FINAL ENVIRONMENTAL ASSESSMENT

AND FINDING OF NO SIGNIFICANT IMPACT

Development and Use of Military Training Facilities

On Pōhakuloa Training Area, Hawai‘i

February 2009

Finding of No Significant Impact

Proposed Action: Development and Use of Military Training Facilities on Pōhakuloa Training Area, Hawai'i

United States Marine Corps Base (MCB) Hawaii proposes to develop and use training facilities at the U.S. Army's Pōhakuloa Training Area (PTA). The United States (U.S.) Marine Corps must provide realistic training opportunities that simulate current and future battle environments to prepare Marines for combat duty. Existing and emerging training requirements driven by theatre of war considerations support the need for new ranges and other training facilities.

The National Environmental Policy Act of 1969 (NEPA) requires federal agencies to consider potential environmental impacts prior to undertaking a course of action. Within the U.S. Marine Corps, NEPA is implemented through regulations promulgated by the Council on Environmental Quality [40 CFR Parts 1500 – 1508], with supplemental guidance provided by Marine Corps NEPA regulations (Chapter 12 of Marine Corps Order P5090.2A).

In March 2006, the 3rd Marines laid out a development concept that would maximize the ground combat element use of PTA to support current and future training requirements. The vision was outlined in a memorandum that described a combined strategy for future development of U.S. Army ranges and training areas in Hawai'i. Part of the 10-year plan is the creation of a training complex at PTA to support combined arms live-fire and maneuver training, urban warfare training, convoy live-fire training, and weapons training. Facilities to meet current and future training requirements would be joint facilities, with shared cost and usage between MCB Hawaii and Army units and other users. The proposed action consists of four projects that support emerging training initiatives and requirements and individually and collectively support the training requirements described by the strategy memorandum.

A Section 106 Consultation was undertaken and concurrence by the State Historic Preservation Officer (SHPO) with a no historic properties affected determination was received on September 5, 2008. No threatened and endangered species issues are associated with three of the four projects included in the proposed action. The formal Section 7 consultation with the U.S. Fish and Wildlife Service (the Service) was reinitiated in July 2008 regarding additional species and new/proposed training actions at PTA, including the convoy live-fire (CLF) course. A no-jeopardy biological opinion was issued by the Service in December 2008, indicating that the Service believes that implementation of the proposed action is not likely to jeopardize the continued existence of any species as long as the Army implements the conservation measures.

Description of Action and Alternatives:

Alternative 1 – Proposed Action. Under the proposed action, MCB Hawaii would develop training facilities and ranges on the U.S. Army's PTA on the Island of Hawai'i. The facilities would include (1) development of a modular military operation on urban training (MOUT) facility to provide an urban warfare training environment, (2) development of a CLF range, (3) enhancement of three forward operating base (FOB) sites by developing modular perimeter walls and improving trail access, and (4) development of a live-fire grenade/shoot house facility. The Army would continue to own the land upon which the proposed facilities would be placed, including the CLF course. The U.S. Marine Corps would own and be responsible for maintenance of the CLF targets, modular MOUT containers, FOB enhancement components, and modular grenade/shoot house components, all of which would be procured with U.S. Marine Corps funds. The U.S. Marine Corps would be responsible for construction and equipment emplacement, as well as major future maintenance and repair of the proposed facilities.

Alternative 2 – No Action. Under the no-action alternative the proposed training facilities would not be built or enhanced. Alternative facilities would need to be identified so that U.S. Marine Corps training requirements could be met.

Alternatives Considered but not Carried Forward. Other alternatives considered included development of facilities on O‘ahu installations, alternate project sites on PTA, alternate project sites outside of Hawai‘i, and development of only a portion of the proposed action. However, none of these alternatives met the full range of training requirements and efficiency objectives associated with having requisite facilities on a single installation, and did not meet the size requirements, live-fire requirements, ease of scheduling requirements, and requisite integration of training objectives with the existing battalion training cycles at PTA.

The Army will continue to implement the required measures from the 2003 Biological Opinion as well as new requirements from the 2008 Biological Opinion. The Army has committed to the following conservation measures as part of the overall action:

- Completion of the PTA Implementation Plan.
- Construction of fencing of Training Area 21 in its entirety and subsequent ungulate removal.
- Implementation of ongoing and new minimization and conservation measures for nēnē in the vicinity of Range 1 and training activities east of Red Leg Trail.
- Continued implementation of the Integrated Wildland Fire Management Plan.
- Continued implementation of the conservation measures outlined for reducing the impacts of invasive plants and animals.
- Avoidance of endangered plants during construction of access roads and trails.
- Review of all equipment emplacement, construction and road projects by the PTA Environmental Office to ensure consistency with Biological Opinion requirements.

Anticipated Environmental Impacts:

The environmental assessment (EA) analyzed the impacts of each alternative on the affected environment as well as cumulative impacts of the proposed action. Mitigation of impacts would be accomplished through adherence to standard construction practices and best management practices, and other guidelines, such as avoidance of areas with known federally-listed species, and monitoring to minimize spread of invasive vegetation. The following section summarizes the anticipated environmental impacts of the proposed action:

Air Quality. No long-term air quality impacts are expected with development of the MOUT site, FOB enhancements, grenade/shoot house or the CLF course. Short-term impacts will result from vehicle emissions and fugitive dust during construction and equipment emplacement. These impacts would be reduced by following base standard operating procedures for construction. The proposed action would not result in the violation of existing national and state air quality standards and therefore, the impacts would be minor.

Geology and Soils. Impacts to soil would be minimal and result from minor ground disturbance during construction and equipment emplacement. Geology will not be affected. Standard operating procedures for construction would be followed and therefore, the impacts would be minor.

Vegetation. The sites are previously disturbed areas that generally lack vegetation. Threatened or endangered plants are not anticipated within the FOB, proposed MOUT, or grenade/shoot house sites. Although threatened or endangered plants may occur within the impact area, in accordance with the 2003 Biological Opinion, potential losses are compensated for by ongoing minimization efforts. The 2008 Biological Opinion states that the potential damage or loss of *Silene hawaiiensis* and *Asplenium fragile* var. *insulare* individuals from road construction and small arms training associated with the CLF will be offset by the ungulate control within the planned Training Area 21 fence. The 2008 Biological Opinion will be appended to the 2003 Biological Opinion and will supersede or augment information only for *Asplenium fragile* var. *insulare*, *Silene hawaiiensis*, *and Solanum completum*. The Army currently implements

conservation measures from the 2003 Biological Opinion to prevent the introduction and spread of invasive plant species. The 2008 Biological Opinion concludes that due to the implementation of these measures, the [ongoing and proposed] action is unlikely to increase the risk of invasive species spread beyond that analyzed in the 2003 Biological Opinion. Therefore, impacts to threatened and endangered plant species associated with the CLF range are considered potentially significant but mitigable.

Wildlife. No threatened and endangered faunal species issues are associated with the grenade/shoot house, forward operating bases, or military operations on urban terrain projects. The endangered nēnē or Hawaiian goose (*Branta sandvicensis*) was not addressed in the 2003 Biological Opinion but since that time nēnē have been observed at several locations on PTA, including Range 1 near the proposed CLF. Known nēnē sites are currently being monitored and the Army will begin studying the impacts of noise and disturbance on nēnē in 2009 in addition to implementing nēnē-related training restrictions and other conservation measures. The Army will continue to implement the required measures from the 2003 Biological Opinion as well as new requirements from the 2008 Biological Opinion. The nēnē portion of the 2008 Biological Opinion will be valid through July 1, 2010, at which point it is anticipated that new data regarding impacts of the actions will be available to enable the Army and the Service to develop conservation measures to avoid, minimize, and offset impacts from training actions occurring on PTA through formal Section 7 consultation. As a result, the impacts to wildlife associated with the proposed action are considered potentially significant but mitigable.

Cultural Resources. No historic properties will be affected by this action. A Section 106 Consultation was undertaken and concurrence by the SHPO was received on September 5, 2008.

Human Health and Safety. Only minor short-term impacts to human health and safety, related to normal construction activities, are expected within the project area. The site of the proposed new construction at PTA is far removed from the areas where the Army believes depleted uranium (DU) was deposited in the impact area. To date, the Army has found no evidence to indicate that a DU weapon system was employed at any of the firing points, training ranges or adjacent impact areas along the entire route of the proposed convoy live-fire range. DU has not been detected outside of the impact area. The Army remains committed to continuing to protect the health and safety of people in surrounding communities, Soldiers and their families, and the civilian work force who live near and work at PTA. To that end, the Army is working closely with the State of Hawai‘i and other federal agencies, such as the Nuclear Regulatory Commission and the Agency for Toxic Substance and Disease Registry, to continually define the issue and determine its effects and will continue to aggressively monitor DU in the environment at PTA.

Cumulative Impacts: The geographical scope of analysis included the extent of sensitive environmental resources potentially affected by the project, as well as the boundaries of other projects and actions that may affect those same resources. The proposed action, in conjunction with other actions on and in the vicinity of PTA, would not result in incrementally or collectively significant and unmitigable cumulative adverse effects.

Public Comment: A notice of availability of the Final EA and Draft Finding of No Significant Impact (FNSI) was published in the State of Hawai‘i Department of Health, Office of Environmental Quality and Control publication *The Environmental Notice* on November 08, 2008 followed by a 30-day comment period. Copies of the Final EA and draft FNSI were available for review at the following libraries: Thelma Parker, Hilo, and Hawai‘i State libraries. One member of the public provided comments on the Final EA. These comments addressed several areas. Text in this Final FNSI has been revised from the Draft FNSI to address comments related to potential impacts from depleted uranium and potential impacts to endangered species. Given the limited geographic boundaries of the proposed action and the minor impacts of the action with implementation of the mitigation measures discussed in the EA, potential health and safety, social, economic and cumulative impacts are appropriately assessed in this EA. Comments related to potential impacts from the alleged illegal occupation of Hawai‘i are beyond the scope of this assessment.

Conclusions: This environmental assessment found the proposed action (Alternative 1) would not have any unmitigable significant direct, indirect or cumulative adverse impacts on human health or the environment. As such, this proposed action does not require the completion of an environmental impact statement, as defined by the Council on Environmental Quality regulations (40 CFR 1500-1508) and 32 CFR Part 651.

Approved by:

Matthew T. Margotta
Colonel, U.S. Army
Commander, U.S. Army Garrison, Hawaii

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Date

Department of the Army
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Environmental Assessment for the Development and Use of Military Training Facilities on Pōhakuloa Training Area, Hawai'i

October 2008

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ACRONYMS AND ABBREVIATIONS

ac	acre(s)
BA	Biological Assessment
BO	Biological Opinion
CFR	Code of Federal Regulations
CLF	Convoy Live-Fire
cm	centimeter(s)
EA	Environmental Assessment
EIS	Environmental Impact Statement
EOD	Explosive Ordnance Disposal
FOB	Forward Operating Base
FONSI	Finding of No Significant Impact
FP	Firing Point
ft	foot/feet
ha	hectare(s)
HQDA	Headquarters Department of Army
IED	Improvised Explosive Device
in	inch(es)
km	kilometer(s)
m	meter(s)
MCB	Marine Corps Base
mi	mile(s)
MOUT	Military Operations on Urban Terrain
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NRCS	Natural Resources Conservation Service
PTA	Pōhakuloa Training Area
SDZ	Surface Danger Zone
T-IED	Training Improvised Exploding Device
USACE	United States Army Corps of Engineers
USAG-HI	United States Army Garrison, Hawai‘i
USARHAW	United States Army, Hawai‘i
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USMC	United States Marine Corps
UXO	Unexploded Ordnance

1.0 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

1.1 Introduction

The United States Marine Corps (USMC) prepared this environmental assessment (EA) in compliance with the National Environmental Policy Act (NEPA) of 1969. Marine Corps Base (MCB) Hawaii proposes to develop training facilities and ranges on the U.S. Army's Pōhakuloa Training Area (PTA) on the island of Hawai'i (Figure 1-1). Specifically, the USMC proposes to enhance training facilities and meet training requirements at PTA by:

- developing a convoy live-fire (CLF) course,
- developing a modular military operations in urban terrain (MOUT) training facility,
- developing a live-fire grenade/shoot house, and
- enhancing existing forward operating bases (FOBs).

The Army would continue to own the land upon which the proposed facilities would be placed, including the CLF course. The USMC would own and be responsible for maintenance of the CLF targets, modular MOUT containers, FOB enhancement components, and modular grenade/shoot house components, all of which would be procured with USMC funds. USMC would be responsible for construction and equipment emplacement, as well as major future maintenance and repair of the proposed facilities.

USMC is conducting this analysis to determine the potential environmental consequences of the proposed action and alternative actions, including the no-action alternative. Under the no-action alternative, the convoy live-fire course, modular MOUT training facility, and live-fire grenade/shoot house would not be developed; the FOB sites would continue to be used without the addition of perimeter walls and other enhancements.

1.1.1 Pōhakuloa Training Area

Pōhakuloa Training Area was established as a multi-functional training facility in 1956 for the U.S. Army Western Command and other Pacific Command units. The facility is the only training area in Hawai'i capable of supporting coordinated live firing of all assigned crew-served weapons of the infantry (company and battalion) and artillery in conjunction with air support. The installation encompasses approximately 44,110 hectares (ha), (109,000 acres [ac]), with a central impact area of approximately 20,638 ha (51,000 ac). Total acreage includes the recently acquired Keamuku Maneuver Area, or Keamuku Parcel.

Much of the land surrounding PTA is designated as a conservation district, which includes both state and privately-owned land. Grazing is the major use of the surrounding conservation district. The Bishop Estate borders PTA on the southwest, Parker Ranch forms the northwestern border with PTA, Hawaiian Homelands are to the east of PTA, and the remainder of adjoining lands belong to the state of Hawai'i. Besides grazing, public recreation is an important land use on neighboring lands (U.S. Army Engineering and Support Center and Nakata Planning Group LLC 2000).

PTA provides training areas for month-long exercises by Army or USMC battalions, weekend or three-week exercises by Reserve Component and National Guard units, and various uses by other occasional and visiting units. USMC is the second largest user of PTA after the 25th Infantry Division. Marine Forces Pacific is structured similarly to the Army with Marine Regiments or Marine Expeditionary Brigades mirroring similarly-sized Army task force units and their missions. Training requirements and standards are also similar. Marine Corps commands at MCB Hawaii have relied upon PTA to fulfill a large portion of their Mission Essential Task List training requirements. PTA supports training for units that are part of the Fleet Marine Forces afloat on transports in the Pacific, and it is a local training area for the 3rd Marine Regiment located at MCB Hawaii Kaneohe Bay, on the island of O'ahu.

Once per quarter (every three months) each Marine battalion trains at PTA. Battalion composition varies, but typically consists of three infantry (rifle) companies, one weapons company, one headquarters company, one combat service company, and a company-sized support unit from the Combat Service Support Group-3. The entire mobilization and training takes approximately 30 days, with actual on-the-ground exercises occupying approximately 8 to 15 days at PTA.

The training schedule is divided among the companies and training facilities across the 8 to 15 days of training. The primary training exercises are live-fire training on existing PTA ranges, MOUT training, and CLF training. Two weeks of MOUT training per year are required to maintain proficiency. This schedule amounts to four months of training cycles for 3rd Marine Regiment (Reinforced) (3rd Marines) training at PTA. Actual Marine training loads may be lighter or less frequent due to deployments.

Pōhakuloa Training Area supports full-scale combined arms live-firing and field training military exercises at all levels from squad to brigade and can be divided into four categories according to type of use:

- Cantonment
- Training areas
- Impact area
- Areas unsuitable for maneuver

The cantonment area makes up less than 1 percent of PTA and contains facility administration offices, troop billeting and support services facilities. The training areas consist of 22 separate ranges in the northern, eastern and western regions of PTA. These areas account for approximately 30 percent of PTA and support a variety of training including weapons live-fire exercises, bivouac and aviation training. Training ranges exist for anti-armor, machine gun, artillery direct and indirect fire and combined arms live-fire exercises; infantry squad and platoon-sized assault training; demolition training; and pistol, rifle, rifle grenade, hand grenade, and machine gun/sniper training. There are three air drop zones within training areas located at PTA. The impact area lies at the center of PTA and accounts for approximately 47 percent of its total area. The impact area is currently used for helicopter gunnery, fixed wing bombing and gunnery and artillery fire, and also encompasses the surface danger zones (SDZs) for firing ranges. No troop movement is permitted in the impact area due in part to the hazard of unexploded ordnance (UXO).

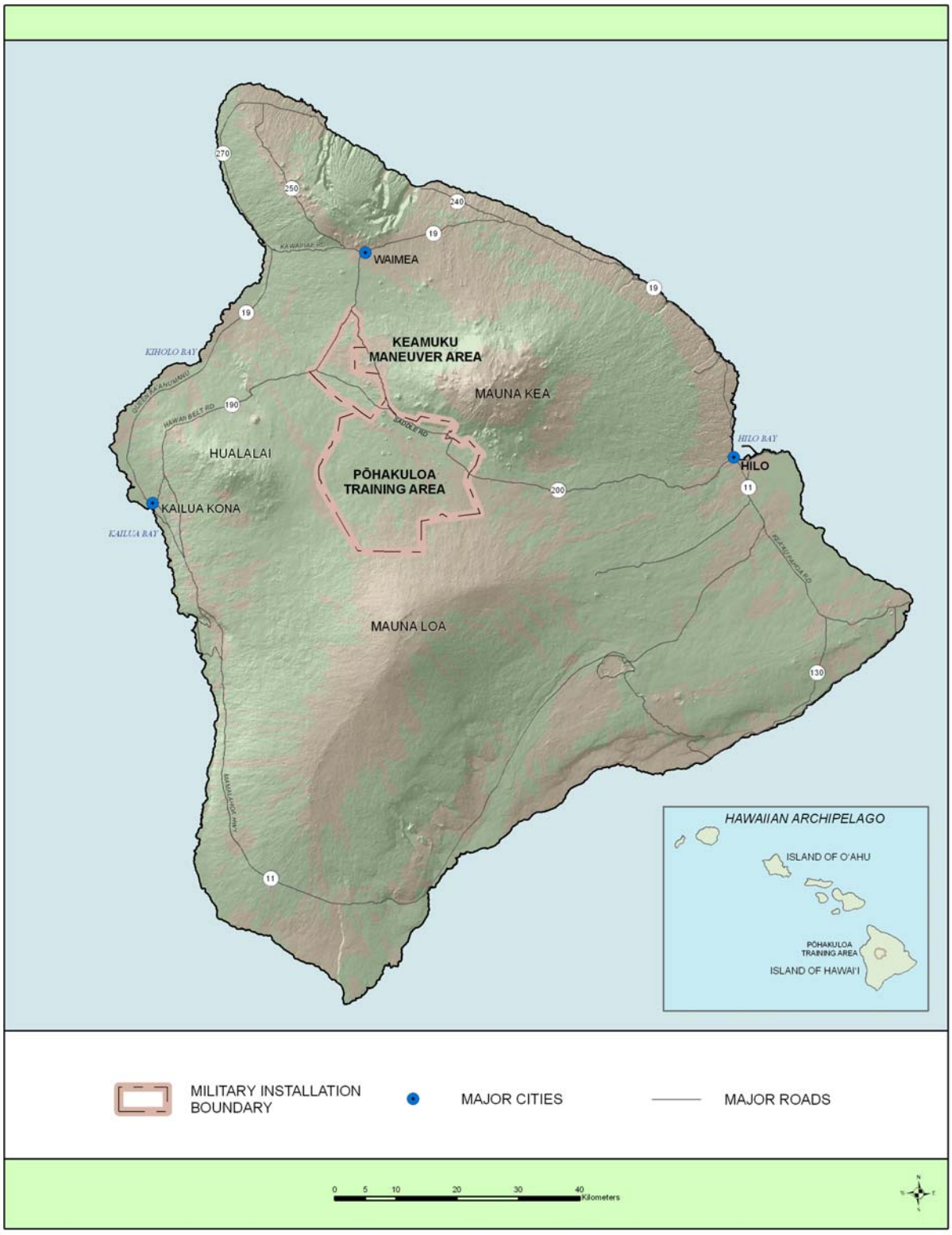

Figure 1-1. Pōhakuloa Training Area on the island of Hawai‘i.

1.2 Purpose and Need for the Proposed Action

USMC must provide realistic training opportunities that simulate current and future battle environments to prepare Marine Corps units for combat duty. Existing and emerging training requirements driven by theatre of war considerations support the need for new ranges and other training facilities.

As a result of forecasted increased use of PTA the Army has started planning for future improvements to the training area to better support training[1]. USMC, as a co-user of PTA with the Army's 25th Infantry Division, Hawaii Army National Guard, and other local and visiting units, supports a combined strategy for future development of U.S. Army ranges and training areas in Hawai'i[2]. As such, the Marine Corps has been involved in the planning process for future PTA improvements. With implementation of the improvements plan, PTA would become an ideal training area to support future war-fighting capabilities.

There is currently no convoy live-fire range in Hawai'i that meets Marine training requirements. Small MOUT facilities exist at Schofield Barracks and Marine Corps Training Area Bellows on O'ahu, but these facilities cannot support the quantity of training required for MCB Hawaii and other user units, and do not meet the requirement for a large, collective-training MOUT facility (>24 structures). MCB Hawaii and other units conduct forward operating base (FOB) activities at PTA but the facilities lack the perimeter walls that characterize FOBs found in the battle environment. A grenade/shoot house exists at MCB Hawaii Kaneohe Bay but it cannot support the throughput or be combined effectively with more complex training missions. Current training facilities at PTA are not adequate to fully meet new training requirements for Soldiers and Marines.

The Army is willing to provide the land at PTA required to meet the USMC training requirements for a convoy live-fire range, a modular MOUT facility, a grenade/shoot house, and FOB enhancements. The proposed projects are necessary to fulfill Marine training requirements and to ensure USMC is able to support its strategic commitments, including ongoing operations in the global war on terror. The Army has similar requirements, and would benefit from this MCB Hawaii initiative. Training efficiency and realism would be significantly increased by co-locating these training facilities at one location that accommodates desired live-fire and non-live fire facilities, including MOUT, FOB, convoy live-fire, and other activities. Other criteria for meeting mission needs include a large installation size to accommodate the convoy live-fire course design, live-fire and associated surface danger zone requirements, ease of scheduling requirements, and requisite integration of training objectives with the existing battalion training cycles at PTA.

The facility development actions and their associated training activities are described below. Locations of the proposed actions on PTA are presented in Figure 1-2. Facilities would also be used to support training for non-Marine units.

Modular Military Operations on Urban Terrain (MOUT) Development – Urban areas are expected to continue to characterize the current and future battlefield for U.S. Forces. As such, realistic training needs to include tactical urban settings. Marines must be taught to shoot, move and communicate in urban warfare settings and to instinctively see and use urban features that provide cover or concealment. USMC must provide realistic scenarios where Marines establish squad and platoon positions, conduct roadblocks and vehicle searches, and practice communication skills in battle-simulated environments. This kind of training requires mock-up structures that are as realistic as possible and facilities that are large enough to simulate a variety of training scenarios and missions.

[1] Memorandum by M.M. Robeson, 3rd Marine Division Commanding General July 5, 2006. Study Submission to the Marine Corps Studies System in Support of Future Concepts for the Utilization and Development of the Pohakuloa Training Area.

[2] Memorandum by S.A. Hummer, MCB Hawaii Commanding General dated November 27, 2006. Hawai'i Based U.S. Marine Corps Commands Combined Strategy for Future Development of U.S. Army Ranges and Training Areas in Hawai'i.

Convoy Live-Fire (CLF) Course – Current military operations include convoys that travel through hostile areas and are often targeted by enemy forces. A large-scale, realistic range is needed to simulate attacks by roadside bombs, organized ambushes, rocket-propelled grenades, and other threats, and to respond to these threats with a wide range of weaponry and tactics. USMC must simulate these conditions and provide training on a convoy live-fire course to meet current requirements and training goals. PTA is the only military training area in Hawai'i able to accommodate the space and live-fire requirements of a convoy live-fire range. The CLF course would provide realistic scenarios and support for standard training events and threats associated with convoy travel. The course would meet both USMC and Army range and training requirements.

Forward Operating Base (FOB) Development – Urban combined arms exercises require real battlefield conditions with convoys traveling between villages or FOBs. FOBs are frequently attacked in battle and enemy forces try to breach perimeters or find weak points. Perimeter defense practice is a necessary part of training for battle. Currently, FOBs at PTA do not include structural walls. Walls would be developed around three FOB sites at PTA to create a more realistic scenario for training: (1) FOB Outlaw in Training Area 3, (2) the FOB site located at firing point 428, and (3) the FOB site located at firing point 438.

