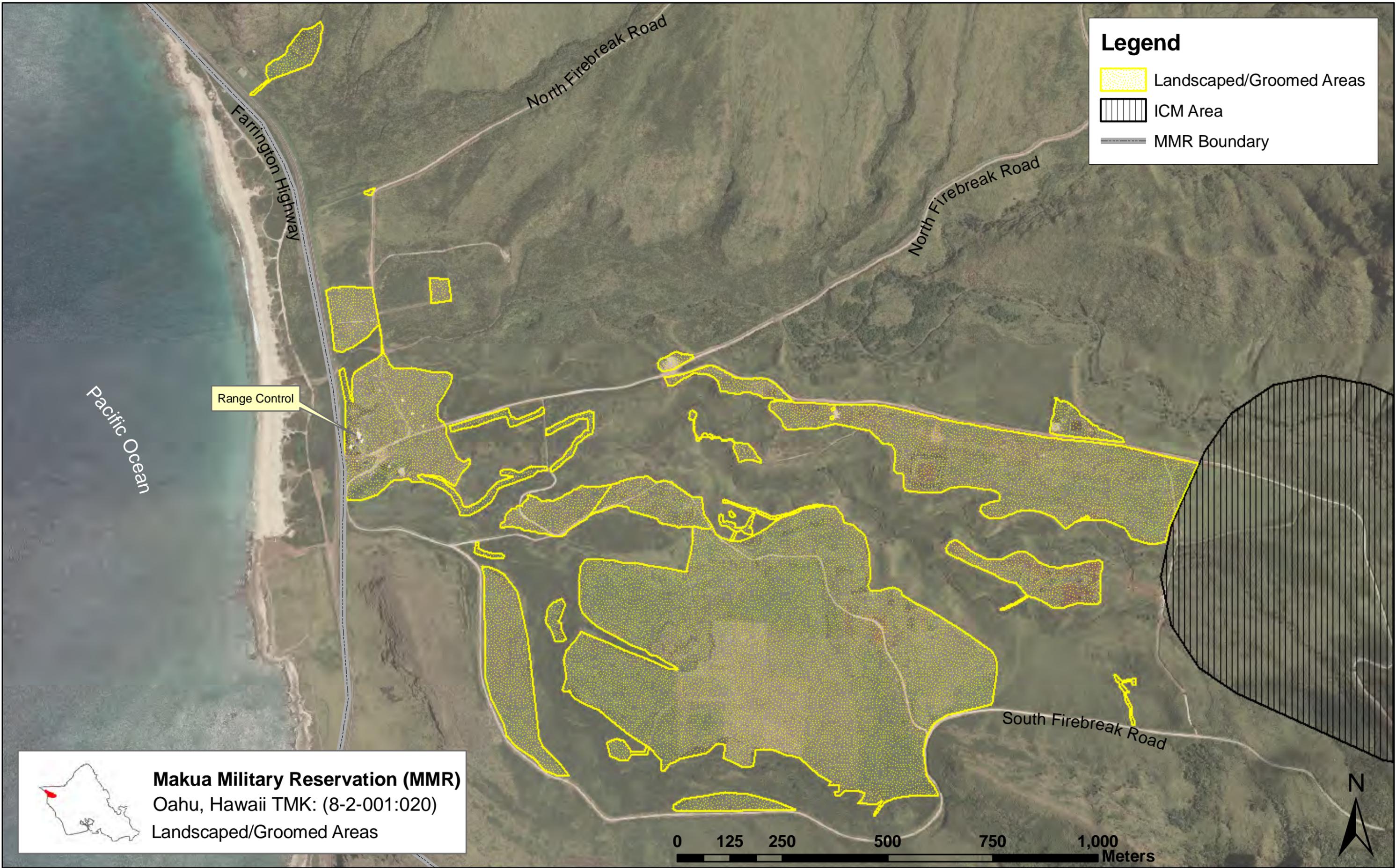


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APPENDIX I

**Legend**

-  Landscaped/Groomed Areas
-  ICM Area
-  MMR Boundary



Range Control



**Makua Military Reservation (MMR)**  
Oahu, Hawaii TMK: (8-2-001:020)  
Landscaped/Groomed Areas

0 125 250 500 750 1,000 Meters



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APPENDIX J

Legend

- Firebreak Roads
- - - Interior Roads
- ▨ Areas Containing Targetry
- Dip Ponds
- ▲ Helicopter Pads
- ▨ ICM Area
- - - MMR Boundary

Pacific Ocean

Range Control



**Makua Military Reservation (MMR)**  
Oahu, Hawaii TMK: (8-2-001:020)  
Installation Infrastructure and Range Components



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# APPENDIX K



**Makua Military Reservation (MMR)**  
Oahu, Hawaii TMK: (8-2-001:020)  
Range Control Facilities Area