Grenade/Shoot House – Urban areas are expected to continue to characterize the current and future battlefield for U.S. Forces. As such, realistic training needs to include tactical urban settings. USMC must provide realistic facilities and scenarios where Marines can practice movement, room clearing, and communication in battle-simulated environments. This kind of training requires mock-up structures that are as realistic as possible and support live-fire training.

1.2.1 Scope of the EA and the Decision to be Made

This EA considers the proposed development of a live-fire training range and other facilities to support Marine training requirements at PTA, and new or additional training activities that would occur on these facilities. The direct, indirect, and cumulative effects of the proposed action and alternatives, including the no-action alternative, are discussed.

This EA was prepared pursuant to the National Environmental Policy Act of 1969 (NEPA) (42 USC 4321 et seq.), the Council on Environmental Quality Regulations implementing NEPA, (40 CFR Parts 1500-1508), and Marine Corps Order P5090.2A, Chapter 12, *Environmental Compliance and Protection Manual* (Jan 2008), and other applicable federal and state-delegated environmental legislation.

A specific requirement for this EA is an appraisal of the impacts of the construction, equipment emplacement and training activities associated with the proposed action. The EA will be used to determine whether or not a Finding of No Significant Impact (FONSI) is appropriate or whether a Notice of Intent to prepare an environmental impact statement (EIS) is required.

The EA is structured in the following manner:

- Chapter 2 describes the proposed action and alternatives to the action. Mitigation measures for the proposed action and a summary of the effects of each alternative on all assessed resources are also provided in Chapter 2.
- Chapter 3 presents the affected environment and anticipated environmental effects of the proposed action and alternatives.
- Chapter 4 addresses the potential for cumulative effects.
- Chapter 5 provides a listing of individuals and agencies consulted during preparation of the EA.
- Chapter 6 identifies persons who prepared the document.
- Chapter 7 includes bibliographical information for cited sources.

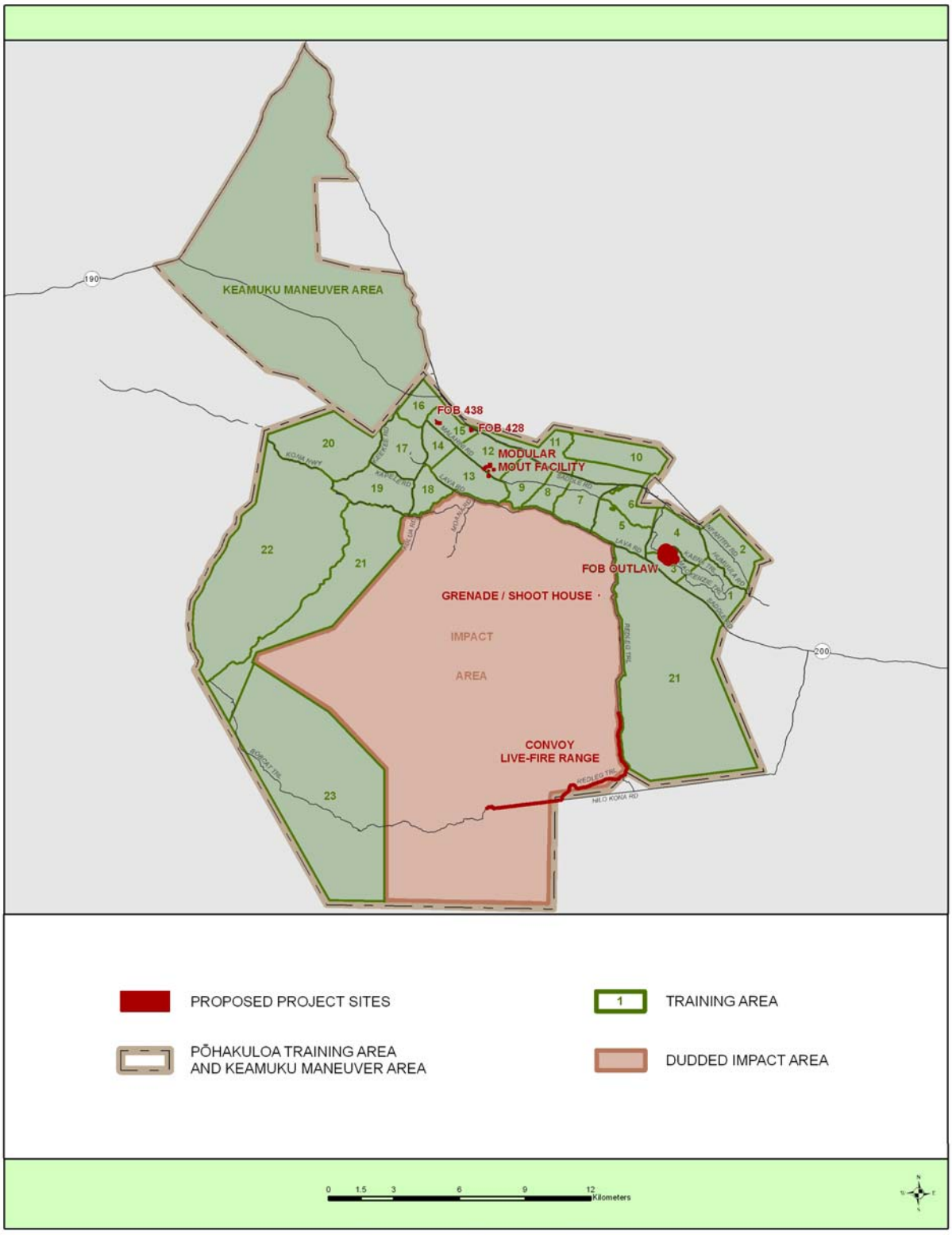

Figure 1-2. Location of proposed projects on PTA.

1.2.2 Issues Analysis

Issues are effects (real or perceived) on physical, biological, social or economic resources. The environmental resources that could be affected by the proposed action and alternatives are described in Chapter 3. Potential issues could include construction and equipment emplacement within areas with culturally sensitive resources or protected plants and animals, or the spread of undesirable plants. Relevant resource areas or issues identified and evaluated in this EA include:

- Air Quality
- Geology and Soils
- Vegetation Resources
- Faunal Resources
- Cultural Resources
- Human Health and Safety (noise, hazardous and toxic materials/waste)

Some issues would not be affected by the proposed action and have been eliminated from further analysis. Brief discussions of the rationale for treatment of these environmental resources are offered in Section 3.7. These resources include:

- Water Resources
- Land Use/Recreation
- Socioeconomics and Environmental Justice

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

This chapter describes the proposed action and the alternatives to the proposed action and compares the alternatives in terms of their environmental effects (summarized from Chapter 3) and achievement of project objectives. Two alternatives, no action and the proposed action, are evaluated. Due to size requirements for the combined actions, no other plausible alternatives were identified for evaluation. The no-action alternative provides the baseline for comparison with other alternatives. Alternatives considered and eliminated from detailed analysis are also described.

2.1 Alternative 1: The Proposed Action - Modular MOUT, CLF Range, FOB, and Grenade/Shoot House Development

2.1.1 Details of the Proposed Action

In March 2006, the 3rd Marines laid out a concept for development of PTA that would maximize the ground combat element use of PTA to support current and future training requirements. The vision was outlined in a memorandum that described a Marine Corps Command combined strategy for future development of U.S. Army ranges and training areas in Hawai'i. Part of the 10-year plan aims to create a training complex at PTA to support combined arms live-fire and maneuver training, urban warfare training, convoy live-fire training, and weapons training (Memorandum from MCB Hawaii Commanding General S. A. Hummer to Commander, USAG-HI, 27 November, 2006). Facilities to meet current and future training requirements would be joint facilities, with shared cost and usage between MCB Hawaii and Army units and other users.

The proposed action consists of four projects that support emerging training initiatives and requirements: (1) development of a modular MOUT facility to provide an urban warfare training environment (one site), (2) development of a CLF range, (3) enhancement of three FOB sites by developing modular perimeter walls and improving trail access (three sites), and (4) development of a grenade/shoot house facility (Figure 1-2). The projects individually and collectively support the training requirements described in the General Hummer memorandum.

2.1.1.1 Modular Military Operations on Urban Terrain (MOUT) Facility

Design and Construction of the MOUT Facility

The modular MOUT facility would be located in the vicinity of Pu'u Lehue near firing points 414, 419, 421, 423, and 424 in the northwest part of historic PTA (installation boundary prior to acquisition of the Keamuku Maneuver Area) (Figure 2-1). The modular MOUT site would consist of seven clusters of containers (Figure 2-1) that would simulate various urban settings (e.g., marketplace, residential, town square). The number and size of modular units comprising each cluster would vary, as would the acreage occupied by each cluster (Table 2-1). The total area of proposed urban terrain is approximately 7.8 ha (19 ac). Containers would sometimes be stacked to simulate two-story buildings. Modular walls approximately 1.8 m (6 ft) tall would be built within some of the clusters to simulate compounds containing several "buildings" or "houses".

Containers would be similar to those used for trucking, shipping, and rail transport of goods. Containers are all eight feet wide and eight to nine and one half feet tall, and manufactured in lengths of 3, 6 and 12 m (10, 20 and 40 ft). Approximately 75 percent of the containers would be 12 m (40 ft) long and approximately 25 percent of the container would be 3 to 6 m (10 to 20 ft) long. Containers would be manufactured off site and transported to the site by commercial vendors. The containers would sit on the ground and would not require concrete footings. Openings are pre-cut in the containers to simulate window and door openings.

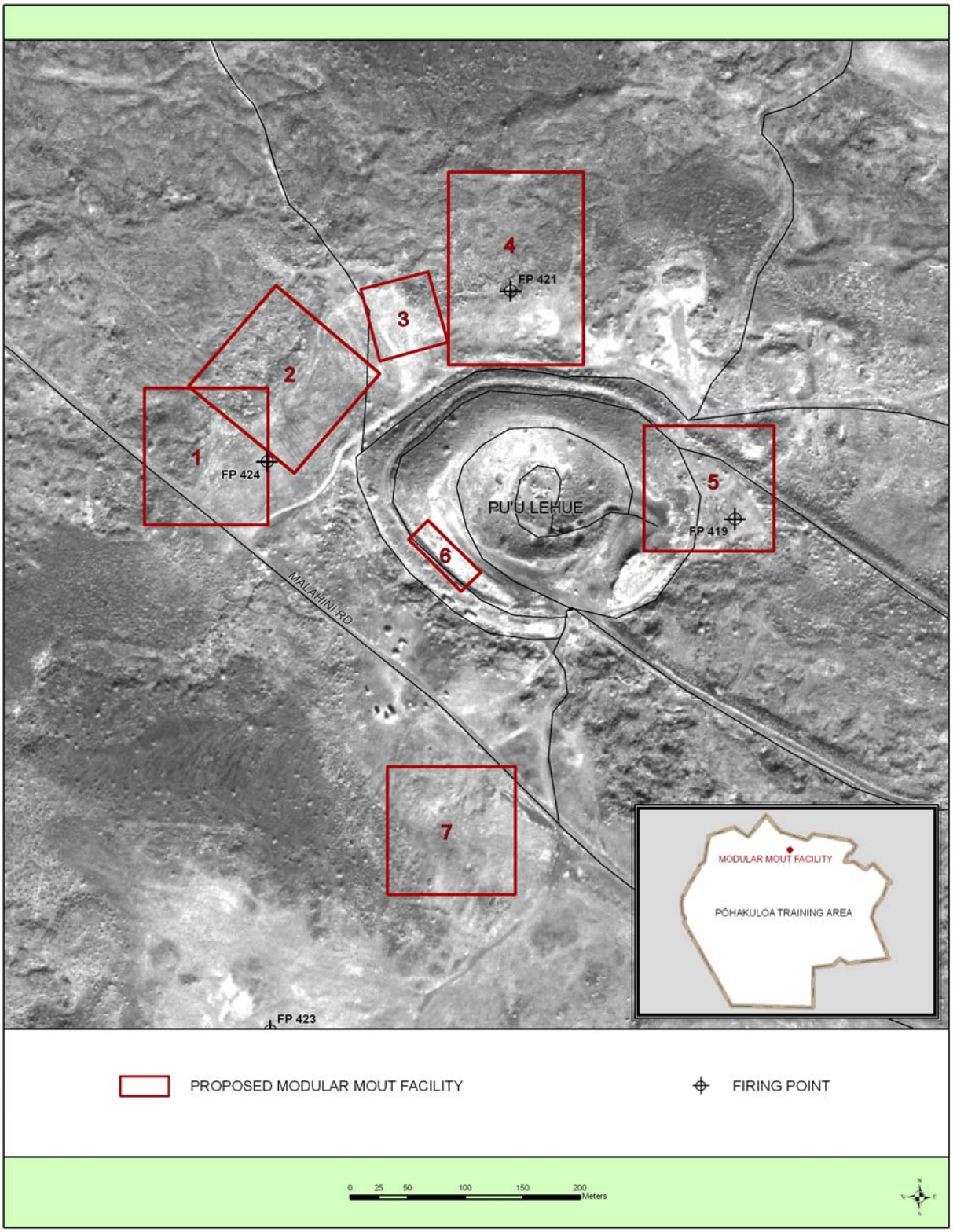

Figure 2-1. Location of proposed modular MOUT facility.

Figure 2-2. Examples of modular MOUT containers used to create a simulated urban environment. Additional examples can be seen at http://www.alliedcontainer.com/gallery.html.

No utilities such as electricity, plumbing, or sewer would be required at the site. Site preparation for modular MOUT containers would consist of site leveling as necessary, using construction equipment such as graders, bulldozers, and front-end loaders. While some site leveling may be necessary, no excavation or fill using material outside of PTA would be needed.

In each cluster, modular walls would be developed to create one to two courtyard enclosures. Concrete wall footings approximately 0.6 m (2 ft) deep and 0.6 m (2 ft) wide would be excavated to anchor the wall system. Specific courtyard locations and sizes would be determined following placement of the modular containers. Existing roads and trails would be used for training. Some construction of connector roads and road upgrades consisting of gravel addition using native material might be done along road sections within the modular MOUT complex. Road development would not exceed 2 km (1.2 mi) total, and road upgrades would not exceed 2 km (1.2 mi) total. Road development would consist of leveling, grading, and compaction using construction equipment, followed by the addition of 15-20 cm (6-8 in) of crushed rock base course and a cap of 6 cm (2.5 in) minus gravel. Gravel would be obtained from the active quarry and rock crushing operation on PTA. Transportation of materials and construction would be done by commercial companies.

Training Activities and Usage of the MOUT Facility

The facility would be used to train squad through company-size units in urban combat operations. Missions and training operations supported would include seizure of key objectives and terrain, infiltration, route security, logistics and supply, force protection, control of entry points, attack on buildings, entry and clearing of rooms and buildings, and various scenarios for small-unit assault, support, and security. MOUT doctrine has been developing rapidly, along with the increase in urban military operations (USMC 1998, Headquarters Department of Army [HQDA] 2004 in revision). The modular MOUT facility would be used approximately 180 days per year by MCB Hawaii units. The facility would also be used by Army and other Service units up to approximately 120 days per year.

Table 2-1. Approximate characteristics of modular MOUT clusters comprising the proposed modular MOUT facility.

Cluster Number	Approximate Number of Containers	Footprint of Containers - Upper Estimate	Footprint of Each Village Cluster - Approximate
1	8-12	301 m^2 (3,240 ft^2)	1.3 ha (3.2 ac)
2	15-20	502 m^2 (5,400 ft^2)	1.4 ha (3.4 ac)
3	8-12	301 m^2 (3,240 ft^2)	0.4 ha (1.0 ac)
4	25-30	753 m^2 (8,100 ft^2)	2.0 ha (4.9 ac)
5	8-12	301 m^2 (3,240 ft^2)	1.2 ha (3.0 ac)
6	5-10	251 m^2 (2,700 ft^2)	0.2 ha (0.4 ac)
7	8-12	301 m^2 (3,240 ft^2)	1.3 ha (3.1 ac)
Totals	**78-108**	**2,710 m^2 (29,160 ft^2)**	**7.8 ha (19.0 ac)**

The modular MOUT facility would primarily support infantry operations but would also be used for combined arms units. No live-fire or dud-producing ammunition would be used. Marines and Soldiers would move through the urban complex, both on foot and riding in tactical vehicles. Vehicles most commonly used at this facility would be high-mobility multipurpose wheeled vehicles and larger trucks, but a variety of other vehicles, including Stryker vehicles and tracked Marine amphibious assault vehicles, would also use the MOUT. Civilian and military role players (i.e., villagers) may also be used in training scenarios. Training realism would be enhanced using “flash-bang” explosives and grenade simulators and high-tech military paintball (a.k.a. simmunitions). Simmunitions closely mimic two-way live fire and have largely replaced older laser military simulation. The 9mm plastic simmunition rounds are nontoxic, biodegradable, washable pellets of detergent that can be fired out of a minimally-modified 5.56mm combat rifle. Simmunitions can be used force-on-force when protective gear such as head and face protection are worn. The impact of the "bullet" is felt by the victim and a biodegradable detergent mark remains wherever the bullet hits, letting individuals know they have been hit.

2.1.1.2 Convoy Live-Fire (CLF) Course Development

Design and Development of the CLF Course

The lower section of Red Leg Trail from Range 1A south to Range 20 within the impact area would be developed as a CLF range (Figure 2-3). The length of the course would be approximately 10 km (6.2 mi). Training currently occurring along this route would be expanded to include additional events and training scenarios that are not currently supported at PTA. CLF activities and schedules would also be integrated with training activities associated with the proposed modular MOUT training facility and FOBs. CLF training is a relatively new requirement that provides realistic training by:

- integrating improvised exploding device training (T-IED) simulators into the concept of operations
- integrating MOUT and FOB operations as part of the larger training exercise
- using live fire to include dismounting and 360° fire for some objectives
- using established scenarios but allowing for flexible configurations, i.e., moving obstacles and T-IED sites within the event locale
- integrating actors and opposing force players

A CLF range is a complex used to train and test Marines and Soldiers, crews, platoons, and companies on the skills necessary to detect, identify, engage and defeat stationary and moving vehicle and infantry targets from a stationary or moving platform (i.e., vehicle) using specified weapons and weapon systems. The targets may be presented individually or as part of a tactical array in an open (i.e., rural roadside) or urban environment (in this case, building facades by roadside) (HQDA 2004 in revision). The facility consists of a course route (road), an entry control point event at the beginning and end of the course, and five additional objectives (live-fire events) along the route. Facility requirements for the training events/objectives are shown in Table 2-2. The CLF course layout and preliminary surface danger zones are shown in Figure 2-3.

At each objective location, the targets would be set up in a training array based on designs based on designs presented in Training Circular 25-8, Training Ranges (HQDA 2004 in revision). Targets would simulate infantry (on foot) and armored (combat vehicle) threats and test weapons skills. Target types include stationary infantry targets, moving infantry targets, stationary armor targets, and moving armor targets, all of which are pop-up type targets. Moving targets traverse along tracks that would be 15 m (50 ft) and 350 m (1,100 ft) long, respectively. All pop-up targets are charged using solar panels, powered by batteries, and remotely controlled, so no field utilities would be required. Stationary targets would be placed in target “coffins” where they are protected and concealed when not up. The coffins would be fabricated from concrete panels and provide a subterranean recess for the targetry. The approximate numbers of targets by type are presented in Table 2-2. Infantry and armor pop-up targets are operated using a hand-held radio control and scored using a field computer system. Security barriers would be either concrete or plastic (sand/water-filled). Wooden facades simulating buildings have wooden bases and braces. Transportation of materials, construction, and equipment emplacement would be done by commercial entities.

Table 2-2. Targetry and other requirements for CLF course events.

Objective/Event	Number of Security Barriers	Number of Wooden Building Facades	Number of Stationary Infantry Targets	Number of Moving Infantry Target Systems	Number of Stationary Armor Targets	Number of Moving Armor Targets
Entry control point escalation of force (1) – course start	5	0	10	0	0	0
Sniper event	0	2	0	0	0	0
Ambush 1 – east and west sites (near/urban)	0	4	10	2	1	0
Blocked ambush with IED/small arms	0	0	10	1	1	0
Ambush 2 (far/urban)	0	4	10	1	1	1
React to rocket-propelled grenade team	0	0	3	0	1	0
Entry control point escalation of force (2) – course end	5	0	10	0	1	0
TOTALS	**10**	**10**	**53**	**4**	**5**	**1**

Construction activities and equipment emplacement would consist of the following:

- Upgrade of existing Red Leg Trail and Hilo Kona Road. The existing Red Leg Trail is approximately 7.3-8.5 m (24-28 ft) wide from Range 1 proceeding south to firing point (FP) 807. This width is considered adequate to support the CLF requirements. South of FP 807, the road narrows further approaching FP 808, averaging approximately 4.5 - 5.5 m (15-18 ft) wide between FP 807 and the western turn of Red Leg Trail. Some even narrower sections are found between the beginning of the western section of Red Leg Trail and Range 20, the end point for the CLF course. A portion of the western leg of Red Leg Trail approximately 0.5 km (0.3 mi) long, crosses the Mauna Loa Forest Reserve (State of Hawai‘i land) approximately 4 km west of Pu‘u Koli, will not be widened. As an interim measure, the Army would request temporary permission from the State of Hawai‘i to cross State lands and would seek a permanent easement in the future. No construction, road widening, or firing from State lands would be permitted. A total of approximately 8.6 km (5.6 mi) of road would require widening by approximately 2.4-3.0 m (8-10 ft) to accommodate two lanes of tactical vehicle traffic. Road widening would employ bulldozing, grading, and adding 15-25 cm (6-10 in) of road base material (6 inch minus gravel) and cap material (3 inch minus gravel) from the active quarry on PTA. The total volume of road base material needed for the widening is estimated at approximately 917 m^3 (1,200 yd^3). This main road is referred to as the course route.

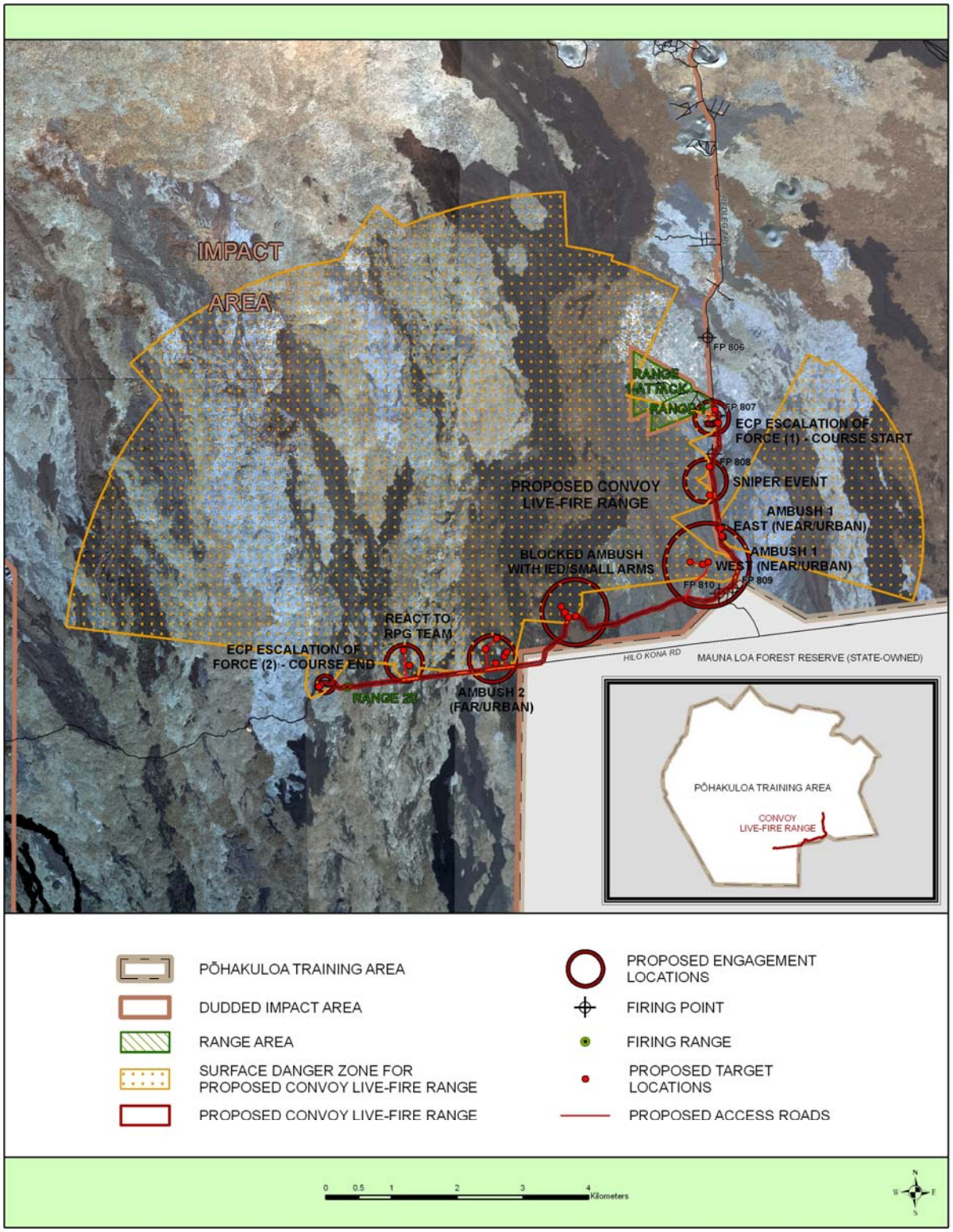

Figure 2-3. Convoy live-fire layout, location of training objectives/engagement boxes, approximate location of target maintenance access trails, approximate location of course targets, and preliminary surface danger zones.

Figure 2-4. Examples of targetry used along the CLF range. Clockwise from upper left: stationary infantry target, moving infantry target on rail, movable armor target, stationary armor target in down position, and stationary armor target in upright position. Photos courtesy Thiessen Training Systems Corp. http://www.theissentraining.com/ and Lockheed Martin Corp. http://lmtds.hiwaay.net/.

- Creation of a network of target access roads and trails at defined points along the CLF course (Figure 2-3). Target access trails would be approximately 3-4 m (10-14 ft) wide, semi-improved roads that are level, free of ruts and obstacles, and capable of supporting, at a minimum, maintenance pick-up trucks. The trails would be used to transport targets, mover/lifter materials, and batteries, and to perform periodic inspections and maintenance. No targets or new access roads are to be constructed on pāhoehoe lava to avoid potential cave collapses and associated safety risk. Trails built atop ʻaʻā (rough) lava would be created by crushing and consolidating the in-situ material and adding additional road base material as necessary to create a relatively smooth road surface. Therefore, grading sub-grade would be performed as needed to develop smooth road surfaces and desired grades, which minimizes the rock tonnage required to establish the road base. Access trail length would be minimized as much as possible. Entry control points (ECP) 1 and 2 (Figure 2-3) would use existing roads/trails for target maintenance. The total access trail length would be approximately 3.3 km (2.1 mi). Target access trail construction would employ bulldozing, grading, and adding road base and cap material from the active quarry on PTA.

- Stationary and moving targets would require site smoothing and leveling for proper functioning and maintenance. For individual stationary infantry and armor targets, minor excavation up to 60 cm (24 in) deep may be necessary to install target coffins that house and conceal the targets when they are down and protect the mechanical and computerized target components. Target lifter protection

could vary by individual target and may employ a combination of surface topography (e.g., naturally occurring features/berms), placing the lifter in a low spot, or surface-mounted steel plating covered with soil or rock.

Training Activities and Usage of the CLF Course

CLF training currently occurs at PTA, but does not include automated targets (only stationary paper targets are currently used), does not support all doctrine-specific CLF scenarios and targets, and does not include the full range of CLF weapons (or the appropriate targets for some weapons). Tactical vehicle convoys of one to fifteen vehicles would respond to obstacles, threats, and attacks occurring along the route. Vehicle types using this course would include the highly mobile multi-purpose wheeled vehicle (HMMWV), light maneuver tactical vehicle (2.5 ton payload), heavy maneuver tactical vehicle (5 ton payload), mine-resistant ambush-protected vehicle, light armored vehicle, medium tactical vehicle replacement truck (i.e., 7 ton truck), Stryker vehicle, heavy expanded mobility tactical truck, amphibious assault vehicle[3], expeditionary fighting vehicle, and other wheeled vehicles used by Army and other Service units using PTA. Regardless of the vehicle type, munitions used on the range would be limited to those listed below and vehicles would remain on established course roads. No construction, road widening, or firing from the section of road crossing State lands would take place.

Small arms weapons firing would occur within the engagement boxes. Preliminary surface danger zones were created for each objective based on the locations of engagement boxes and targets and the types of ammunition fired from the convoy route. The following ammunition would be approved for use on this range: 5.56mm, 7.62mm, and .50 caliber weapons; MK19 training practice target (40mm grenade machine gun round that produces a "flash-bang" to simulate combat ammunition, and releases a powder at the point of impact to show the location – non incendiary and non high-explosive); and the M-72 light anti-tank weapon and M136 AT4 (both shoulder-fired rockets). Supporting fire from 60mm, 81mm, and 120mm mortars, 155mm howitzers (towed artillery) and 105mm Stryker Mobile Gun System would occur from existing firing/mortar points 805, 806, 807, 808, and 809.Only 5.56mm ammunition would be fired at Ambush 1 (near/urban) targets east of Red Leg Trail (outside the impact area). Fixed targets representing armored vehicles within the impact area would be engaged by practice rounds from helicopters and fixed-wing aircraft, mortars, and grenade guns. No dud-producing ammunition would be used on the CLF range. Both ball and tracer ammunition would be used during both daytime and nighttime training.

Training scenarios require groups of vehicles traveling in a convoy. The majority of convoys would consist of high mobility multi-wheeled vehicles and other trucks. A minority of the CLF exercises would involve amphibious assault vehicles, the only tracked vehicle currently used at PTA. There are seven training events/objectives along the course: two entry control point escalation of force objectives - one each at course start and end; a sniper event; one near/urban ambush objective (east and west sites can be used together or independently); a blocked ambush with improvised explosive device (IED)/small arms objective; a far/urban ambush event; and a rocket propelled grenade reaction event. Obstacles, disabled vehicles, IED scenarios, and safety considerations require that the road provide for two lanes of passage by combat vehicles. Firing would occur from the road from positions inside and outside vehicles. Training activities may also involve civilian and military personnel as role players. CLF training along a portion of the proposed course currently takes place approximately 60 days per year. The frequency of training exercises by Marine units is approximately one battalion training cycle per quarter, or approximately 8-15 days per quarter. This

[3] The armored assault amphibious vehicle (AAVP7A1) is a tracked vehicle used by the U.S. Marine Corps to carry troops in water operations from ship to shore, through rough water and the surf zone, and to inland objectives after coming ashore. The AAVP7A1 provides protected transport of up to 25 combat-loaded Marines through all types of terrain. Its weaponry includes an M2 .50-cal. machine gun and an MK-19 40mm grenade launcher. It can move at speeds of up to 45 mph on land. Currently, MCBH has one platoon (12-16 vehicles) of them in support of ground troops. Up to one full platoon is deployed to PTA approximately four times per year and vehicles are used only on the approved roads at PTA.

Marines usage of approximately 60 days per year would continue under the proposed action. Use of the course by Army and other units is currently approximately 20-25 days per year, and would increase to approximately 60 days per year, for a total proposed usage of approximately 120 days per year for all users combined.

2.1.1.3 Forward Operating Base (FOB) Development

Design and Development of FOB Perimeter Walls

Two company-level FOBs (at firing points 428 and 438) and one battalion-level FOB (FOB Outlaw) at PTA would be enhanced by the development of perimeter security walls and minor trail construction. Locations of proposed wall development sites are shown in Figure 1-2. The footprints of the proposed sites are shown in Figure 2-5. The size and perimeter of each FOB site are detailed in Table 2-3. Development would consist of installing modular perimeter walls made of capped or uncapped, prefabricated corrugated 16-18 gauge steel panels 1 m (3 ft) wide and 3 m (10 ft) tall. Metalith™ barriers are prefabricated steel wall structures that are easy to install and similar to FOB perimeter barriers constructed during wartime. The walls are filled with soil or rock and can be dismantled if desired (Figure 2-6). According to PTA environmental guidance, soil, rock, and fill material must originate from within PTA to minimize the spread of invasive and noxious plant species. Wall fill material needed for all three FOBs is approximately 7,260 m^3 (9,500 yd^3) (Table 2-3) and would be obtained locally on PTA from one of several sources. One possible source is the active quarry and rock crushing operation on PTA. The active quarry provides material for various road and other site development projects on PTA. The second possible source of material is the black sand deposit on the newly acquired Keamuku Maneuver Area. The sand from the deposit is relatively coarse and has been used historically for various uses on PTA. Advantages of sand use are that the material is easier to work with, there are no rock crushing costs, the material is less damaging to the wall structures during the filling process, and the sand may be more easily removed relative to rock if the walls are dismantled.

Earth disturbance at each FOB as a result of the proposed action would include minor site leveling for wall installation and gravel road development within the FOB. Corner observation towers may or may not be constructed, but their construction would not increase the footprint of the facility. Some gravel roads may be developed within each FOB to minimize dust generation by vehicle traffic. Gravel road development would consist of minor leveling and grading within the FOB perimeter using construction equipment, followed by the addition of 15-20 cm (6-8 in) of crushed rock base and a cap of 6 cm (2.5 in) minus gravel. Gravel would be obtained from the active quarry and rock crushing operation on PTA. Transportation of materials and construction would be done by commercial entities.

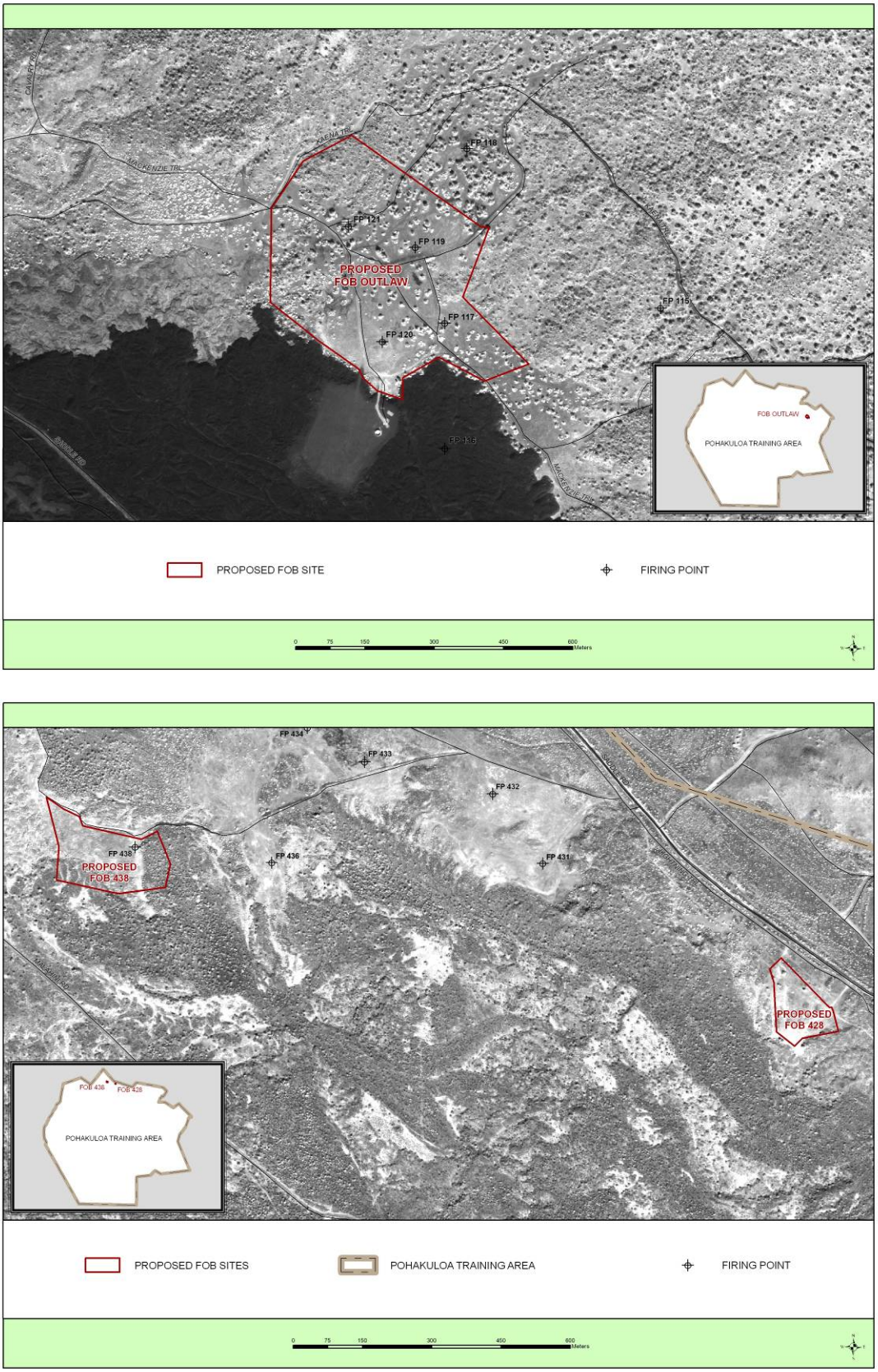

Figure 2-5. Footprints of FOB enhancement sites.

Table 2-3. Size and perimeter of proposed FOB enhancement sites.

FOB Location/Name	FOB Area	FOB Perimeter	Approximate Wall Fill Volume (cubic yards)
FOB 428	1.6 ha / 3.9 ac	535 m / 585 yd	1,562
FOB 438	3.2 ha / 7.8 ac	823 m / 900 yd	2,403
FOB Outlaw	18.8 ha / 46.4 ac	1882 m / 2,058 yd	5,495

Figure 2-6. Examples of corrugated metal, modular FOB walls manufactured by Metalith Corp.

Training Activities and Usage of FOBs

Once completed, no digging, maintenance, or fire-producing activities would take place within the FOBs. Ammunition to be used during the current training mission would be stored temporarily at the FOBs. The FOBs would be non live-fire facilities used to practice entry point control, and to provide bivouac, communications, combat service and service support, and support headquarters activities. Vehicles most commonly used at the FOBs would be high-mobility multipurpose wheeled vehicles and larger trucks, but a variety of other vehicles, including Stryker vehicles and tracked Marine amphibious assault vehicles, would also use the FOB. Each FOB provides a fortified staging area and base of operations for the units using the site, and provides necessary living facilities such as tents for sleeping, eating, and training. No permanent structures would be constructed within the FOB walls. The three sites, which have been used historically as firing points, are currently used for bivouac, command post, and other FOB-related training. FP 428 currently has a gravel berm surrounding the FOB site as a surrogate for a reinforced perimeter wall. Current annual usage of the sites for FOB activities are approximately 40-60 days each for FOB 428 and FOB 438, and 120 days for the FOB Outlaw site.

2.1.1.4 Grenade/Shoot House Live-fire Facility

Design and Development of a Grenade/Shoot House

The facility would be developed on existing Range 10 at PTA (Figure 2-7). Range 10 is an Infantry Platoon Battle Course facility that currently supports live-fire and maneuver tactics using small arms, training practice grenades, up to ¼ lb TNT, Claymore mines, and high explosive, white phosphorus, and illumination

mortars (60mm, 81mm, and 120mm). The existing range consists of a series of access roads, stationary and moving targetry, and trenches that are used for trench-clearing training. Range 10 is heavily used and is located in an area of highly disturbed terrain.

The site would be graded approximately level, which might involve excavating high points and filling low points of the site. No road construction would occur at this site. Approximately 0.5 km (0.3 mi) of access trail would be constructed from existing range roads to the grenade/shoot house site. Trail sections would be graded using heavy machinery and built up with 7-15 cm (3-6 in) aggregate from rock sources within PTA. The structure would be approximately 18×12 m (60×40 ft) and one story tall with an open roof. The facility would have approximately three to six rooms, one to three corridors, and approximately two entry/exit points.

The grenade/shoot house would be fabricated from modular wall panels made from shock-absorbing concrete (SACON). SACON, developed by the U.S. Army Corps of Engineers, is a foamed, fiber-reinforced concrete that does not produce bullet ricochets, is fire resistant, and can be used with grenades (Figure 2-8). Each panel is approximately 2.5 m (8 ft) high, 0.7-1.3 m (24-41 in) wide, and weighs 1.6 tons. SACON panel edges overlap to prevent rounds from passing between the panels. The panels would be erected using a heavy duty crane, and are supported by a 15×15 cm (6×6 in) steel frame. The outside corridor walls provide blast protection for trainees waiting to use the grenade house. Also, a corrugated steel canopy provides protection from falling shrapnel for those waiting to enter the facility. SACON panels would be placed on a conventional reinforced concrete footing approximately 0.5 m (2 ft) thick and 1 m (4 ft) wide. The footing would either be placed below grade, which would require excavation, or placed above grade and subsequently protected from blasts/bullets with additional SACON blocks along the interior wall bases. Floors would be packed sand from a local PTA source.

Training Activities and Usage of a Grenade/Shoot House

Training would consist of squad-sized units entering the facility in small groups and using grenades and small arms fire to clear each room of potential threats. Ammunition used at this facility would consist of 5.56mm ball and tracer, 7.62mm ball only, hand grenades (practice and fragmentation fuse), and flash/bang type grenade simulators. Marine usage of the proposed facility, sometimes in conjunction with other training at Range 10, would be approximately 10 to 60 days per year by Company-sized units (140-200 personnel per event). The proposed facility would also be used by Army units and other users of PTA. Training would take place during the day and at night. Additional grenade/shoot house training at the Ulupaʻu Range Training Facility on Oʻahu would continue as planned. The PTA Training and Range SOPs will be updated to include administrative and operational guidance for the new facility.

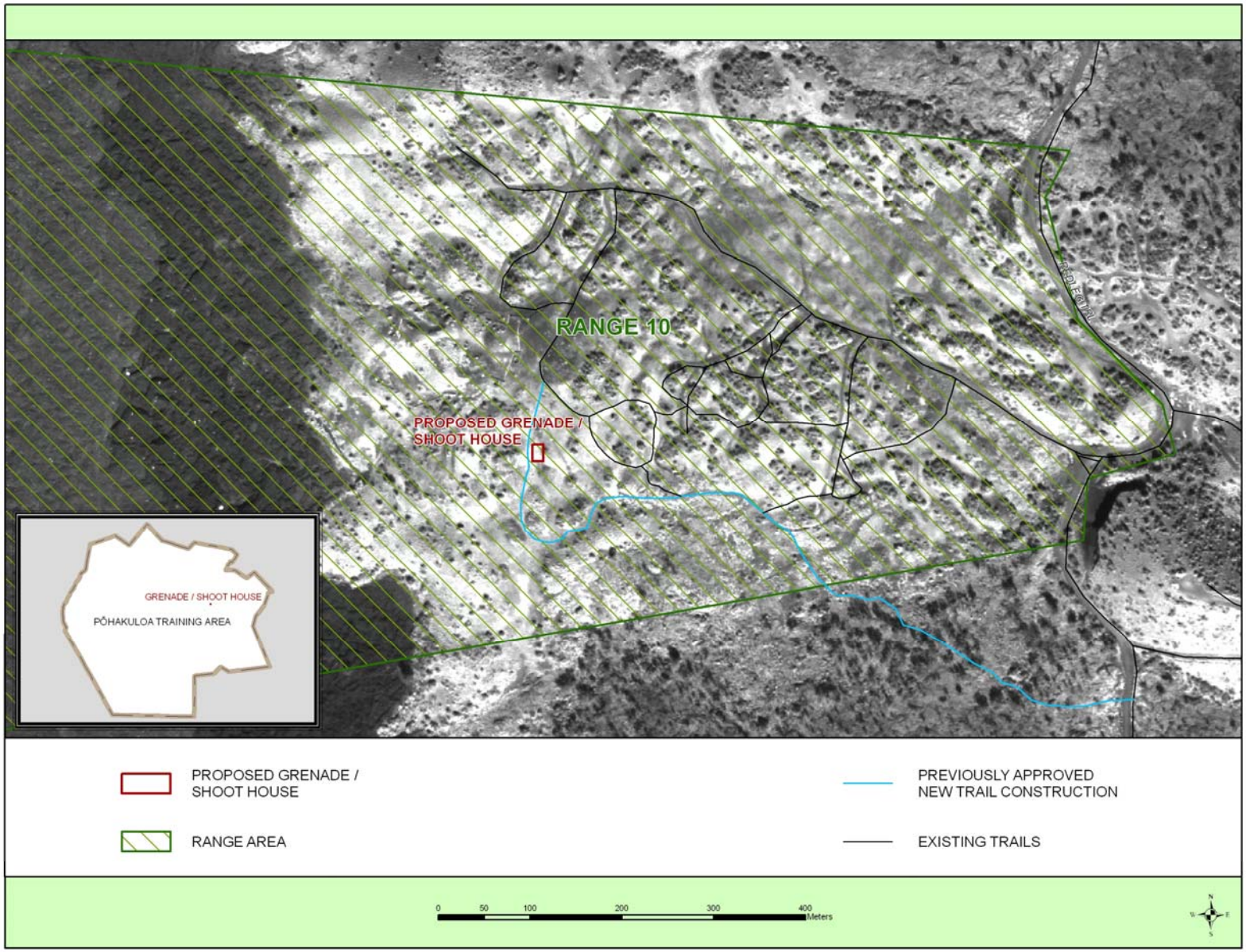

Figure 2-7. Location of proposed grenade/shoot house on Range 10.

Figure 2-8. Example of SACON grenade/shoot house constructed at Fort Bragg, South Carolina (photo courtesy Ballistics Technology International Ltd.).

2.1.2 Mitigation Measures for the Proposed Action

This section identifies mitigation measures to minimize or eliminate adverse effects of the proposed action.

- **Dust control:** A dust palliative would be applied to road surfaces of the CLF course, FOB sites, and modular MOUT complex. A product such as Durasoil® would be applied to road surfaces upon construction completion. Durasoil®4 is non-hazardous and non-toxic. It is formulated as a liquid and applied topically to surfaces using standard 1000-3000 gallon water trucks. Depending on traffic volume and site conditions, the dust palliative would be reapplied as necessary, approximately one to two times per year, based on dust observations by PTA land management staff. Dust mitigation would be addressed by the Land and Rehabilitation Maintenance program at PTA.

- **Avoidance of known and high-probability sensitive resources:** The FOB and MOUT sites would be located in areas that are degraded from prior use and contain no sensitive resources or habitats. Construction and target emplacement associated with the CLF range would avoid known sensitive habitats, populations, and cultural features/resources. Pāhoehoe lava types have a higher probability of harboring sensitive plants and cultural resources; ground-disturbing activities in these areas would be avoided to the greatest extent possible. The FOB and MOUT sites are located atop Mauna Kea ʻaʻā flows. Since there are no pāhoehoe flows there is also a low probability of cultural resources in these areas. There are no lava tubes in these areas as well. The CLF targets and access trails would be placed on ʻaʻā flows.

- **Federally listed species:** If listed species or evidence of listed species are identified during construction activities, the current standard operating procedures for protection of natural resources at PTA would be followed (Annex F. Protection of Natural and Cultural Resources, USAG-HI 2005). This would include: (1) halting all activities in the area immediately, (2) protecting the resource from further damage, (3) informing Range Control of the find and any damage caused, and (4) contacting the PTA Environmental Office for advisement.

[4] http://www.durasoil.com/productinfo.php (accessed December 2007)

A Section 7 consultation with the U.S. Fish and Wildlife Service (USFWS) has been reinitiated based on new information regarding the Hawaiian goose (nēnē) on PTA and *Silene hawaiiensis* within Training Area 21. A biological assessment for reinitiation of Section 7 consultation was prepared by the Army and submitted to the USFWS in September 2008. All requirements listed in the 2003 Biological Opinion (BO) and new reinitiated consultation would also be followed to minimize the impacts to listed species. Because conservation measures are pledged in the Biological Assessment Project Description by the Army, their implementation is required under the terms of the consultation. The following measures would reduce the overall project impacts associated with PTA training activities, including construction and use of the CLF range, by avoiding or minimizing specific Army actions on listed species or increasing populations through proactive measures. The following conservation measures have been proposed by the Army as part of the overall action. By incorporating these as well as other conservation measures, the Army anticipates that the USFWS will issue a "no jeopardy" opinion" for the Convoy Live Fire range.

PTA Implementation Plan
The Army submitted a draft Project Implementation Plan to the USFWS in 2004 as outlined in the conservation measures of the 2003 Biological Opinion (BO); however, USFWS requested that the Army amend it to include a more detailed list of action items. After coordination meetings between the Army and the USFWS, it was decided that the Army would start over and write a new draft utilizing an Implementation Team. The team consisted of expert biologists from USFWS, US Geological Survey, US Forest Service, Volcanoes National Park Rare Plant Facility, Army Natural Resource Program, Department of Land and Natural Resources, and several unaffiliated biologists. Implementation Team meetings were held throughout 2006 and 2007 and a draft implementation plan was circulated to the team members for review and comment in the summer of 2007. The draft is currently undergoing revisions and a final will be submitted to the USFWS by January 30 2009. The full list of requirements of the plan is found in the conservation measures of the 2003 BO (USFWS 2003).

Fence Units and Buffers
The Army will fence all of TA 21 to the East of Red Leg Trail to protect sensitive lava tubes and crevices that provide habitat for *Asplenium peruviana* var. *insulare* or *Silene hawaiiensis*. The Army will also remove the ungulates from this enclosure. This fence will be completed by the end of 2013 and will be ungulate free by the end of 2015.

Nēnē at Range 1
Mitigation measures currently in place for nēnē at Range 1 include the following:

- Remote sensing cameras are currently stationed at Range 1 to record Hawaiian goose (nēnē) activity. Data from cameras are used to determine patterns in nēnē presence for use in training scheduling. Additionally, Range 1 is checked for goose presence before scheduled military training if geese have been observed in the area within a week of the training. Training is only allowed to resume when the geese have left the range. Siebert stakes have been installed around certain areas to warn Soldiers and Marines to stay out. These measures may or may not continue contingent upon the results of the current formal consultation.
- Warning signs will be installed and surveys for nēnē sign (droppings) are ongoing (USAG-HI 2008).
- Upon completion of training, Range Control staff checks the area to ensure all refuse has been collected to prevent providing a food source for geese.

In addition to the measures identified in the conservation measures for the 2003 BO, the Army agrees to implement the following conservation measures, in accordance with the 2008 BO (pending USFWS decision):

- The Army will continue to check the cameras on Range 1 on a monthly basis and record any nēnē activity for the next three years.
- The Army will research the possibility of having an active camera installed on the range that has a wider view and can be checked remotely by the biologists.
- The Natural Resource Office will monitor Range 1 in person on a weekly basis for nēnē presence.
- Every unit that will use Range 1 is briefed on the issues associated with nēnē in the area and provided with a pamphlet that outlines the Army's responsibility under the Endangered Species Act.
- Range control staff will check the area after each training event ends to ensure that the areas used by the nēnē are clear of all refuse.
- Siebert stakes have been installed around the areas to warn soldiers to stay out.
- Signs educating soldiers about the nēnē will be installed on the range by 1 March 2009.
- The Natural Resource Office will work with researchers and the USFWS to implement a noise study starting during the 2009 flocking season. The study will help the Army determine the possible noise levels that cause distress in nēnē.
- The Natural Resource Office will work with researchers and the USFWS to implement a radio tracking study of the movement of nēnē on the Big Island.
- The Army will conduct an experimental study to determine the efficacy of habitat enhancement in pulling nēnē out of areas the Army regularly trains in into preferred non-training sites nearby. The Army will report annually to the USFWS on its experiences with this project.

Wildland Fire Management Plan
The Army will continue to implement the Wildland Fire Management Plan for PTA as outlined in the 2003 BO conservation measures.

Invasive Plant Control
The Army will continue implement the conservation measures outlined for reducing the impacts of invasive plants contained in the 2003 BO.

Invasive Animal Control
The Army will continue implement the conservation measures outlined for reducing the impacts of invasive animals contained in the 2003 BO.

East of Red Leg Trail

- Although no endangered plants are currently known to occur within the areas planned for access road and trails for the new firing point, if new plants are located, they will be avoided when constructing the roads and trails.
- As with the line of fire on Range 1, if nēnē are seen entering the area between the firing point and the target or the area in the SDZ past the targets; an immediate cease fire will be called and the unit will contact the Natural Resource office for assistance. A biologist will watch the birds and determine when it is safe to resume (i.e., nēnē have left the range completely).

Convoy Live Fire
All construction, equipment emplacement and road projects associated with the Convoy Live Fire training will be reviewed by the Natural Resource Office for consistency with the requirements of the 2003 Biological Opinion and new Biological Opinion (anticipated late 2008).

- **Federally endangered plants and plant surveys**: Plant surveys have been performed at proposed sites (Field Report in Appendix C). No federally threatened or endangered plants were found in the vicinities of the proposed sites for the FOBs, modular MOUT, and grenade/shoot house facilities. Approximately 86 *Silene hawaiiensis* were found primarily along the CLF course within the impact area. The loss of up to 86 *S. hawaiiensis* plants within the impact area may occur, but loss of some individuals in the impact area was considered in the 2003 USFWS Biological Opinion and the conservation measures agreed upon at that time. Plant locations were considered during the process of locating CLF objectives, targets, and associated access/maintenance trails, and site-specific avoidance of rare plants would be applied to the greatest extent possible both within the impact area and east of Red Leg Trail. Additionally, fencing and ungulate removal projects planned east of Red Leg Trail in TA 21 will greatly benefit both *Asplenium peruviana* var. *insulare* and *S. hawaiiensis*. It is anticipated that the conservation measures from the 2003 BO and the current Section 107 Consultation will more than offset potential losses of plants due to construction and training activities along the CLF.

- **Cultural resource surveys and monitoring**: All project areas have been pedestrian surveyed for cultural resources. Proposed access trails and target locations have been adjusted to avoid cultural sites or areas considered archaeologically sensitive. Mitigation of the proposed action has occurred through performing pedestrian surveys for all project areas and avoiding sites and sensitive areas through design modifications. Archaeological monitoring of construction activities will be performed by PTA staff archaeologists to ensure widening remained within defined limits. Monitoring will also occur during construction activities adjacent to T-031408-1 to ensure avoidance of this site. Inadvertent discoveries of cultural materials outside of monitoring areas would be reported to the PTA cultural resource staff and would be addressed in accordance with stipulations in Chapter 6 of Army Regulation 200-1. Construction teams will be briefed on protocol for inadvertent discoveries. A copy of the PTA Inadvertent Discovery Plan is included in Appendix C (Enclosure 3).

- **Human health and safety:** The proposed target sites for the CLF course would be inspected by explosive ordnance disposal (EOD) specialists prior to road-widening and access trail construction and target emplacement. Unexploded ordnance hazards encountered would be destroyed in-situ or trail access/roadways would be modified to avoid the hazards.

2.2 Alternative 2: No Action

Under the no-action alternative, MCB Hawaii, Army, Pacific Command and other units would continue to use PTA for training, without the addition of a CLF range, modular MOUT facilities, a grenade/shoot house, or FOB enhancements.

MOUT training currently occurs at smaller MOUT facilities at Schofield Barracks and Marine Corps Training Area Bellows, both on the island of O‘ahu. These smaller MOUT facilities inadequately support the training requirements for MOUT training. Moreover, MOUT training at the O‘ahu facilities cannot be combined with battalion and company-level live-fire exercises.

Under the no-action alternative, convoy live-fire training would continue along the lower section of Red Leg Trail and along Hilo Kona Road from the impact area boundary to existing Range 20. No road upgrades would be done, and no targetry would be installed. The requirements for live-fire convoy training cannot be met by this training because the targetry is temporary (i.e., paper targets placed by hand within the impact area), does not meet the targetry required by new doctrine with regard to type or size (Training Circular 25-8 [HQDA 2004 in revision]), and does not provide realistic training scenario events. Convoy live-fire training is currently conducted at PTA quarterly by four MCB Hawaii battalions, and with additional use by Army and other units, occurs approximately 60 days per year.

The proposed FOB enhancement sites are currently used by Marine Corps and other units for headquarters/command, bivouac, and combat support training. The battalion typically sets up a command company and battalion-level support group in the vicinity of firing points 117-121, referred to as FOB Outlaw.

The command FOB area would continue to be used for bivouac for one of the rifle companies (up to 300 to 500 Marines) and one company each (100 to 200 Marines) would bivouac at firing points 428 and 438. During the training cycle, the Marines live at the FOB sites and leave the FOBs daily for training activities. The FOBs provide a secure and defensible site for bivouac, command and logistic support activities. Training would continue at these sites, but would not be as realistic or meet the training requirements for FOB activities. Training and exercises requiring fortified perimeter walls would not be carried out.

Under the no-action alternative, the grenade/shoot house would not be built and live-fire training to clear buildings of potential threats would not occur at PTA. This type of training would continue at MCB Hawaii Kaneohe Bay on the island of O'ahu, however, facilities would not be adequate to support training requirements. The level of use of these areas is not expected to increase without additional enhancements. Therefore, no additional environmental consequences beyond those from already existing MOUT, CLF, and FOB training at PTA would occur.

2.3 Alternatives Considered and Eliminated

Other alternatives were considered. However, none of these alternatives met the full range of training requirement and efficiency objectives associated with having requisite facilities on a single installation, size requirements, live-fire requirements, ease of scheduling requirements, and requisite integration of training objectives with the existing battalion training cycles at PTA.

2.3.1 Development of Facilities on O'ahu Installations

PTA's impact area is over 10 times the size of Schofield Barracks' and over twice as much maneuver space is located on PTA (INRMP 2006). Moreover, existing field facilities (e.g., for bivouac and FOB training) are limited in number and size, and are not co-located to facilitate the full range of urban warfare and live-fire range training. Building the convoy live-fire course and associated MOUT facilities at Schofield Barracks was eliminated from further consideration and analysis because it failed to meet the requirement for a large-scale training facility. Moreover, the existing facilities at Schofield Barracks are heavily scheduled and difficult to integrate with MCB Hawaii training schedules.

2.3.2 Development of a Convoy Live-Fire Facility at PTA and Some or All Other Facilities on O'ahu

We have discussed the infeasibility of constructing the CLF on O'ahu due to installation size and surface danger zone requirements. It might feasible to develop some or all of the FOB sites, the modular MOUT facility, and the grenade/shoot house on either MCBH or Army lands on O'ahu, but they could not be accommodated at any single installation due to existing and planned facilities. This is especially true for the MMOUT facility (relatively large footprint) and the grenade shoot house (requires location within an existing SDZ). Also importantly, to support training realism and efficiency in training logistics, it is crucial that units be able to integrate FOB, MOUT, grenade/shoot house, and CLF activities within individual training cycles, since these activities are key to modern warfighting. This is also being done to the highest degree with the existing facilities on PTA, but is not fully meeting training and integration requirements. Lastly, the logistics of transporting brigade and smaller size units to Schofield barracks for limited activities such as grenade/shoot house training are inefficient, expensive, and would require significant scheduling and coordination effort.

2.3.3 Alternate Project Sites on PTA

Other sites on PTA, primarily high-use firing points and other degraded areas in northern historic PTA, were considered for the forward operating base (FOB) and modular military operations on urban terrain (MOUT) facilities, but were rejected because the locations were inaccessible, the terrain was too rugged to locate the necessary structures, or the land uses would create conflicts with other missions or land uses. Because CLF and grenade/shoot house training would involve live fire, the course needed to be located on the perimeter of the impact area, which led to a short list of feasible course routes. An alternate location for the CLF

course along the western side of the impact area was considered but was less economical (longer distances from FOBs and other training facilities) and conflicted with other existing or future facilities or uses. Moreover, due to the presence of significant vegetation fuels and proximity to adjacent grasslands, the western location was deemed to have an elevated risk relative to fire ignitions and spread.

2.3.4 Alternate Project Sites Outside of Hawai'i

MCB Hawaii units do conduct regular training at Marine Corps Air Ground Combat Center, Twenty Nine Palms, California. However, the mainland training cycle for MCB Hawaii units cannot accommodate additional time for workup and sustainment training for the facilities proposed. Training at remote locations would also be more expensive that the same training integrated within existing training cycles close to home. Moreover, the desire to develop realistic training environments and facilities close to home for both current and future training needs has been articulated by USMC commanders[5].

2.3.5 Development of Portions of the Proposed Action

The proposed action consists of four projects linked by broad program needs, timing, and geographic location. Development of one, two, or three of the projects at PTA was considered. While development of any one project would improve the training facilities at PTA and enable training to support existing and future requirements, the ideal training installation would contain numerous training facilities addressing a wide variety of training skills and tasks.

2.4 Current and Future Actions Contributing to Cumulative Effects

Analysis of cumulative effects is required for NEPA documents. Cumulative effects result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions. Cumulative effects can also result from individually minor but collectively significant actions taking place locally or regionally over a period of time. Impacts of these cumulative activities are discussed in detail in Chapter 4 of this EA. Implementation of the proposed projects would not result in significant unmitigable impacts to any environmental resource area. Therefore, the projects, in conjunction with other actions on and in the vicinity of PTA would not result in significant and unmitigable cumulative impacts. Other actions considered in assessing cumulative effects at PTA include cantonment and range improvement projects, training activities, and nonmilitary activities.

2.4.1 Cantonment Projects

A variety of capital improvement projects are planned or are currently underway on installation cantonment areas. These areas typically contain installation support infrastructure. The PTA cantonment area has undergone some development over the past 50 years. Recent, current, and future projects include building upgrades, new training and support facilities, airfield modifications, fencing, and other infrastructure. Some of these projects are described in the cumulative effects section of the *Transformation of the 2nd Brigade, 25th ID(L) Final EIS* (USACE 2004).

2.4.2 Range Improvement Projects

Maneuver training generally occurs outside of cantonment areas. There are several recent, current, and future range construction and improvement projects planned on PTA, primarily in conjunction with the transformation of the 2nd Brigade. These include new ranges, battle courses, and maneuver lands. Environmental effects of these actions are described in USACE (2004).

[5] Memorandum by S.A. Hummer, MCB Hawaii Commanding General dated November 27, 2006. Hawai'i Based U.S. Marine Corps Commands Combined Strategy for Future Development of U.S. Army Ranges and Training Areas in Hawai'i, Enclosure 2: Position Paper - 3rd Marines' Future Concept for Pohakuloa Training Center (June 2006).

2.4.3 Training Activities

A brigade of the 25th Infantry Division recently underwent a force transformation to a Stryker Brigade Combat Team. This entails increased training activity, stationing of new personnel, construction of new training facilities, and utilization of additional support vehicles and equipment. Environmental effects of this action on PTA are presented in the *Transformation of the 2nd Brigade, 25th ID(L) Final EIS* (USACE 2004). The Integrated Training Area Management program was specifically developed to promote sustained use of military training lands while also achieving long-term environmental sustainability. DPW Environmental Office and the Integrated Training Area Management program are active in mitigation associated with current and proposed training activities.

2.4.4 Nonmilitary Activities

Nonmilitary activities can also contribute to cumulative effects on Army lands. These include public recreation, such as hunting, and other activities affecting PTA lands such as the Saddle Road realignment/construction.

2.5 Summary of Environmental Consequences

Determination of the significance of effects should consider both the context and intensity of an effect, whether beneficial or adverse. Significance is determined by evaluating the action, alternatives, and proposed mitigation measures as it relates to the individual resource.

Air Quality. An alternative could have a significant air quality effect if it would cause federal or state air quality standards to be exceeded.

Geology and Soils. An alternative could have a significant effect if it results in extensive loss of soil (erosion) or a change in the availability of a geologic resource.

Biological Resources (vegetation and fauna). An alternative could have a significant effect to vegetation and fauna if it would disrupt or remove any endangered or threatened species, or its habitat, migration corridors, or breeding areas. The loss of a substantial number of individuals of any plant or animal species that could affect the abundance or diversity of that species beyond normal variability could also be considered a significant effect. An alternative could have a significant effect when there is measureable degradation of sensitive habitats.

Cultural Resources. An alternative could have a significant cultural or archaeological impact if it would result in destruction or loss of artifacts or historical sites or Native population resources or result in the loss of archeological sites.

Human Health and Safety. An alternative could have a significant effect on human health and safety if there are associated adverse health effects, or if the number and magnitude of accidents increases.

Five categories of effect are used in this environmental assessment:

- Significant Adverse
- Significant but Mitigable
- Less than Significant
- Minor or No Impact
- Beneficial Impact

The beneficial effects of mitigation actions (Section 2.1.2) are included in the determination of overall effects. Without the implementation of listed mitigation, adverse effects could be more severe. Minor negative impacts to nēnē currently occur and are anticipated to occur under the proposed action due to the

collective effects of traffic, safety hazards, and disturbance associated with military training. The proposed action would have minor adverse effects on the following resources areas: Air Quality, Geology and Soils, and Human Health and Safety. The EA also found that no historic properties would be affected by the proposed action, so cultural impacts were determined to be minor. Impacts to Biological Resources (vegetation and wildlife) were found to be significant, but mitigable. No beneficial consequences to resources were identified. The anticipated environmental consequences of the proposed action (including mitigation) and no-action alternative are summarized in Table 2-4 and discussed in detail in Chapter 3.

Table 2-4. Summary of environmental consequences by resource for the proposed action and no-action alternative. The beneficial effects of mitigation actions (Section 2.1.2) are included in the determination of overall effects.

Resource	Proposed Action	No Action
Air Quality (Section 3.1)	Minor	Minor
Geology and Soils (Section 3.2)	Minor	Minor
Vegetation Resources (Section 3.3)	Significant but mitigable	Significant but mitigable
Faunal Resources (Section3.4)	Significant but mitigable	Significant but mitigable
Cultural Resources (Section 3.5)	Minor	Minor
Human Health and Safety (Section 3.6)	Minor	Minor

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3.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES OF EACH ALTERNATIVE

As set forth in Section 1.2.1, per 40 CFR 1501.7(a) (3), this EA addresses a focused scope of potentially affected environmental resources: air quality, geology and soils, biological resources (including vegetation and faunal resources), cultural resources, and human health and safety. Resources deemed to be unaffected by the proposed action were not examined in detail and are described in Section 3.7.

This chapter provides an overview of the existing environmental conditions (affected environment) of the area(s) created or affected by the proposed action. Only resource areas relevant to the proposed projects or of public concern are presented and analyzed in this section of the EA. The affected environment portion for each resource provides background information on the existing environment and discusses the current conditions of the resource within the vicinity of the proposed action.

This chapter also identifies the probable direct or indirect effects (environmental consequences) to the environmental components (resources) that would be affected by the proposed action and alternatives and discusses the cumulative effects that would occur upon implementation of the proposed action. Anticipated adverse or beneficial effects are presented for each resource described and provide the basis for the scientific and analytic basis for comparison and decision-making. If no impacts are identified for a particular resource area, that is also mentioned.

Chapter 3 is organized by resource. For each resource, a description of the affected environment is presented followed by discussion of the environmental consequences for the proposed action and the no-action alternative. Assessment of environmental effects considers listed mitigation as part of the proposed action.

3.1 Air Quality

3.1.1 Affected Environment

Air pollution on the island of Hawai‘i is generally minimal due to its small size and isolation (U.S. Army Corps of Engineers [USACE] 2004). There are limited opportunities for locally generated air pollutants to accumulate or recirculate before being transported offshore and away from land areas. High concentrations of suspended particulate matter can occur in some areas, mostly due to agricultural burning or fireworks (USACE 2004). Natural air pollutants include gaseous emissions from volcanoes and marine aerosols from the ocean.

Both federal and state statutes regulate air quality in Hawai‘i. The Clean Air Act authorizes the U.S. Environmental Protection Agency (USEPA) to establish national ambient air quality standards (NAAQS) to protect public health and the environment. The state of Hawai‘i has also adopted ambient air quality standards that are in some cases more stringent than federal standards and may also address pollutants that are not covered by federal standards (USACE 2004). There are currently no areas in Hawai‘i designated with non-attainment status for any criteria pollutant (USEPA 2006).

There has been no long-term ambient air quality monitoring at PTA, but, in general, air quality is considered good (USARHAW 2002a). Due to its rural location, air quality at PTA is not affected by pollutant sources from urban areas. Emissions from transportation and explosives detonation can be locally important during troop transportation, maneuver, and firing exercises. Localized fugitive dust can be generated by wind effects on exposed soils and unpaved roads, especially in conjunction with vehicle maneuvers (both on and off-road). Dust emissions from roads are currently managed using soil stabilizers. Wind-borne dust originating from other exposed soils is managed using revegetation and by applying gravel. Dust and other emissions generally dissipate quickly, while smoke from wildland fires can last longer (USARHAW 2002a).

3.1.2 Environmental Consequences to Air Quality

3.1.2.1 Alternative 1: Proposed Action - Modular MOUT, CLF Range, FOB, and Grenade/Shoot House Development

Modular MOUT Facility

The modular MOUT site may be leveled with bulldozers (e.g., Caterpillar D-10). Construction activities associated with leveling the site would generate engine exhaust emissions and fugitive dust. Dust would also be periodically generated from wind erosion on the exposed, unvegetated surface of the MOUT areas and, to a minor extent, from unpaved roads. However, fugitive dust from roads would be managed using dust palliatives. The specific quantities of exhaust emissions and dust depends on several factors such as weather conditions (wind speed and direction, precipitation), physical properties of the surface material (particle size and density, moisture content), and the duration of a particular training exercise.

Air quality effects associated with development and use of the MOUT are expected to be short-term and localized because dust and emissions generally dissipate quickly at PTA (USARHAW 2002a). Existing NAAQS and state air quality standards are not expected to be exceeded either within PTA or outside the installation boundary. Furthermore, the location of PTA relative to populated areas means that there are few sensitive receptors of poor air quality that might originate from the installation (USARHAW 2003). In the event that fugitive dust generation becomes problematic and has the potential to adversely affect air quality, a dust palliative would be applied to the areas within the MOUT facility, as necessary. More details on this mitigation activity are provided in Section 2.1.2.

Convoy Live-Fire Course

Construction and use of the CLF course would generate vehicle emissions and fugitive dust. Engine exhaust emissions would be generated from construction vehicles, military vehicles, and other vehicles associated with land management activities at PTA. Fugitive dust would be created from driving vehicles on the course as part of training, construction and maintenance, and other land management activities. Dust would also be generated from wind erosion on the exposed, unvegetated surface of the convoy road.

Air quality during use of the CLF course is not expected to violate existing NAAQS and Hawai‘i air quality standards either within PTA or outside the installation boundary. Dust palliatives would be applied as necessary to the surface of the convoy route to prevent unacceptable dust generation. More details on this mitigation activity are provided in Section 2.1.2. Little dust is anticipated to be generated from CLF target sites and maintenance trails due to the nature of the substrates.

Forward Operating Base (FOB) Development

The three existing FOB sites are currently used for bivouac, firing point, and command post activities. Wall development around the perimeter may be done by bulldozers, grading equipment, dump trucks to transport wall-fill material, and bucket loaders to fill walls. Construction activities would generate engine exhaust emissions and fugitive dust. Currently, dust is periodically generated from wind erosion on the exposed, unvegetated surface of the FOB areas. The specific quantities of exhaust emissions and dust would be dependent on several factors such as weather conditions (wind speed and direction, precipitation), physical properties of the surface material (particle size and density, moisture content), and the duration of a particular training exercise. However, dust generated during construction and training events would be very localized and short-term in nature. Because of trail development, selective hardening of high-use areas, and application of dust palliatives, fugitive dust emissions are not anticipated to increase appreciably compared to current emissions from the sites.

Grenade/Shoot House Facility

Development and use of the grenade/shoot house would generate vehicle emissions and fugitive dust similar with the other activities within this proposed action. The specific quantities of exhaust emissions and

dust would be dependent on vehicle conditions (number, type, size, traffic volumes), weather (wind speed and direction, precipitation), physical properties of the surface material (particle size and density, moisture content), and the duration of a particular training exercise.

Air quality effects would be mitigated by use of a dust palliative as necessary to road surfaces within the area.

3.1.2.2 Alternative 2: No Action

Air quality would not be changed under the no-action alternative.

3.2 Geology and Soil Resources

3.2.1 Affected Environment

A majority of PTA is covered by both prehistoric and historic Mauna Loa lava flows consisting of both pāhoehoe and ʻaʻā lava types and Mauna Kea lava flows consisting of ʻaʻā flows and alluvial /colluvial deposits. Much of the land surface of PTA is characterized by sparsely vegetated basaltic rock in the early stages of decomposition and soil formation. Small to large cinder cones dot the landscape, especially in the northern portion of PTA. Cinder cones make up a small proportion of the landscape, but they provide unique habitat for several endangered plant species. About 35,600 ha (88,000 ac) of PTA are classified by the Natural Resources Conservation Services (NRCS) as lava flows, of which about half are ʻaʻā flows and half are pāhoehoe flows. Pāhoehoe lava and ʻaʻā lava are the two primary lava types found on PTA. Pāhoehoe lava is characterized by a smooth, billowy, and folded or ropy surface (Figure 3-1). Sub-surface voids and channeling tubes are common in pāhoehoe. The roofs of lava tubes, which range from a few to several feet thick, develop fractures with cooling and aging, and are prone to eventual collapse. Construction projects in areas covered with pāhoehoe lava require extensive measures (softening) to fill in the voids and make the surface stable and safe for vehicles. Although the composition of ʻaʻā lava is similar to pāhoehoe, ʻaʻā lava is characterized by a rough, jagged, sharp, and uneven surface (Figure 3-1). ʻAʻā forms steep-sided, jumbled piles of sharp plates and boulders (Sato et al. 1973). ʻAʻā lava tubes and voids are uncommon, which makes ʻaʻā lava easier to soften or compact for construction and development compared to pāhoehoe (USARHAW 2001).

Figure 3-1. Image of pāhoehoe lava (left), and ʻaʻā lava (right - note pāhoehoe lava in background).

On much of historic PTA, soils are generally thin and poorly developed, while soils on the Keamuku Parcel are deeper colluvial soils and wind deposits. The low precipitation, rapid runoff, and high altitude reduce the rate of weathering, and the high slope and wind tend to prevent soils from accumulating. PTA soil types are

shown in Figure 3-2 and. Soils along the northern boundary of PTA near Saddle Road within Training Areas 1 through 17 and 22 are classified as soils formed on volcanic deposits. These deeper soils support grassland, shrubland, and treeland communities. The term “Pahala Ash” has been widely used to describe nearly all the thick soils on Hawai‘i (USACE 2004).

Soil erosion potential is low over most of the installation where pāhoehoe and ‘a‘ā lava are present, but erosion potential is quite high on the fine textured soils in the northern portion of the installation. Water erosion is minimal due to the rapid permeability of soils, low rainfall rate, and low index of erosivity of rain events, but episodic water erosion events do occur. In addition to the lava types discussed above, soil types for the proposed project locations are described below (Sato et al. 1973; Hawai‘i NRCS electronic data available at http://www.ctahr.hawaii.edu/soilsurvey/soils.htm):

Ke‘eke‘e loamy sand, 0 to 6 percent slopes: somewhat excessively-drained soils that developed in alluvium from volcanic ash and cinders. The surface layer is loamy sand, silt loam, and fine sand. The subsoil is silty clay loam. The substratum is stratified sand and loam. This soil type occurs on nearly level to gently sloping uplands. Permeability is rapid. Runoff is slow, and dust generation can be moderate to severe.

Very stony land: ‘a‘ā lava that has a thin covering of volcanic ash locally extending deep into cracks and depressions. 50 to 90 percent of the surface area is covered with stones and boulders. ‘A‘ā lava outcrops are common. Slopes are between 10 and 15 percent. The erosion hazard is slight.

Cinder land: a miscellaneous land type consisting of bedded cinders, pumice, and ash. Particles have jagged edges and a glassy appearance. There is little or no evidence of soil development.

Modular MOUT Facility

The proposed modular MOUT clusters 5 and 6 would be located on cinder land, while clusters 1, 2, 3, 4, and 7 would be located on very stony land (further from Pu‘u Lehue) and Ke‘eke‘e sandy loam (closer to Pu‘u Lehue).

Convoy Live-Fire Course

The proposed CLF range would be located on ‘a‘ā and pāhoehoe lava flows. The course route would cross approximately 2.2 km (1.4mi) of pāhoehoe lava and 6.5 km (4 mi) of ‘a‘ā lava.

Forward Operating Base (FOB) Development

The majority of the areas encompassed by proposed FOB 428 and FOB 438 sites are located on Ke‘eke‘e loamy sand (0 to 6 percent slope) with the remainder on very stony land. Proposed FOB Outlaw is located on Ke‘eke‘e loamy sand (0 to 6 percent slope).

Grenade/Shoot House Facility

The proposed grenade/shoot house would be located on ‘a‘ā lava.

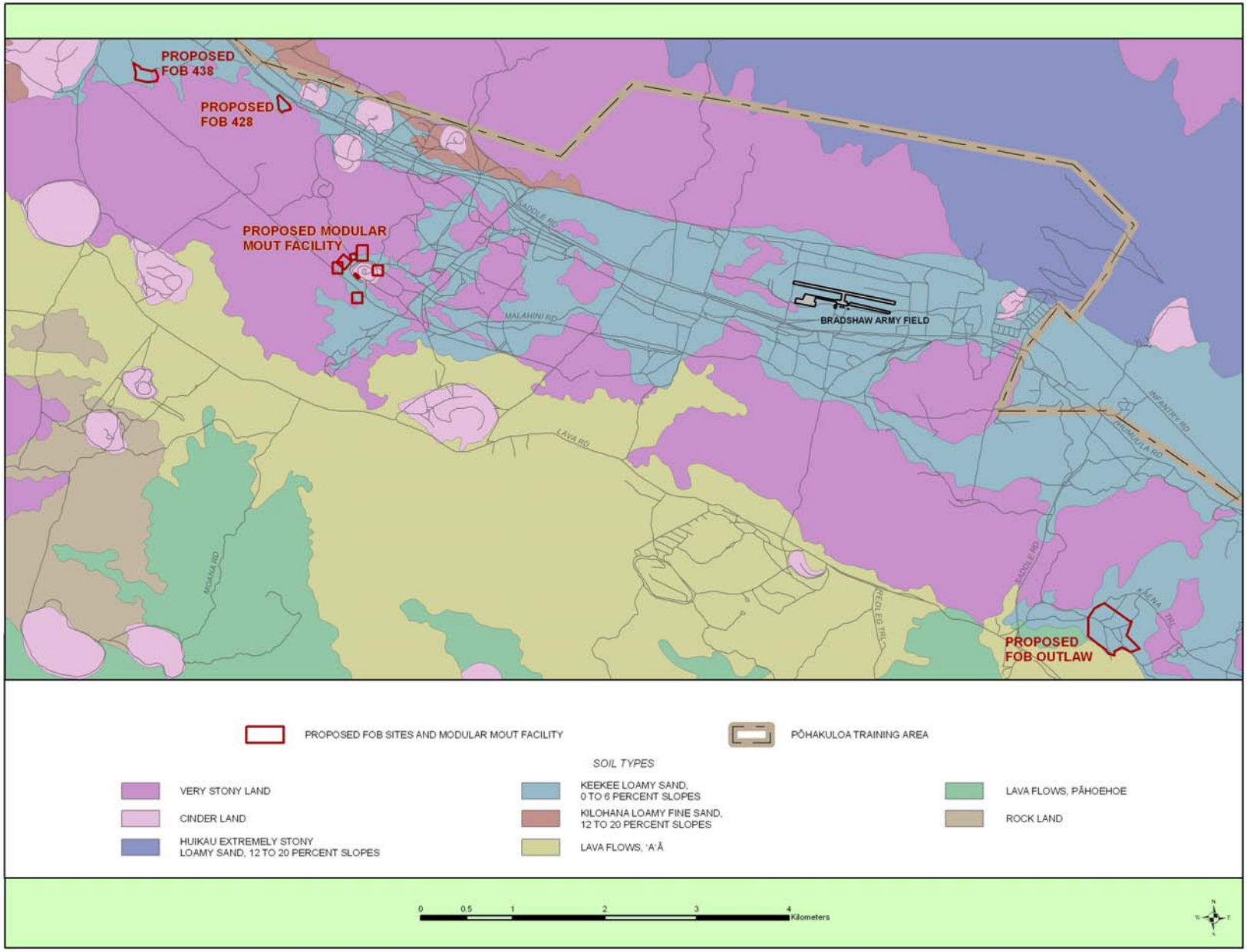

Figure 3-2. Soil types on PTA in relation to proposed FOB and modular MOUT sites.

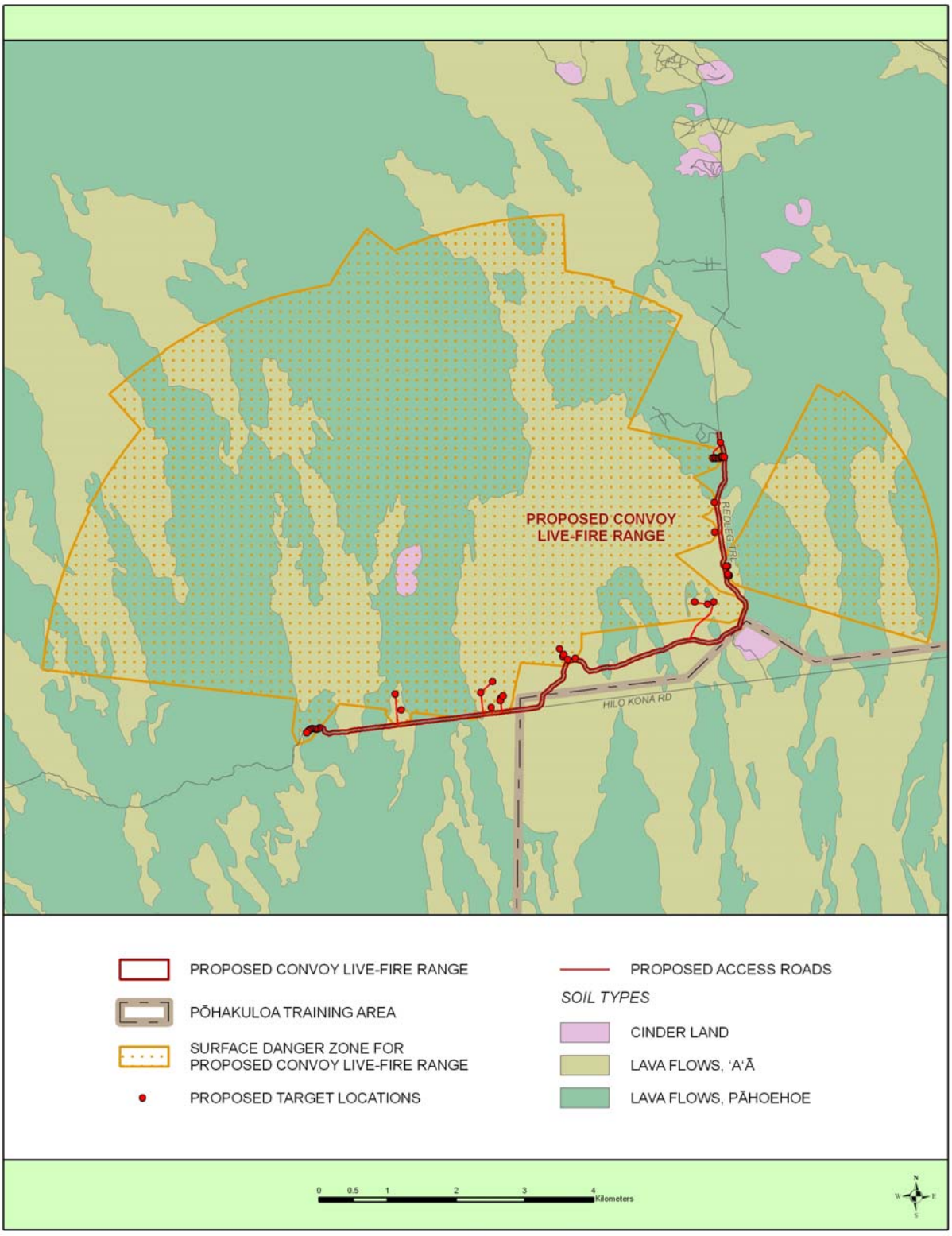

Figure 3-3. Soil types in the vicinity of the proposed convoy live fire course.

3.2.2 Environmental Consequences to Geology and Soil Resources

3.2.2.1 Alternative 1: Proposed Action - Modular MOUT, CLF Range, FOB, and Grenade/Shoot House Development

Effects of fugitive dust on air quality are addressed in Section 3.1.

Modular MOUT Facility

Soils in this area have been heavily disturbed by current and historic land uses. Additional soil disturbance would result from training activities within the modular MOUT clusters, including foot trampling, minor site leveling and grading associated with mock buildings, and vehicle traffic. This soil disturbance would be relatively minor given the historic disturbance at these locations. Minor amounts of wind erosion would be generated by vehicle traffic both on and off established trails. Hardening of trails with gravel and dust palliatives would be used to minimize soil erosion by wind.

Convoy Live-Fire Course

Disturbance to substrates include road widening, localized site leveling for mobile and stationary targets, and target access trail construction (site grading and leveling). Road widening of approximately 9.1 km (5.6 mi) of road would involve grading, leveling, and addition of road base and cap material. The structure of existing lava substrates along the affected section of road, at target locations, and along target access trails would be altered, but no wind or water erosion is anticipated given the nature of these substrates. The section of road that crosses state of Hawai‘i land (0.5 km [0.3 mi]) would not be widened. Dust palliative would be applied to wind erosion-prone sites and surfaces as necessary, and soil erosion by wind would be localized and minimal.

Forward Operating Base (FOB) Development

Soils in this area have been heavily disturbed by current and historic land uses. Much of the area within the FOB perimeters has been leveled and disturbed by artillery firing point, bivouac, and other uses. Some grading, leveling and grubbing may be necessary to provide a proper surface for the FOB walls to sit upon. No footings are required to anchor the wall. Areas within proposed FOBs 428 and 438 are partially hardened with gravel and 100 percent disturbed. No additional alteration of soils is anticipated at those sites. The area within proposed FOB Outlaw has some highly disturbed areas and a series of vehicle trails within it. Additional hardening of trails, command post/tent facility areas, and vehicle parking areas is anticipated within FOB Outlaw. Exposed soils prone to wind erosion would be treated with dust palliatives, as necessary. The area of disturbed soils would increase at FOB Outlaw, but the soils would be stabilized and minimally affected by the facility and its use.

Grenade/Shoot House Facility

Soils in this area have been heavily disturbed by current and historic land uses. Some grading, leveling and grubbing may be necessary to provide a level surface for the grenade/shoot house. Excavation approximately 0.6 m (2 ft) deep and 1.2 m (4 ft) wide would be required for a concrete footing below all wall sections. Construction of an access trail less than 0.5 km (0.3 mi) long would disturb soils between the existing range road and the proposed facility.

3.2.2.2 Alternative 2: No Action

No additional effects are expected from the no-action alternative.

3.3 Vegetation Resources

3.3.1 Affected Environment

PTA is considered a subalpine tropical dryland ecosystem. Diverse vegetation community types are the result of soil types, different-aged lava flows, and other differences in site factors and historic uses/disturbances across PTA. Twenty-four vegetation communities made up of treeland, shrubland, grassland, lava, and disturbed types have been mapped and described on historic PTA (Shaw and Castillo 1997). Disturbed communities are restricted to heavily-used areas, such as firing points, bivouac sites, staging and refueling areas, and landing zones. These sites are most common in the northern part of the installation and along Red Leg Trail. During periods of heavy use, vegetation is typically sparse (2 to 10 percent cover) and dominated by non-native species. During low-use periods and when adequate moisture is present, these areas can become heavily infested with non-native species such as *Senecio madagascarensis*.

On PTA, there are 14 federally listed endangered and one federally threatened plant species (Table 3-1). The Kīpuka Kalawamauna Endangered Plants Habitat (3,178 ha [7,853 ac]) is located in the northwest corner of PTA between the impact area and the historic boundary in portions of Training Areas 18, 19, 20, and 22. This area was designated as endangered plants habitat by the U.S. Army following the discovery of *Haplostachys haplostachya* and *Stenogyne angustifolia* and their subsequent listing as federally endangered species. The area also contains other rare plants. An area including Puʻu Kapele was fenced in 1981, and a 45 ha-area (111 ac) within the fencing is managed as a sensitive plant area, with significant concentrations of *H. haplostachya*. A 14 ha (35 ac) area was fenced in Training Area 3 in 1999, specifically to protect the largest population of *S. hawaiiensis* on PTA. Although threatened and endangered plants are located in some concentrated areas on PTA, they are also widely dispersed throughout the installation.

Plant surveys were performed at all proposed project sites in March 2008. (Botanical Survey Report in Appendix C). No federally threatened or endangered plants were found in the vicinities of the proposed sites for the FOBs, modular MOUT, and grenade/shoot house facilities.

During calendar year 2006, the PTA Natural Resources Staff spent over 7,500 hours in the field managing natural resources (not including large-scale fence construction). Approximately 33 percent of the time spent in the field was surveying, outplanting and monitoring rare endangered species. The remaining field time was spent controlling threats (primarily weeds and feral ungulates) for these native endangered and threatened species (PTA Environmental Office 2007).

In 2003, the U.S. Fish and Wildlife Service (USFWS) issued a Biological Opinion in response to a formal Endangered Species Act, Section 7 consultation with the U.S. Army (USFWS 2004). The Biological Opinion required specific conservation measures and non-discretionary terms and conditions to be implemented by the U.S. Army. They are intended to ensure the continued existence of the federally listed species found at PTA. One of the main requirements of the Biological Opinion was construction of large-scale fencing units to encompass approximately 8,700 ha (21,500 ac) to protect listed plant occurrences at PTA. Combined with the existing three fence units, this would result in nine fence units on the western side of PTA. The Biological Opinion also required five additional fence units on the eastern side of PTA to protect 347 ha (857 ac) and required completion of an Implementation Plan that outlines the specific actions necessary to maintain the federally-listed species long-term. A draft Implementation Plan was developed and the final plan is anticipated in early 2009.

In 2008, the U.S. Army reinitiated the Section 7 consultation with the USFWS because additional surveys since the Biological Opinion was issued identified the potential for many more individuals within suitable habitat (USAG-HI 2008). Additional surveys identified approximately 216 occurrences with 874 individuals of *S. hawaiiensis* within a 234 ha area (578 ac) to the east of Red Leg Trail in TA 21. The U.S. Army is seeking clarification from the USFWS because the current fencing would only protect 35 percent of the 160 known locations of *S. hawaiiensis*. Two puʻu in the Keamuku Maneuver Area have been fenced. A new population

of *Solanum incompletum* was located and will require fencing. As part of the Biological Opinion, the U.S. Army is required to protect the listed species and their habitat from identified threats.

Due to the arid nature of PTA and the invasion of non-native fire-adapted grasses, fire is one of the most serious threats to native ecosystems and listed species. Other threats include competition from other invasive plant and animal species, browsing and trampling from feral and introduced ungulates, and potential damage from human trampling and traffic associated with training (PTA Environmental Office 2007).

Table 3-1. Federally endangered plant and animal species on PTA (PTA Environmental Office 2007).

Taxon	Federal Status
Hedyotis coriacea	Endangered
Isodendrion hosakae	Endangered
Melanthera venosa	Endangered
Neraudia ovata	Endangered
Solanum incompletum	Endangered
Tetramolopium arenarium ssp. arenarium	Endangered
Vigna o-wahuensis	Endangered
Asplenium peruviana var. *insulare*	Endangered
Silene lanceolata	Endangered
Zanthoxylum hawaiiense	Endangered
Portulaca sclerocarpa	Endangered
Haplostachys haplostachya	Endangered
Silene hawaiiensis	Threatened
Spermolepis hawaiiensis	Endangered
Stenogyne angustifolia	Endangered

* Priority Species 1 (PS1) – Plants species with fewer than 500 individuals and/or 5 or fewer populations remaining statewide; Priority Species 2 (PS2) – Plant species with 500 - 1,000 individuals and/or 6 - 10 populations remaining statewide; Priority Species 3 (PS3) – Plant species with 1,000 – 2,000 individuals and/or 10 - 20 populations remaining statewide; Priority Species 4 (PS4) - Plant species with more than 5,000 individuals and/or more than 40 populations remaining statewide.

Modular MOUT Facility

The proposed modular MOUT clusters would be located in the vicinity of Pu‘u Lehue near firing points 414, 419, 421, 423, and 424 in the northwest part of historic PTA. This area encompasses disturbed land with little vegetation, primarily representative of the native *Eragrostis* Grassland Community (Figure 3-4). Existing vegetation consists of disturbed communities (i.e., barren and/or weedy) on the historically-used flat areas surrounding the cinder cone, and grasslands on the cinder cone and to the east, as well as on very stony land. A population of *H. haplostachya* is located approximately 470 m (1,541 ft) to the southeast Figure 3-6. Threatened and endangered plants are not expected at these MOUT locations (Lena Schnell personal comm. 2007).

Convoy Live-Fire Course

The proposed CLF course would be located within barren lava, *Styphelia-Dodonaea* shrubland, and *Sophora-Myoporum* shrubland with forb understory vegetation community types (Figure 3-5). Vegetation on ‘a‘ā substrates is very sparse. The two shrubland vegetation types on pāhoehoe substrates are considered more sensitive because they have a higher probability of containing endangered species. The *Sophora-Myoporum* shrubland has some vegetation fuels and potential to carry a wildland fire. Construction activities and the location of targets and access trails would be minimized to the highest degree possible within the shrubland/pāhoehoe vegetation types.

A number of federally endangered plants have been documented north of Range 1 outside the impact area. Recent surveys of the proposed CLF along Red Leg Trail recorded approximately 14 occurrences and

approximately 86 *S. hawaiiensis* individuals within the impact area to the west of Red Leg Trail, with the closest occurrence a cluster of *S. hawaiiensis* approximately 77.5 m (254 ft) from one of the targets in Ambush 2 (USAG-HI 2008). The closest documented federally endangered plants outside the impact area to the course route are: *S. hawaiiensis* occurrence approximately 200 m east of Range 1, a *S. hawaiiensis* occurrence approximately 1,000 m (3,280 ft) southeast of Range 1, and an *Asplenium peruviana insulare* occurrence near Puʻu Koli approximately 350 m from the easternmost point on lower Red Leg Trail (Figure 3-7). The 2003 Biological Opinion assumed complete loss eventually of all species found in the impact area due to destruction of habitat and individuals. To minimize the impact of that loss, the Army is fencing the majority of the plants located to the east of Red Leg Trail (USAG-HI 2008) while implementing the measures outlined in the Draft Implementation Plan to control and minimize adverse impacts. The plan outlines the specific measures for protection of each species to ensure long-term survival. Approximately 175 individual plants are also located within the SDZ for the firing point to the east of Red Leg Trail. These plants are all found at least 6 km (3.7 mi) from the targets and because only small arms will be used the Army believes the chance of hitting a plant is small and the potential for fire on the sparsely vegetated lava is negligible within the SDZ (USAG-HI 2008). These issues are being discussed in the reinitiated consultation with USFWS.

The loss of up to 86 *Silene hawaiiensis* plants within the impact area may occur, but loss of some individuals in the impact area was considered in the 2003 USFWS Biological Opinion and the conservation measures agreed upon at that time. Plant locations were considered during the process of locating CLF objectives, targets, and associated access/maintenance trails, and site-specific avoidance of rare plants would be applied to the greatest extent possible both within the impact area and east of Red Leg Trail. Additionally, fencing and ungulate removal projects planned east of Red Leg Trail in TA 21 will greatly benefit both *Asplenium peruviana* var. *insulare* and *Silene hawaiiensis*. It is anticipated that the conservation measures from the 2003 BO and the current Section 107 Consultation will more than offset potential losses of plants due to construction and training activities along the CLF.

Forward Operating Base (FOB) Development

FOB areas are used historically and currently for military training. The existing FOB 438 location is within disturbed shrubland and the native *Myoporum-Dodonaea* shrubland plant community. The FOB 428 site is in a primarily disturbed area dominated by invasive species. The FOB site 438 (Outlaw) has some disturbance and is dominated by *Sophora-Myoporum* shrubland with a grass understory, especially in areas away from the high-use core areas. The nearest rare plant is a population of *S. hawaiiensis* that occurs approximately 100 m (328 ft) west of FOB 438.

Grenade/Shoot House Facility

The proposed grenade/shoot house would be located within a disturbed vegetation community that was originally a *Sophora-Myoporum* shrubland. Vegetation is sparse, and a degraded *Sophora-Myoporum* shrubland community is found to the east and west. Surveys for endangered plants were done in this area. *Silene hawaiiensis* has been documented on pāhoehoe substrates approximately 0.6 km (0.35 mi.) to the north and approximately 0.6 km (0.35 mi.) to the east across Red Leg Trail.

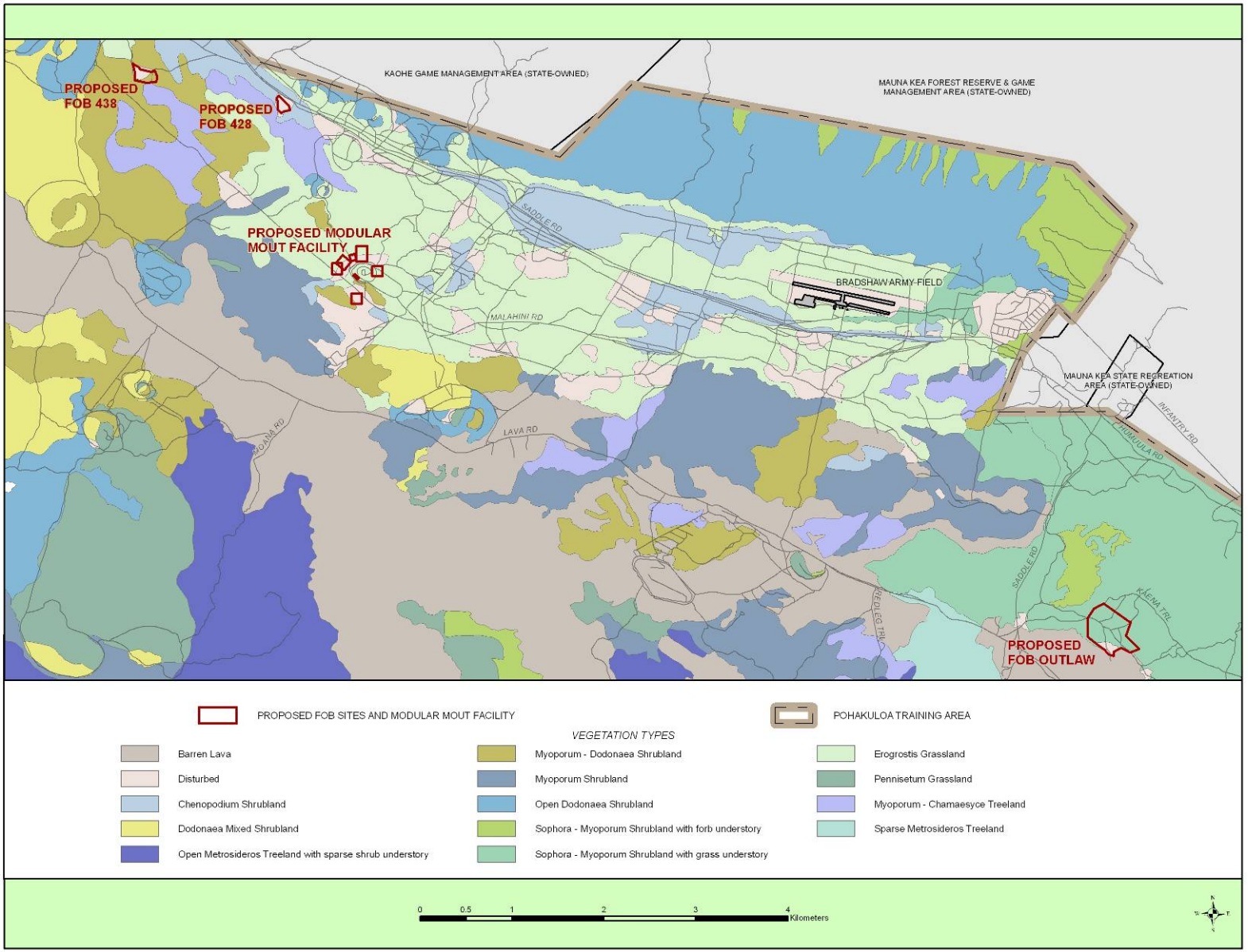

Figure 3-4. Vegetation community types near the modular MOUT and FOB sites.

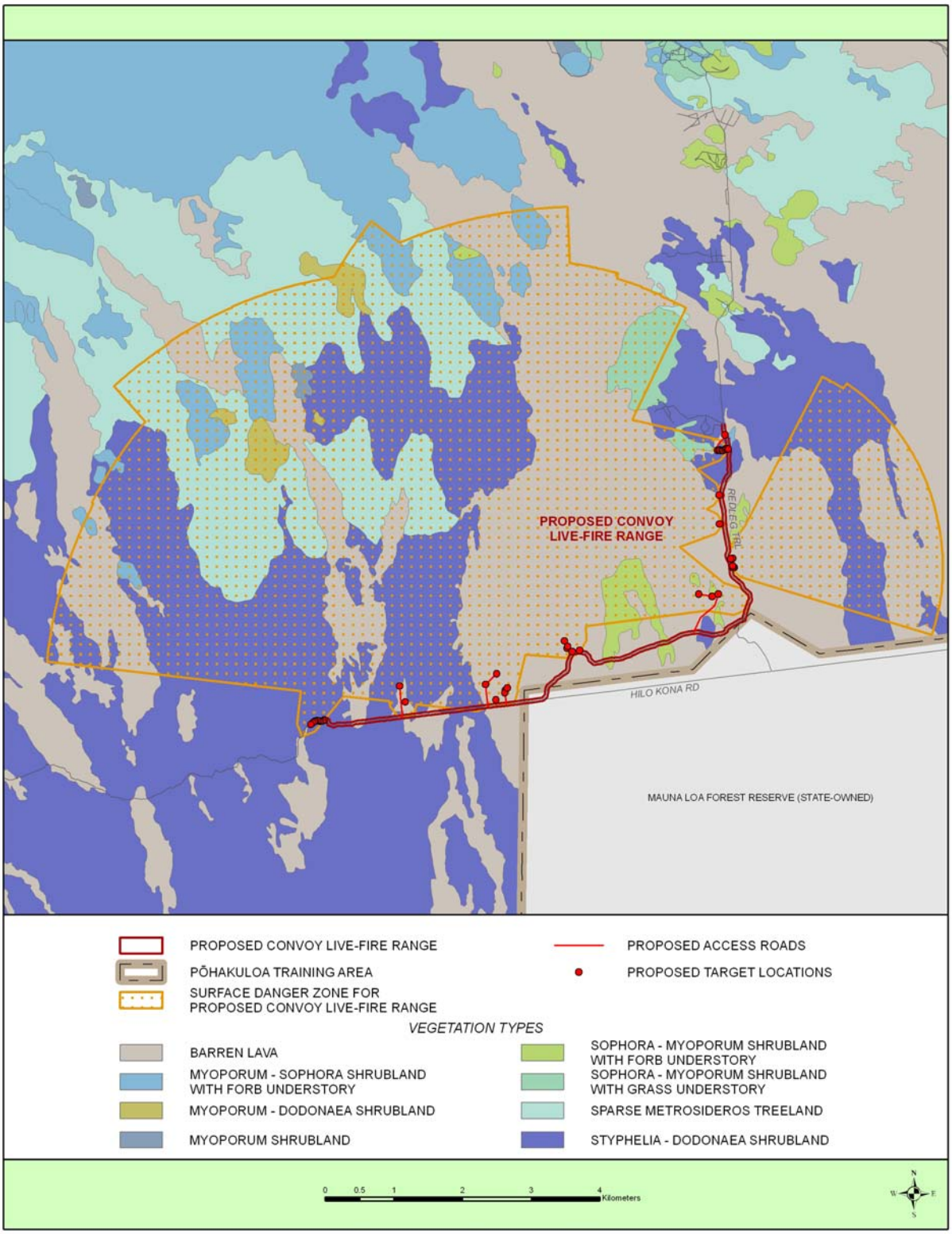

Figure 3-5. Vegetation community types near the proposed CLF range.

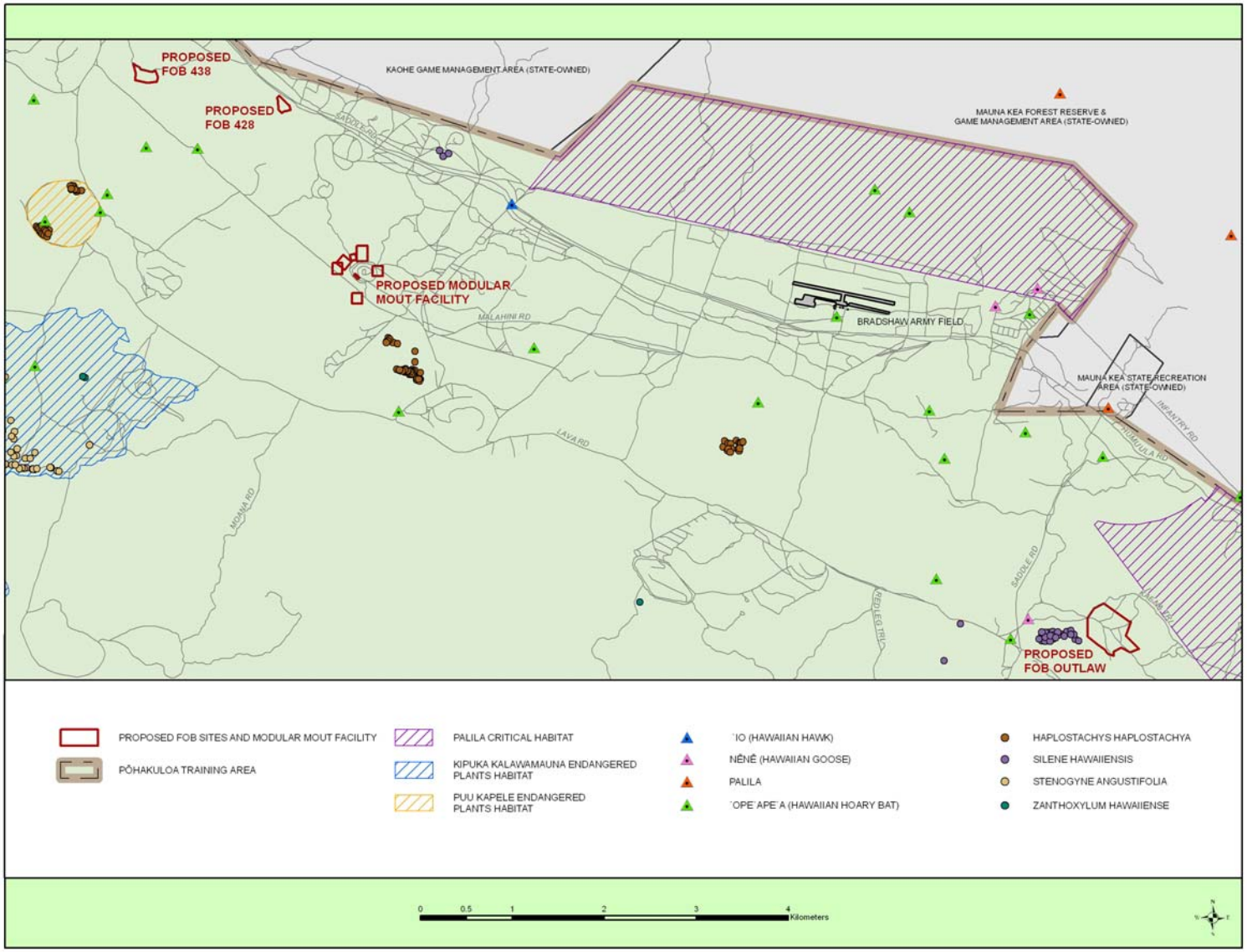

Figure 3-6. Location of threatened and endangered plants and animals near the proposed modular MOUT and FOB sites.

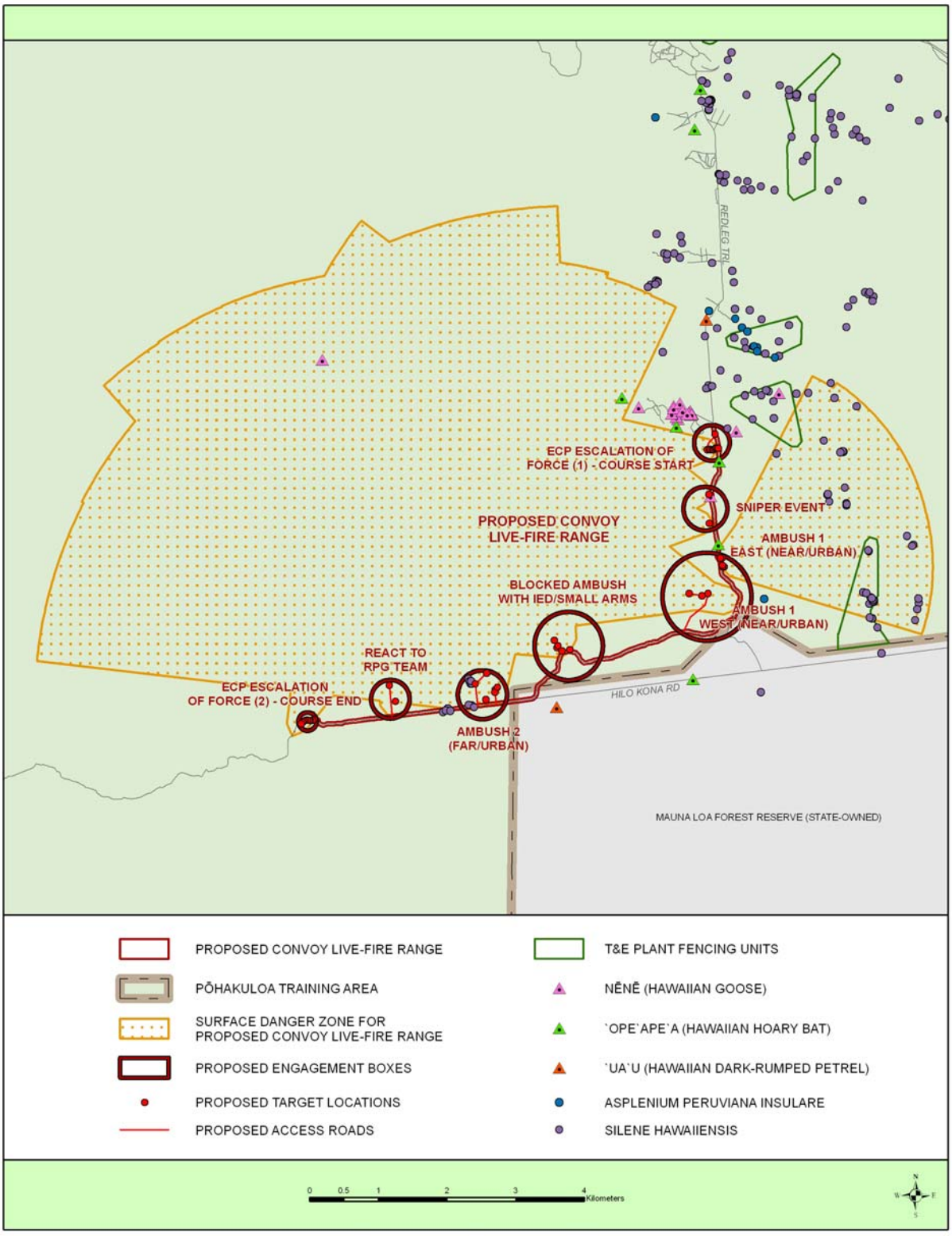

Figure 3-7. Location of threatened and endangered plants and animals near the proposed CLF range.

3.3.2 Environmental Consequences to Vegetation Resources

PTA has developed guidelines and requirements (e.g., vehicle washing requirements) to prevent the establishment of non-native species (USARHAW 2000). Primary factors potentially affecting vegetation resources include physical damage and loss of vegetation and sensitive species and introduction and spread of non-native plant species. Wildland fire was not considered a significant variable of environmental concern. No significant effects to vegetation are expected by the proposed action.

Sites associated with the proposed action were surveyed on foot for threatened and endangered plant species in March 2008 (Appendix C). In the event a federally listed species is inadvertently encountered during construction for the CLF course, modular MOUT, FOB enhancement or grenade/shoot house project, the current standard operating procedures for protection of natural resources at PTA would be followed (Annex F. *Protection of Natural and Cultural Resources*, USAG-HI 2005). This would include: (1) halting all activities in the area immediately and marking the location, (2) protecting the resource from further damage, (3) informing Range Control of the find and any damage caused, and (4) contacting the PTA Environmental Office.

Possible effects to vegetation resources include direct and indirect impacts to sensitive species. Direct impacts might include physical destruction of plant individuals due to construction and training activities. Indirect effects to vegetation resources might include reduced vigor due to dust exposure, and establishment and spread of nonnative plants. The Army has developed and implemented an Integrated Wildland Fire Management Plan to control the frequency, intensity, and size of fires on USAG-HI lands in order to comply with federal and state laws and meet land stewardship responsibilities (USARHAW 2003). Specific standard operating procedures for wildland fire management at PTA are addressed in the plan and all Marine Corps activities at PTA are subject to those standard operating procedures.

Wildland fire potential would be largely unaffected by the proposed action primarily because the project sites are almost entirely sparsely vegetated or barren. Unvegetated areas are not vulnerable to fire, and the inter-mix of barren and sparsely vegetated areas helps to naturally contain fires near the point of ignition. In addition, the Hilo-Kona Road included as part of the CLF course serves as a fuel management corridor to prevent fires from leaving the impact area (USARHAW 2003). These factors would negate any increase in fire vulnerability that would result from potential ignition sources such as catalytic converters and sparks associated with construction vehicles and machinery.

All areas included in the proposed action would experience an increase in usage and thus an increase in invasive species vectors. Exotic species control at PTA is governed under Army guidelines (USARHAW 2000) and PTA-specific requirements (Schnell et al. 1998) and all precautions therein would be taken during training under the proposed action. The primary species of concern from a wildfire standpoint is *Pennisetum setaceum* (fountaingrass). This species establishes wherever the substrate is sufficient for its needs, but it prefers disturbed sites. It produces substantial biomass, copious seed crops, and is well adapted to fire. The increase in invasive species vectors as a result of the proposed action would be minor relative to current use.

3.3.2.1 Alternative 1: Proposed Action - Modular MOUT, CLF Range, FOB, and Grenade/Shoot House Development

The proposed action is pending successful completion of consultation with the U.S. Fish and Wildlife Service. A No Jeopardy Opinion is anticipated and the Army would continue to comply with the requirements in the 2003 Biological Opinion as well as any new requirements made by the USFWS.

Modular MOUT Facility

Vegetation at the proposed project sites is sparse and dominated by non-native species. Placement of the modular facilities may require minimal leveling of ground but would not require soil excavation. Maneuvering troops and vehicles can result in direct trampling of vegetation and potential establishment of introduced

species, both from other areas on PTA and from equipment and vehicles originating outside. Additional establishment and spread of non-native species should be minimal due to the already degraded nature of the site and additional monitoring and invasive plant management activities proposed as part of the action. Therefore, direct effects to vegetation are anticipated to be very minor. The modular MOUT sites were surveyed on foot with a maximum buffer of 20 m (65 ft) for endangered plants in March 2008. No rare plants were found. No change to the risk of fire ignition and spread is anticipated.

Convoy Live-Fire Course

Vegetation resource effects would be minor and localized. Widening of existing roads, construction of target maintenance trails, and installation of targetry, including local site leveling and excavation, may result in some loss of local vegetation. Construction within pāhoehoe lava would be avoided so that potentially protected plant species known to inhabit this type of lava would not be affected. Vehicles would be confined to the main CLF route. Both barren flows and native vegetation occur in the impact area. Occurrence of rare plants is unknown within the impact area. The main course route, target access trails, and target sites were surveyed on foot by two people 10 m (32 ft) apart for endangered plants in March 2008. Survey areas consisted of a 20 m (65 ft) buffer on either side of the planned routes. The surveys found approximately 86 *S. hawaiiensis* along the road within the impact area. Objective 3 and Objective 5 were moved to leave a larger buffer between plants and the target installation. There are approximately 175 occurrences of *S. hawaiiensis* that occur approximately 3.7 miles to the east of Red Leg Trail within the SDZ for the CLF. The potential for a plant being struck by a stray round during training, considering the distance from the targets and the scarcity of plants, is a near impossibility (USAG-HI 2008). The CLF training will not negatively impact *S. hawaiiensis* because the plants are found over 6 km (3.7 mi) from the small arms targets.

There will, however, be a loss of a small number of individuals (up to 86 plants or approximately 2 percent of the known population) that grow within the Impact Area on the west side of Red Leg Trail. However, the USFWS assumes complete loss of plants within the Impact Area under the 2003 Biological Opinion. The greatest potential impact to *S. hawaiiensis* plants on PTA is wildfire. Targets would be placed 300 m from the roadside in a barren ‘a‘ā lava field with no vegetation of any type within 400 m. In addition, a natural ridge of lava provides a backdrop to stop any stray rounds from traveling much further than 400 m to the east. The vegetation surrounding the *S. hawaiiensis* plants in Training Area 21 is very sparse and mostly *Styphelia*. Fountain grass has not yet invaded this area in densities great enough to pose a wildfire risk. The potential for a wildfire to be ignited as a result of CLF training and result in the loss of any *S. hawaiiensis* plants is minimal (USAG-HI 2008). The Army will implement all previous agreed to minimization measures to offset potential impacts to the species. In the end, the benefit of the Army’s positive efforts outweighs the potential impacts to the species. Finally, the Army proposes to fence all of Training Area 21 to protect all known occurrences of *Silene* and *Asplenium* in the area to accommodate the fencing outlined in the 2003 Biological Opinion.

Dust is known to possibly reduce the vigor of some plant species. Dust from both the main course road and target maintenance trails is anticipated to be minimal due to the use of dust palliatives. Moreover, at PTA plants more than 75m (250 ft.) from significant dust sources are not considered to have an elevated risk of physiological impacts from dust (USFWS 2003). While some dust would be generated by construction and use of the range, no TES plants are known within this distance of the main road. For *Asplenium fragile*, the negative effect of dust is considered low because the plant occurs in protected lava tubes, which provide natural protection sites where dust is not as likely to accumulate (USFWS 2003).

Four small islands of vegetation surrounded by lava (kīpukas) exist within the surface danger zone (SDZ) for the CLF course. The use of fire-prone munitions, such as tracers, would very likely result in some fires within these kīpukas. Fires are expected to be limited in size due to patchy vegetation and would be limited to the area within the kīpukas due to surrounding barren lava and corresponding lack of fuel. A maximum of 209 acres could potentially be affected by fire, but it is expected that only a small fraction of this area would ever be burned. Vegetation throughout the rest of the area covered by the SDZs is too sparse to carry fire.

Firing points proposed for use in conjunction with the CLF range are highly disturbed areas with predominantly bare ground and non-native plants. Invasive, non-native grass species may establish or increase along Red Leg Trail and Hilo Kona Road edges as a result of the change in use. However, mitigation in the form of monitoring and weed management, proposed as part of the action, should prevent any increase in the establishment and spread of invasives such as fountaingrass along this training corridor.

Forward Operating Base (FOB) Development

Development of the FOB perimeter walls may require minimal leveling of ground and soil excavation and would have a negligible effect on vegetation resources. Vegetation within the FOB perimeters at sites 428 and 438 is currently sparse and composed of non-native species and additional vegetation loss would not represent a significant effect. The proposed FOB Outlaw site is larger and contains disturbed/barren areas as well as a mixture of native (primarily shrubs) and non-native vegetation (grasses and forbs). Vegetation loss would occur within the FOB walls during construction and training activities. Additional establishment and spread of non-native species should be minimal due to the already degraded nature of the site and additional monitoring and invasive species management activities proposed as part of the action. The FOB sites were surveyed for endangered plants on foot with a maximum of 20 m (65 ft) between surveyors in March 2008. No rare plants were found. Fuels in the immediate vicinity of FOB's 438 and 428 are insufficiently contiguous to carry wildfire. Prescribed fires in similar fuels in 2000 did not carry even in 20 mph winds. Pockets of vegetation farther from the FOB's could carry fire for limited distances.

Grenade/Shoot House

Development of the grenade/shoot house may require minimal leveling of ground and soil excavation and would have a negligible effect on vegetation resources. Vegetation is very sparse at the proposed project site, and is classified as the generic "disturbed" community. Vegetation in the vicinity is also disturbed or a degraded *Sophora-Myoporum* shrubland. Minor vegetation loss would occur during construction and as a result of training activities in the immediate vicinity of the facility, but given the low quality of the existing vegetation, the effect would not be significant from a community or landscape perspective. Additional establishment and spread of non-native species would be minimal due to the already degraded nature of the site and additional monitoring and invasive plant management activities proposed as part of the action. The grenade/shoot house site was surveyed on foot in March 2008 and no rare plants were found

3.3.2.2 Alternative 2: No Action

No additional effects are expected to vegetation resources from the no-action alternative.

3.4 Faunal Resources

3.4.1 Affected Environment

A variety of fauna is found at PTA in a diversity of habitats, including 43 bird species and 9 mammals. The majority of the faunal species (31 birds, 72 percent; 8 mammals, 89 percent) were introduced. Until recently, records of federally listed animal species on the installation were limited to birds documented as "in flight" and by feces found during surveys. Endangered wildlife recorded in the past 20 years at PTA include three avian species: Hawaiian goose, or nēnē (*Branta sandvicensis*), Hawaiian hawk (*Buteo solitarius*), and Hawaiian dark-rumped petrel (*Pterodroma phaeopygia*) (USACE 2003). One endangered mammal, the Hawaiian hoary bat (*Lasiurus cinereus*), has been documented in northern and western portions of PTA and in Range 1 in the early 1990s, and one bat was recently flushed from a day roost at Range 1 in September 2008. Hawaiian geese have been seen at Range 1 as far back as 1992 (Schnell, personal communication 2007), especially during flocking season (March-September) suggesting Range 1 is an important stop over area for these birds. In January 2008, two separate pairs of nēnē were observed protecting nest sites on the Keamuku parcel of PTA. As required by the Biological Opinion issued in 2003, the Army is reinitiating the Section 7 consultation based on the change in status to this species. Formal consultation on the reoccurring nēnē seen at Range 1 has also been initiated (USAG-HI 2008). The palila (*Loxioides bailleui)* and akiapolaau (*Hemignathus munroi*) have not been observed on PTA for 20 years.

Bats are more frequently sighted than birds; however, distribution and abundance information are not available for the Hawaiian hoary bat on the installation or in the state of Hawai'i. An installation-wide bat monitoring program was instituted at PTA in 2007 to provide data for seasonal and interannual comparisons of the Hawaiian hoary bat occupancy at PTA. Bat observations have been limited and scattered throughout the installation. Most sightings have been in the western part of the installation where there is greater variety and denser vegetation. Bats may reside at the installation for at least part of the year. A Hawaiian hawk ('Io) was observed in 1992 on Saddle Road near the northeast corner of Training Area 1 and the proposed location of the MOUT training facility, and hawks have been sighted over Training Area 23 (to the south and west of the proposed action locations) in 2003, 2005, 2006, and April 2008, but no further sightings have occurred near any of the proposed action locations (Lena Schnell, personal communication 2007).

During an endangered species inventory in 1994, three Hawaiian dark-rumped petrels ('Ua'u) were detected by radar as they flew over the eastern portion of PTA over the northern flank of Mauna Loa (David 1995); however, more recent surveys within PTA have not detected the species (Cooper et al. 1996; David 1997; Schnell et al. 1998). In 2002, three human-modified pits were discovered that may have historically been used by the dark-rumped petrel as burrows. An additional burrow with two nests from a previous nesting year was also found (Evans et al. 2002). The size of potential available nesting habitat at PTA makes the area attractive for petrels, and, although no birds have been sighted recently at PTA, their burrowing behavior and the discovery of previously used nesting sites suggest small undetected populations are possible. Annual surveys for the species were conducted in two sites where they were previously recorded, but no birds were seen or heard during those surveys in 2007-08. The PTA Natural Resources initiated a six-year audio monitoring program for Hawaiian Petrels in 2008(PTA Environmental Office 2007). Long-term surveys for the species using remote sensing devices are recommended (Evans et al. 2002).

Modular MOUT Facility

The poor quality of the vegetation limits use of the area by native and non-native wildlife. With no apparent food or water source, or vegetation for shelter or protection, native and non-native mammals and birds are unlikely to be found in the MOUT areas. The proposed MOUT facility is approximately 0.6 km (0.3 mi) from Palila Critical Habitat.

Convoy Live-Fire Course

Native birds have been noted traversing the area, but no nesting colonies are known. The proposed CLF course would follow existing roads through an area that is away from critical habitat areas or areas of special concern. The Hawaiian goose (nēnē) has been documented in the vicinity of Training Area 21 and Range 1 along Red Leg Trail, approximately 330 m (1,080 ft) from the northernmost objective in the proposed convoy live-fire course (Figure 3-7). A group of 18 individuals were observed at PTA in August of 2007, including 14 birds that were previously banded and a group of up to 24 individuals were observed in that vicinity in July 2008. These are the largest groups of Hawaiian goose recorded in that location or anywhere else on the installation. They are typically observed there in the late summer and fall months, and records of Hawaiian geese using the area date back to 2005. Nēnē are known to utilize a variety of habitats including the *Styphelia–Dodonaea* Shrubland habitat typical of Training Area 21 and Range 1. The Army has initiated management actions to minimize potential impacts to nēnē at PTA, including installation of remote sensing cameras to detect nēnē presence (see Section 2.1.2 for a complete description of minimization and conservation measures).

PTA is believed to be a historical stopover site for birds flying between the two east and west population centers on the island (Lena Schnell personal comm. 2008).

Forward Operating Base (FOB) Development

The sparse and degraded nature of the vegetation limits the use of the area by native and non-native wildlife. With no apparent food or water sources, or vegetation for shelter or protection, native and non-native mammals and birds are unlikely to be found in the FOB areas. FOB 438 Outlaw, located within

Training Area 3, is approximately 320 m (1,000 ft) from federally designated Palila Critical Habitat (Area B). The palila has not been observed in the designated critical habitat area (David 1995; Schnell et al. 1998) and currently is found only at the upper limits of its former range, along the western slopes of Mauna Kea. The project area is outside the mandatory 75-m (246 ft) no-use buffer required to protect the species within the critical habitat, should it occur there. FOBs 428 and 438 are located within Training Area 15 and are not near critical habitat areas or areas of special concern.

Grenade/Shoot House Facility

The proposed grenade/shoot house would be located on moderately disturbed land. No federally threatened or endangered species have been noted at this site. With no apparent food or water sources, or vegetation for shelter or protection, native and non-native mammals and birds are unlikely to be found in abundance in the grenade/shoot house area.

3.4.2 Environmental Consequences to Faunal Resources

3.4.2.1 Alternative 1: Proposed Action - Modular MOUT, CLF Range, FOB, and Grenade/Shoot House Development

Modular MOUT Facility

Placement of the modular facilities may require minimal leveling of ground but would not require soil excavation; therefore, site preparation would have a negligible effect on the biological environment. The MOUT facilities would not further impair or enhance site quality or cause non-native wildlife species to use the area. Short-term increases in human presence and noise levels may temporarily disturb the normal behavior of native birds in the immediate vicinity of these activities. Noise would be short-term and no adverse effects are anticipated.

Convoy Live-Fire Course

This action is pending successful completion of consultation with the U.S. Fish and Wildlife Service. A No Jeopardy Opinion is anticipated and the Army would comply with the recommendations made by the USFWS.

The proposed CLF range would require the widening or establishment of roadways. Native or non-indigenous animals are not expected to frequently use the site because the proposed areas lack both vegetation for food or shelter and water. Feral ungulates may browse native vegetation but are found in low densities in these lava-dominated landscapes. Locating the CLF course along the proposed route would not impair or enhance site quality or cause non-native wildlife species to use the area. Noise associated with use of firing points can disturb native species like the Hawaiian goose and the hoary bat near the CLF course. Impacts to these species within the CLF course could include direct impacts from rounds hitting them. They could encounter high stress situations due to the noises produced during training, which could induce a heart attack. Birds could also be harmed by ingestion of military debris, such as bullet casings. Harassment of birds and bats from human presence could cause them to leave the area before they are rested, leading to reduced overall fitness. In addition, these species could be affected by smoke generated from simulators or compression impacts from large munitions and also directly impacted by interactions with support attack helicopters and vehicles. Habitat alteration could occur at the CLF from vehicles, fire, and human disturbance. There could be increased familiarization to humans, vehicles and increased exposure to trash. Night operations could cause roosting birds and bats to take flight (USAG-HI 2008).

Birds and bats flushed into flight risk serious injury or mortality by colliding with the convoy traffic. Roadside killings are a common cause of death for adult Hawaiian geese that may be attracted to grass clippings from roadside mowing in rural areas, but the risk of hitting a goose at PTA would be low due to the distance of potential habitat from the road and slow vehicle speeds on Red Leg Trail. Hawaiian geese typically migrate through the area intermittently during flocking. The frequency of military use of the proposed CLF range during that period would increase the potential risk of negatively impacting the Hawaiian goose and hoary

bat. The Army has installed remote sensing cameras at Range 1 to record nēnē activity. The recorded data is checked for nēnē presence before scheduled military activities and if seen entering the range, a cease fire is initiated until it is determined by natural resource staff that the birds are in a safe location or until the birds leave the range (USAG-HI 2008). The Army is studying patterns of nēnē presence so that times of high presence can be avoided.

Forward Operating Base (FOB) Development

Development of the FOB walls may require minimal leveling of ground and soil excavation; therefore, site preparation would have a negligible effect on the biological environment. No native or non-indigenous animals are expected to frequently use the site because the proposed areas lack vegetation for food, shelter, or water. Locating the FOB facilities in these areas would not impair or enhance site quality or cause non-native wildlife species to use the area. Negligible effects on fauna are expected from the proposed action.

Grenade/Shoot House Facility

Development of the grenade/shoot house may require minimal leveling of ground and soil excavation and would have a negligible effect on mammals and birds. Vegetation is very sparse at the proposed project site, and is classified as the generic "disturbed" community. Given the disturbed nature of the site and the low quality of the existing vegetation, faunal effects would not be significant from a community perspective. No known threatened or endangered animals are located at the grenade/shoot house site.

3.4.2.2 Alternative 2: No Action

No additional effects are expected to biological resources from the no-action alternative.

3.5 Cultural Resources

3.5.1 Affected Environment

Cultural resources are defined as historic properties, cultural items, archaeological resources, sacred sites, or collections subject to protection under the National Historic Preservation Act(NHPA), the Archaeological Resources Protection Act (ARPA), the Native American Graves Protection and Repatriation Act (NAGPRA), EO 13007, and the guidelines on Curation of Federally Owned and Administered Collections (36 CFR Part 79).

Numerous cultural resource inventory surveys covering an estimated 16,007 ha (39,554 ac) have been conducted on PTA and have identified over 300 archaeological sites (Brown et al. 2006). Archaeological sites are locations containing the physical remains or other evidence of past human activity and are commonly categorized according to formal (or typological) and functional classes. The formal classification groups Hawaiian archaeological sites into four general groups: deposits, structures, modified natural features, and paleo-environmental features. A fifth formal site category is that of the traditional place. There are a number of different ways that archaeological remains may be classified functionally and may include: habitation features, agricultural features, animal enclosures, fish ponds and fish traps, religious structures, boundary markers and trails, burial markers, and specialized activity areas. Specialized functional areas include stone quarrying sites, isolated tool production locales, and petroglyphs

3.5.1.1 Historic Context

Pōhakuloa Training Area (PTA) lies primarily in the upland saddle region of Hawai'i Island. Originally part of the Parker Ranch, the area now known as PTA was initially utilized for military training during World War II. In 1942, a "sprawling military camp of Quonset huts and tents, known as 'Camp Tarawa' …was set up…and more than 50,000 acres of Parker Ranch land …[were used] for military maneuvers" (Eidsness et al. 1998). The U.S. Army constructed Saddle Road that same year. The cantonment and Bradshaw Army Airfield were established in conjunction with the development of Saddle Road. PTA was formally established in 1956. A

detailed archaeological and historical summary of PTA is presented in Cordy (1994), with summaries of the specific PTA region described in numerous archaeological reports for the facility (summarized in Williams 2000). Eidsness et al. (1998) provides an historic preservation plan that describes the historic context of PTA in detail.

Within the boundaries of what is now PTA, Hawaiians came periodically to collect upland resources like birds, other forest products, and volcanic glass and basalt for tools. Volcanic glass, which occurs as surface chills on pāhoehoe flows in the Saddle area, and basalt were quarried and worked in the PTA area (Athens and Kaschko 1989; Eidsness et al. 1998). Lava tubes provided protection from the high elevation conditions (Eidsness et al. 1998), as well as an exceptionally important source of water, and occupants left behind evidence of their presence in the form of fire pits, pavings, cupboards, and other household improvements. A variety of artifacts attest to their residence: groundstone tools, charred wooden torches, gourd containers, cordage and matting, woven leaf sandals, and the remains of meals of fish, shellfish, and bird. Trails in the area were used in pre-contact and early post-contact eras for the movement of armies (Kamakau 1961), and certainly for access to the resources of the PTA region and adjacent areas, including the basalt quarries on the Mauna Kea volcano.

Although resource collection probably began in the A.D. 1000 - 1100 period in the upland region as a whole, the most intensive period of use in the PTA area was in the A.D. 1400 - 1600 period (Streck 1992; Reinman 1999; Shapiro and Cleghorn 1998).

3.5.2 Environmental Consequences to Cultural Resources

3.5.2.1 Alternative 1: Proposed Action - Modular MOUT, CLF Range, FOB, and Grenade/Shoot House Development

Modular MOUT Facility

The project APE has been 100 percent pedestrian surveyed for cultural resources. No historic properties were identified in the area of the proposed MOUT during the Stryker Brigade Combat Team Go/No Go Maneuver Areas survey conducted in 2004 (Brown et al. 2006). Site preparation for modular MOUT containers may consist of site leveling using graders, bull dozers and front-end loaders; however no excavation or fill using material from outside of PTA would be needed.

Convoy Live-Fire Course

The area of potential effect (APE) for the CLF is defined as 15m either side of the target access trails and moving target tracks to 15m beyond the end of the access trails (the target location) and 10 m either side of the CLF route (the Red Leg Trail and Hilo-Kona Roads). Approximately two-thirds of the length of the CLF course APE was previously surveyed for cultural resources (Shapiro et al. 1998). The remaining unsurveyed areas within the APE were pedestrian surveyed in support of this project by PTA cultural resources staff. Aerial surveys were also conducted in addition to the pedestrian surveys. Archaeological findings for this survey were limited to a series of excavated pits and a possible c-shaped alignment identified as temporary site T-031408-1. Excavated pahoehoe pits and other associated modifications found in this area are believed to be related to bird hunting activities occurring in the pre-historic period. The site has not been formally evaluated although it is being treated as potentially eligible for the National Register in accordance with criteria D. All target areas and access trails have been placed to avoid adverse impacts to site T-031408-1 locating it outside of the defined APE. Additionally T-031408 is located in a depression sitting well below the actual line of fire and therefore is protected from potential live fire impacts since it cannot be fired upon directly. Initial design of the project placed various targets and access roads upon pāhoehoe flows. Because pāhoehoe flows have a higher probability of cultural resource occurrence, the CLF targets and access roads have been relocated to only ‘a‘ā flows, greatly reducing the risk of inadvertent findings. This change also reduces the risk of potential collapse of lava tubes found within pāhoehoe flows. No cultural resources have been identified within the APE and therefore no historic properties will be affected by the construction and utilization of the CLF course.

Forward Operating Base (FOB) Development

The project APE has been 100 percent pedestrian surveyed for cultural resources. No cultural resources have been identified within the APE for the FOB development areas and therefore no historic properties will be affected by the construction and use.

Grenade/Shoot House Live-fire Facility

The project APE has been 100 percent pedestrian surveyed for cultural resources. No cultural resources have been identified within the APE for the Grenade/Shoot house project and therefore no historic properties will be affected by the construction and use.

Inadvertent Discoveries

In the event of an inadvertent discovery of archaeological or historical resources encountered during construction of the CLF course, MOUT, grenade/shoot house or enhanced FOB walls, the current standard operating procedures for protection of natural and cultural resources at PTA would be followed (PTA External SOP, Protection of Natural and Cultural Resources, Annex F, dated 2008, Chapter 6 of Army Regulation 200-1; See Appendix C, enclosure 3 for a copy of the PTA Inadvertent Discovery Plan). This would include: (1) halting all activities in the area immediately, (2) protecting the resource from further damage, (3) informing Range Control of the find and any damage caused, and (4) contacting the PTA Environmental Office. Briefings will be held with all operators of construction equipment prior to construction in order to ensure they are aware of both natural and cultural resource sensitivities and procedures to be followed.

3.5.2.2 Alternative 2: No Action

No additional effects to cultural resources would be anticipated from the no-action alternative.

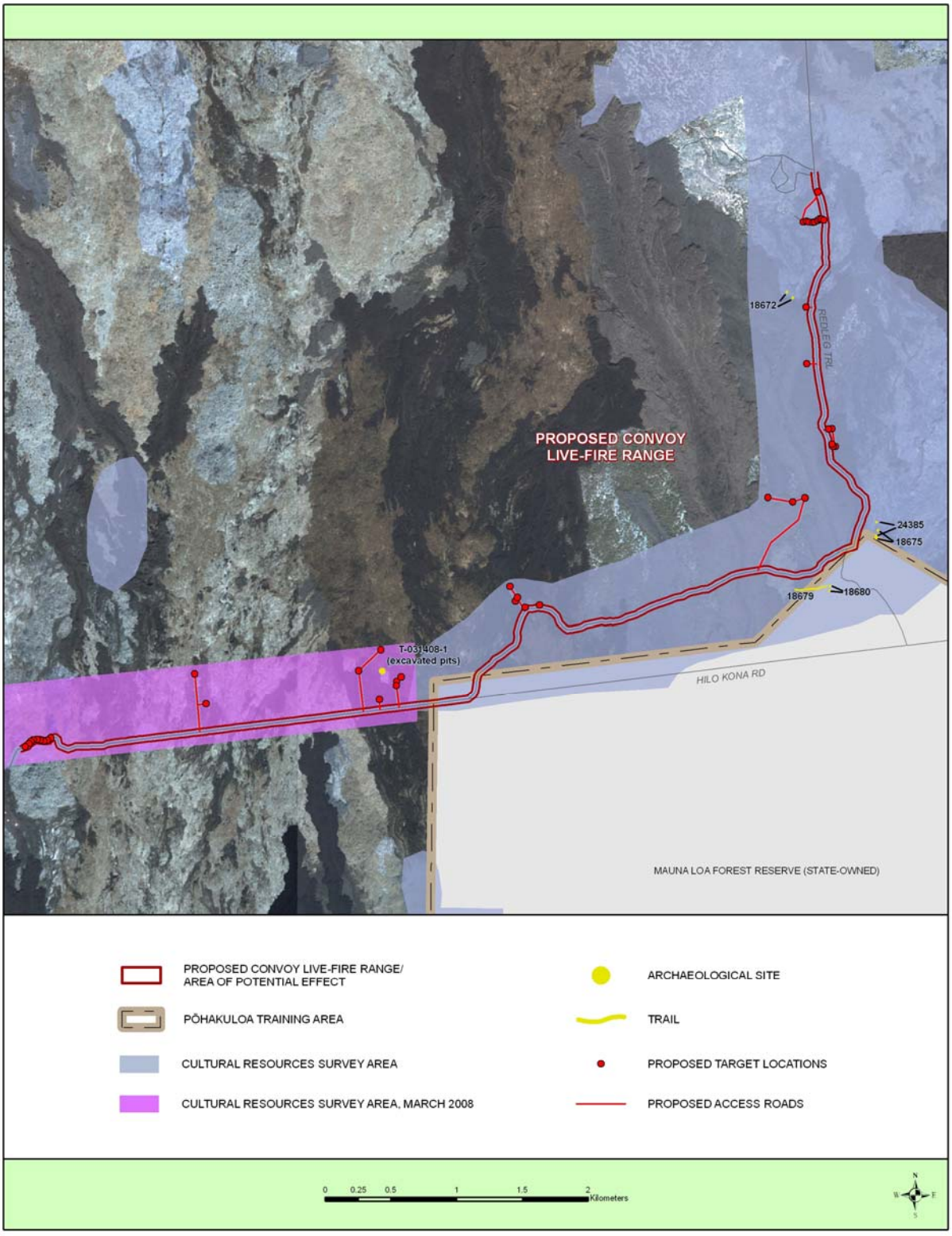

Figure 3-8. Map of the proposed CLF route and target locations showing the area of potential effect (APE) and surveyed areas.

3.6 Human Health and Safety

3.6.1 Affected Environment

General human health and safety issues on Army lands include hazardous materials, contaminated sites, and noise. Specific health and safety hazards include ammunition and ordnance; installation restoration program sites; lead; asbestos; electromagnetic fields; petroleum, oils, and lubricants; underground storage tanks; pesticides and herbicides; and wildfires.

An additional human health and safety issue on the impact area is UXO resulting from live-fire weapons training. The presence of UXO is a threat to personnel working on the range.

3.6.2 Environmental Consequences to Human Health and Safety

3.6.2.1 Alternative 1: Proposed Action - Modular MOUT, CLF Range, FOB, and Grenade/Shoot House Development

Effects to human health and safety related to construction as well as ground operations and maintenance would be minimal and no different from standard, ongoing activities occurring at PTA. There are no specific aspects of construction, operations, or maintenance that would create any unique or extraordinary safety issues, with the exception of the impact area construction for the CLF course. Potential effects to human health and safety are similar with those for other activities involving the impact area. Some targets would be placed within the impact area via air support to protect humans from potential on-ground encounters with UXO. Maintenance of small targets via access trails represents a small risk to personnel from UXO. The proposed target sites would be inspected by explosive ordnance disposal (EOD) specialists prior to road widening and access trail construction and target emplacement. UXO hazards encountered would be destroyed in-situ or avoided.

All weapons firing and associated SDZs would be on withdrawn military lands contained within prescribed safety zones, and would not endanger civilian populations (which are more than 20 km [12 mi] away). Existing range standard operating procedures and safety procedures would be followed and updated under the proposed action.

Activities associated with development of the modular MOUT, FOBs grenade/shoot house and the CLF range would generate periodic noise, mainly from vehicular traffic and weapons firing. Minor noise would result from the increased use of the new facilities for training.

3.6.2.2 Alternative 2: No Action

No additional environmental consequences would result from the no-action alternative.

3.7 Resources Not Examined in Detail

The description of the affected environment focuses on resource areas that would be potentially affected if the proposed action or alternative were implemented. The following resource areas were omitted from this analysis: land use, water resources, and socioeconomics and environmental justice. These resource areas were deemed to be unaffected by implementation of the proposed action. The following sections describe these resources and the basis for exclusion.

3.7.1 Land Use

Development and use of the MOUT, grenade/shoot house, CLF course and FOBs would neither change nor affect land use classifications at PTA. The three projects proposed under this EA would not affect other training activities that currently take place at PTA. The proposed action would have no effect on recreational use of the area because recreation is currently not allowed in the impact area or other training areas proposed for these projects.

3.7.2 Water Resources

There are no surface water features at PTA due to low rainfall, porous soils, and the high permeability of the young volcanic substrates (USACE 2004). Therefore, waterborne erosion associated with the proposed action would not occur and stream channels and surface water quality would not be affected. Groundwater at PTA is greater than 305 m (1,000 ft) below the soil surface (USARHAW 2002b). The proposed action would therefore have no effect on groundwater hydrology or quality.

3.7.3 Socioeconomics and Environmental Justice

Socioeconomics include sociological and economic conditions such as demographics, regional employment and economic activity, housing, schools, medical facilities, shops and services, and recreation facilities. In addition, Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (1997), requires federal agencies to assess activities that have disproportionate environmental health effects on children. Implementation of the proposed action would not affect any of the sociological and economic conditions at PTA.

Implementation would also not affect children due to the absence of schools in the area and the lack of permanent family housing facilities at PTA. Environmental justice focuses on the distribution of race and poverty status in areas potentially affected by implementation of a proposed action. Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (1994), directs each federal agency to identify and address any disproportionately adverse environmental effects of its activities on minority and low income populations. Implementation of the proposed action at PTA would not change conditions associated with environmental justice.

4.0 CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVEABLE COMMITMENT OF RESOURCES

A cumulative effects analysis considers the potential environmental impacts resulting from "the incremental impacts of the action when added to other past, present and reasonably foreseeable further actions regardless of what agency or person undertake such other actions" (40 CFR 1508.7). Assessing cumulative effects involves defining the scope of the other actions and their interrelationship with the proposed action. Cumulative impacts can result from individually minor but collectively significant actions taking place over time (40 CFR Sec 1508.7). This section discusses other projects on PTA and in Hawai'i that may contribute to cumulative effects when combined with the effects from the alternatives discussed in this EA.

To identify cumulative effects, the analysis addresses three questions:

1. Could affected resource areas of the proposed action interact with the affected resource areas of past, present and reasonably foreseeable actions?
2. If one or more of the affected resource areas of the proposed actions and another action could interact, would the proposed action affect or be affected by impacts of the other action?
3. If such a relationship exists, are there any potentially significant impacts not identified when the proposed actions are considered alone?

The scope of the cumulative effects analysis involves both the geographic extent of the effects and the time in which the effects could occur. Actions not occurring in or near PTA are not considered in the analysis. Primary sources of this analysis were public documents prepared by Army personnel.

4.1 Past, Present and Reasonably Foreseeable Actions

PTA is an active military installation that undergoes continuous changes in mission and in training requirements. Other actions considered in assessing cumulative effects at PTA include projects, training activities, and nonmilitary actions. The effects of past and present actions are expressed by the existing facilities and current condition of resources. Recent, ongoing and/or reasonably foreseeable actions occurring on or near the PTA are listed in Table 4-1 (USACE 2004):

4.1.1 Cantonment Projects

A variety of capital improvement projects are planned or are currently underway on installation cantonment areas. These areas typically contain installation support infrastructure. The PTA cantonment area has undergone some development over the past 50 years. Recent, current, and future projects include building upgrades, new training and support facilities, airfield modifications, fencing, and other infrastructure. Some of these projects are described in the cumulative effects section of the *Transformation of the 2nd Brigade, 25th ID(L) Final EIS* (USACE 2004). Additional projects associated with the Army Growth and Force Structure Realignment to Support Operations in the Pacific Theater (HQDA 2008) beyond those listed are anticipated.

4.1.2 Range Improvement Projects

Maneuver training generally occurs outside of cantonment areas. There are several recent, current, and future range construction and improvement projects planned on PTA, primarily in conjunction with the transformation of the 2nd Brigade. These include new ranges, battle courses, and maneuver lands. Environmental effects of these actions are described in USACE (2004). Additional projects associated with the Army Growth and Force Structure Realignment to Support Operations in the Pacific Theater (HQDA 2008) beyond those listed are anticipated.

Table 4-1. Recent, ongoing, and foreseeable actions on and near PTA.

Project Title	Project Description	Timeframe
Battle Area Complex	Proposal to construct BAX at existing Range 12 for company gunnery training and qualification requirements of selected weapons systems and to support mounted and dismounted infantry platoon tactical live-fire operations.	2010
Construct Military Vehicle Trail, PTA-Kawaihae	Construct 43 kilometer (new) roadway from Kawaihae Harbor and PTA for use by military vehicles.	2009+
Land Easement for Military Vehicle Trail, PTA-Kawaihae	Acquire easement	2009+
Ammunition Storage	Proposal to construct three new earth-covered ammunition bunkers, totaling 627 square meters (6,750 square feet) within the existing ammunition storage facility.	2010
Tactical Vehicle Wash Facility	Construction of a tactical vehicle wash facility with four wash stations.	2008+
West PTA Maneuver Training Area Land Acquisition	Proposal to acquire between 6,070 ha (15,000 ac) and 9,308 ha (23,000 ac) of land adjacent to PTA from Parker Ranch to be used for maneuver training.	Land acquired; training use pending infrastructure development
Range Maintenance Facility	Proposed construction of a 1,407-squar meter consolidated range maintenance complex on a previously developed site in a PTA cantonment.	2009+
Runway Upgrade/Extension, Bradshaw AAF	Proposed construction of an 18,667-ft (5,700 m) long paved runway with 1,000-ft (300-m) long paved runway overrun areas on each end, plus an operations complex to support runway activity.	2009+
Fixed Tactical Internet	Construct vertical whip antennas oat eight strategic locations, each with four antennas, on existing tower sites.	2008+
Installation Information Infrastructure Architecture	Install fiber optic cable from cantonment area to ranges, motor pool and other facilities.	2008+
Consolidated command and range control building	Construction of a consolidated command center for ongoing training	2008+
Modified Record Fire Operation and Maintenance	Construction of a range with stationary infantry targets.	Completed
Target emplacement in Impact Area	Emplacement of approximately 25 non-fragmenting armored targets in the impact area to augment existing targetry.	2008
Known Distance Range	Construction of a 10-lane shooting facility. The range footprint is approximately 1000 meters by 150 meters.	Completed
Range 1 Modernization	Expansion and construction of two ranges at Range 1.	Completed

4.1.3 Training Activities

A brigade of the 25th Infantry Division recently underwent force transformation to a Stryker Brigade Combat Team. This entailed increased training activity, stationing of new personnel, and utilization of additional support vehicles and equipment. Environmental effects of this action on PTA are presented in the *Transformation of the 2nd Brigade, 25th ID(L) Final Environmental Impact Statement* (USACE 2004). The Integrated Training Area Management program was specifically developed to promote sustained use of military training lands while also achieving long-term environmental sustainability. DPW Environmental Office and the Integrated Training Area Management program are active in mitigation associated with current and proposed training activities. Additional projects associated with the Army Growth and Force Structure Realignment to Support Operations in the Pacific Theater (HQDA 2008) beyond those listed in Table 4-1 are anticipated.

4.1.4 Nonmilitary Activities

Nonmilitary activities can also contribute to cumulative effects on Army lands. These include public recreation and other activities affecting PTA lands such as the Saddle Road realignment/construction. Nonmilitary human use of PTA can have many of the same impacts that military uses do, e.g. birds being hit by civilian vehicles using PTA for recreational or other nonmilitary uses. The realignment of Saddle Road is one nonmilitary project proposed near PTA.

4.2 Cumulative Effects by Resource

4.2.1 Air Quality

The cumulative effects of the proposed action on air quality over time are expected to be minimal due to the quick dissipation of dust and other emissions at PTA and palliative measures proposed to mitigate excessive dust if necessary. A cumulative effect may occur if training or construction occurs simultaneously with other activities that generate poor air quality, such as wildland fire, major construction projects, and windstorms, but this additional effect would be insignificant by comparison. Fugitive dust generation has been raised as a concern in the Transformation EIS (USACE 2004) as a result of maneuver on the deeper soils in the Keamuku Maneuver Area. The proposed actions are not within the Keamuku area and are not anticipated to add measurably to the effects described in the Transformation EIS.

4.2.2 Geology and Soil Resources

Effects on soils are primarily related to erosion from wind and water. These effects tend to be localized along roads and in disturbed areas with relatively deep soils. Project sites for the FOB enhancements, modular MOUT project, and grenade/shoot house do contain some areas with deeper soils which could be subject primarily to wind erosion. Mitigation in the form of site hardening, road development, and the use of soil stabilizers will minimize soil loss, but some soil loss will occur the proposed action areas. These effects may be locally important but not significant at larger scales. The proposed action is not likely to add measurably to existing effects due to the mitigation measures proposed, low precipitation in the area, and generally flat topography. Therefore, other than minor, localized erosion the proposed action will not contribute significantly to cumulative effects on soils and geology.

4.2.3 Vegetation Resources

Cumulative effects to vegetation resources from military land use can include impacts on federally listed species and their federally designated and critical habitats, impacts to sensitive species either by the loss or degradation of habitat or the spread and added competition from non-native species in training areas (USACE 2004). They can also include the effects of nonnative vegetation and wildfire. Nonnative vegetation and wildfire are not anticipated to increase under the proposed action. Conservation measures to minimize and eliminate effects of these agents are outlined in the 2003 Biological Opinion (USFWS 2003) and

additional conservation measures being developed as part of the current Section 7 Consultation between the Army and the USFWS.

The proposed action would have a minor adverse effect on native vegetation resources present at the modular MOUT, FOB, grenade/shoot house, and CLF range locations. At all locations, there would be some loss of native vegetation, even though some areas are historically highly disturbed or dominated by non-native vegetation. There will be some effects to known endangered plants (*Silene hawaiiensis*) within the impact area due to road widening and construction activities, but these effects would be mitigated by other conservation measures in other areas on PTA and would therefore not constitute a significant effect. Because the potential loss of these individuals within the impact area has already been addressed in the 2003 Biological Opinion (USFWS 2003) and the current Section 7 Consultation, the proposed action would not add to cumulative effects on this resource.

4.2.4 Faunal Resources

Cumulative effects to biological resources from military land use include impacts on federally listed species and their federally designated and critical habitats, impacts to sensitive species either by the loss or degradation of habitat, or the spread and added competition from non-native species (USACE 2004). The proposed action is not likely to significantly affect listed threatened or endangered wildlife species present at the MOUT, FOB, or grenade/shoot house locations, since none of these species have been found following surveys. Use of these areas would not significantly increase the presence of non-native species and may reduce the abundance of non-native plants in some cases. The Hawaiian goose has been documented using the area in the vicinity of Range 1 and near Red Leg Trail. The Army is currently applying management techniques (e.g., remote sensing cameras, signage, and surveys) to protect federally-listed birds from harm in the area of the proposed CLF. The implementation of various conservation measures by the Army is anticipated to offset any potential adverse effects on nēnē.

In the event a federally listed species is inadvertently encountered during construction or use of the CLF course, MOUT, grenade/shoot house or enhanced FOB walls, the current standard operating procedures for protection of natural resources at PTA would be followed (Annex F. *Protection of Natural and Cultural Resources*, USAG-HI 2005). This would include: (1) halting all activities in the area immediately, (2) protecting the resource from further damage, (3) informing Range Control of the find and any damage caused, and (4) contacting the PTA Environmental Office.

4.2.5 Cultural and Archaeological Resources

No cultural resources have been identified within the defined APEs for the MOUT, FOB and CLF locations and therefore no historic properties would be affected by the implementation of the proposed action and no-action alternative. The use of the project areas is consistent with the current use and the proposed actions are will not contribute to cumulative impacts to cultural resources.

4.2.6 Human Health and Safety

Human health and safety of Marine personnel could be affected by current and future use of the impact area for weapons training. The proposed action is not expected to significantly add to these effects.

4.3 Irreversible and Irretrievable Commitments of Resources

NEPA requires an analysis of significant, irreversible effects resulting from implementation of a proposed action. Resources that are irreversibly or irretrievably committed to a project are those that are typically used on a long-term or permanent basis; however, those used on a short-term basis that cannot be recovered (e.g., non-renewable resources) also are irretrievable.

Alteration of lava substrates by construction activities and road improvements would be irreversible. Implementation of the proposed action would result in the irreversible commitment and expenditure of

human labor that could not then be expected in the service of other projects. These commitments of resources are neither unusual nor unexpected, given the nature of the action. Construction (e.g., road-widening along Red Leg Trail) could result in irreversible commitment of fuel for construction vehicles and equipment and irretrievable commitment of land. Similar commitments would be associated with the MOUT sites and the live-fire grenade/shoot house. Development of the walls at the FOBs would result in irreversible commitment and expenditure of human labor that could not then be expected in the service of other projects.

4.4 Conclusion

Implementation of the proposed action would not result in significant unmitigable impacts to any environmental resource area. Therefore, the proposed action, in conjunction with other actions on and in the vicinity of PTA, would not result in significant cumulative impacts.

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APPENDIX A

Concurrence Letter of No Historic Properties Affected

Hawaii State Historic Preservation Division

National Historic Preservation Review (NHPA) Section 106 Review

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

September 5, 2008

Matthew T. Margotta, Colonel, US Army
Office of the Garrison Commander
Department of the Army
US Army Installation Management Command, Pacific Region HQ
United States Army Garrison, Hawaii
851 Wright Avenue, Wheeler Army Airfield, Schofield Barracks, Hawaii 96857-5000

LOG NO: 2008.3811
DOC NO: 0809MD36
Archaeology

Dear Colonel Margotta:

SUBJECT: **National Historic Preservation Review (NHPA) Section 106 Review – Section 106 Historic Preservation Review Request for Concurrence of No Historic Properties Affected Kaohe 4th & 5th Ahupua`a, Hamakua District, Island of Hawai`i TMK: (3) 4-4-016:various**

Thank you for the opportunity to comment on the aforementioned undertaking, which we received on August 27, 2008. The undertaking entails a proposed United States Marine Corps Marin Corps Base Hawaii sponsored undertakings at the US Army's Pohakuloa Training Area.

We concur that **no historic properties will be affected** by this project because:

- ☐ Intensive cultivation has altered the land
- ☐ Residential development/urbanization has altered the land
- ☒ Previous military undertakings have altered the land
- ☐ An accepted archaeological inventory survey (AIS) found no historic properties
- ☐ SHPD previously reviewed this project and mitigation has been completed
- ☒ Other: *While 15 known archaeological sites do exist within the APE, they will be avoided and we concur there will be no adverse affect.*

In the event that historic resources, including human skeletal remains, cultural materials, lava tubes, and/or lava blisters/bubbles are identified during the construction activities, all work needs to cease in the immediate vicinity of the find, the find needs to be protected from additional disturbance, and the State Historic Preservation Division, Hawaii Island Section, needs to be contacted immediately at (808) 981-2979. Please contact Morgan Davis at (808) 981-2979 if you have any questions or concerns regarding this letter.

Aloha,

Nancy A. McMahon

Nancy McMahon, Deputy SHPO/State Archaeologist
and Historic Preservation Manager
State Historic Preservation Division

APPENDIX B

National Historic Preservation Act Section 106 Consultation Package

SUBMITTED TO THE HAWAIʻI STATE HISTORIC PRESERVATION OFFICER (AUGUST 2008)

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

AUG 2 6 2008

Office of the Garrison Commander

Ms. Laura Thielen
State Historic Preservation Officer
Department of Land and Natural Resources
State of Hawaii
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

Dear Ms. Thielen:

The US Army Garrison, Hawaii (USAG-HI) is initiating Section 106 coordination and consultation for the proposed United States Marine Corps (USMC) Marine Corps Base Hawai'i (MCBH) sponsored undertakings at the U.S. Army's Pōhakuloa Training Area (PTA) on the island of Hawai'i. This consultation is in compliance with the National Historic Preservation Act (NHPA) of 1966, as amended, pursuant to implementing regulations 36 CFR, Part 800. Consultation with your office is requested to ensure that historic properties are afforded proper consideration and protection. The Army is also initiating consultations with other interested parties to ensure concurrence is reached on appropriate protection measures and in accordance with the NHPA. Please see Enclosure 1 for a list of all consultation parties.

The USMC Commanding General 3rd Marine Division recommended a combined strategy for future development of U.S. Army ranges and training areas in Hawai'i. The strategy includes a proposal to maximize ground combat element use of PTA. Specifically, the USAG-HI proposes to implement the USMC's plan to enhance training facilities and meet training requirements at PTA by:

- constructing a convoy live-fire (CLF) course,
- enhancing three forward operating bases (FOBs) with perimeter walls,
- constructing a live-fire grenade/shoot house, and
- constructing a modular military operations in urban terrain (MOUT) training facility.

Each of these proposals is described in greater detail below. Project maps including Areas of Potential Effect (APE), areas surveyed and archaeological site locations can be found at Enclosure 2 Figures 1-11. All archaeological sites within the APE and within 200 meters of the APE boundary are illustrated on the figures. Known sites located beyond this 200 meter buffer area are not depicted on the figures.

Convoy Live Fire Course (CLF).

A CLF range is a complex used to train and test Marines and Soldiers, crews, platoons, and companies on the skills necessary to detect, identify, engage and defeat stationary and moving vehicle and infantry targets from a stationary or moving platform (i.e., vehicle) using specified weapons and weapon systems. The proposed CLF course is shown in Enclosure 2 (Figures 1 through 5).

The proposed CLF course involves seven events/objectives, targeting stationary and moving targets located at various distances from Redleg Trail that will be fired upon from the road (small arms fire) or from established artillery firing points. Construction of the CLF course will involve road improvements along existing segments of the Redleg Trail and the Hilo-Kona Road, construction of targets and access roads, and placement of deep targets (1,000-2,000 m [3,280-6,560 ft] from the road inside the impact area) by helicopter.

Training Activities and Usage of the CLF Course:

CLF training currently occurs at PTA, but does not include automated targets (only stationary paper targets are currently used), does not support all doctrine-specific CLF scenarios and targets, and does not include the full range of CLF weapons (or the appropriate targets for some weapons). Tactical vehicle convoys of one to fifteen vehicles would respond to obstacles, threats, and attacks occurring along the route. Vehicle types using this course would include the highly mobile multi-purpose wheeled vehicle (HMMWV), light maneuver tactical vehicle (2.5 ton payload), heavy maneuver tactical vehicle (5 ton payload), mine-resistant ambush-protected vehicle, light armored vehicle, amphibious assault vehicle, expeditionary fighting vehicle, medium tactical vehicle replacement truck (i.e., 7 ton truck), Stryker vehicle, heavy expanded mobility tactical truck, and other wheeled vehicles used by Army Units in Hawaii and other units using PTA. Regardless of the vehicle type, munitions used on the range would be limited to those listed below and vehicles would remain on established course roads.

The armored assault amphibious vehicle (AAVP7A1) is a tracked vehicle used by the USMC to carry troops in water operations from ship to shore, through rough water and the surf zone, and to inland objectives after coming ashore. The AAVP7A1 provides protected transport of up to 25 combat-loaded Marines through all types of terrain. Its weaponry includes an M2 .50-cal. machine gun and an MK-19 40mm grenade launcher. It can move at speeds of up to 45 mph on land. Currently, MCBH has one platoon (12-16 vehicles) of them in support of ground troops. Up to one full platoon is deployed to PTA approximately four times per year and are used only on the approved roads at PTA.

Small arms weapons firing would occur within the engagement boxes. Preliminary surface danger zones were created for each objective based on the locations of engagement boxes and targets and the types of ammunition fired from the convoy route. The following ammunition would be approved for use on this range: 5.56mm, 7.62mm, and .50 caliber weapons; MK19 training practice target (40mm grenade machine gun round that produces a "flash-bang" to simulate combat ammunition, and releases a powder at the point of impact to show the location – non incendiary and non high-explosive); and the M-72 light anti-tank weapon and M136 AT4 (both shoulder-fired rockets). Supporting fire from 60mm, 81mm, and 120mm mortars, 155mm howitzers (towed artillery) and 105mm Stryker Mobile Gun System would occur from existing firing/mortar points 805, 806, 807, 808, and 809. Only 5.56mm ammunition would be fired at Ambush 1 (near/urban) targets east of Redleg Trail (outside the impact area). Fixed targets representing armored vehicles within the impact area would be engaged by practice rounds from helicopters and fixed-wing aircraft, mortars, and grenade guns. No dud-producing ammunition would be used on the CLF range. Both ball and tracer ammunition would be used during both daytime and nighttime training.

Training scenarios require groups of vehicles traveling in a convoy. The majority of convoys would consist of HMMWVs and other trucks. A minority of the CLF exercises would involve amphibious assault vehicles, the only tracked vehicle currently used at PTA. There are eight training events/objectives along the course: two entry control point escalation of force objectives - one each at course start and end; a sniper event; two near/urban ambush objectives (east and west sites); a blocked ambush with improvised explosive device (IED)/small arms objective; a far/urban ambush event; and a rocket propelled grenade reaction event. Obstacles, disabled vehicles, IED scenarios, and safety considerations require that the road provide for two lanes of passage by combat vehicles. Firing would occur from the road from positions inside and outside vehicles. Training activities may also involve civilian and military personnel as role players. CLF training along a portion of the proposed course currently takes place approximately 60 days per year. The frequency of training exercises by Marine units is approximately one battalion training cycle per quarter, or approximately 8-15 days per quarter. This Marines usage of approximately 60 days per year would continue under the proposed action. Use of the course by Army and other units is currently approximately 20-25 days per year, and would increase to approximately 60 days per year, for a total proposed usage of approximately 120 days per year for all users combined.

Road Improvements:

Approximately 9.1km (5.6 mi) of road would require widening by approximately 2.4-3.0m (8-10 ft) to accommodate two lanes of tactical vehicle traffic. Road widening would employ bulldozing, grading, and adding 15-25cm (6-10 in) of road base material and cap material from the active quarry on PTA.

Targets and Barriers:

Target types include stationary infantry targets, moving infantry targets, stationary armor targets, and moving armor targets, all of which are pop-up type targets. Moving targets traverse along tracks that would be 15m (50 ft) and 350m (1,100 ft) long, respectively. All pop-up targets are charged using solar panels, powered by batteries, and remotely controlled, so no field utilities would be required. Stationary targets would be placed in target "coffins" where they are protected and concealed when not up. The coffins would be constructed from concrete panels and provide a subterranean recess approximately 60 cm deep for the targetry. For individual stationary infantry and armor targets, minor excavation up to 60cm (24 in) deep may be necessary to install target coffins that house and conceal the targets when they are down and protect the mechanical and computerized target components. Target lifter protection could vary by individual target and may employ a combination of surface topography (e.g., naturally occurring features/berms), placing the lifter in a low spot, or surface-mounted steel plating covered with soil or rock.

Target access trails would be approximately 3-4m (10-14 ft) wide, semi-improved roads that are level, free of ruts and obstacles, and capable of supporting, at a minimum, maintenance pick-up trucks. On pahoehoe (smooth, pillowy) lava, roads and trails would be built up on top of the existing surface, whereas, on a'a (rough) lava, trails would be created by crushing and consolidating the in-situ material and adding additional road base material as necessary to create a relatively smooth road surface.

Security barriers would be either concrete or plastic (sand/water-filled). Wooden facades simulating buildings have wooden bases and braces. Transportation of materials and construction would be done by commercial entities.

Historic Property Survey Results in CLF APE

The APE for the CLF is defined as 15m either side of the target access trails and moving target tracks to 15m beyond the end of the access trails (target locations) and 10m either side of the CLF route (the Redleg Trail and Hilo Kona Roads) (refer to Enclosure 2 Figures 1-5). Approximately two-thirds of the length of the CLF course had been previously surveyed for cultural resources (Shapiro et al. 1998) and an additional aerial and pedestrian

survey has been conducted in preparation for the Environmental Assessment for the proposed action by PTA cultural resources staff. Archaeological findings for this survey were limited to a series of excavated pits and a possible c-shaped alignment identified as temporary site T-031408-1. Excavated pahoehoe pits and other associated modifications found in this area are believed to be related to bird hunting activities occurring in the pre-historic period. The site has not been formally evaluated although it is being treated as potentially eligible for the National Register in accordance with criteria D. All target areas and access trails have been placed to avoid adverse impacts to site T-031408-1. Additionally T-031408 is located in a depression sitting well below the actual line of fire and therefore is protected from potential live fire impacts since it cannot be fired upon directly. A number of lava tubes and cave blisters were identified during the subsequent survey. Entries were examined as permitted and no cultural materials or signs of habitation were identified. However due to safety concerns and the potential of collapse of these areas by heavy equipment the CLF design was altered to utilize only areas of `a`ā lava flow for target placements and access road construction. Very few archaeological sites have been identified at PTA upon a`ā lava flows and it remains a preferable terrain as regards project design. Through utilizing the mitigations discussed above no known historic properties will be affected by the construction or utilization of the CLF course.

Forward Operating Bases (FOBs) Enhancement

Two existing company-level FOBs (at firing points 428 and 438) and one battalion-level FOB (FOB Outlaw) would be enhanced by the construction of perimeter security walls and minor trail construction. The footprints of the proposed construction sites are shown in Enclosure 2 (Figures 1 and 6-8). Construction would consist of installing modular perimeter walls made of capped or uncapped, prefabricated corrugated 16-18 gauge steel panels 1m (3 ft) wide and 3m (10 ft) tall. Metalith™ barriers are prefabricated steel wall structures that are easy to install and similar to FOB perimeter barriers constructed during wartime. The walls are filled with soil or rock and can be dismantled if desired.

Wall fill material needed for all three FOBs is approximately 7,260m^3 (9,500 yd^3) and would be obtained locally on PTA from one of several sources. One possible source is the active quarry and rock crushing operation on PTA. The active quarry provides material for various road and other site development projects on PTA. The second possible source of material is the black sand deposit on the newly acquired Keamuku Maneuver Area. The sand from the deposit is relatively coarse and has been used historically for various uses on PTA.

Earth disturbance at each FOB as a result of the proposed action would include minor site leveling for wall installation and gravel road development within the FOB. Corner observation towers may or may not be constructed, but their construction would not

increase the footprint of the facility. Some gravel roads may be developed within each FOB to minimize dust generation by vehicle traffic. Gravel road development would consist of minor leveling and grading within the FOB perimeter using construction equipment, followed by the addition of 15-20cm (6-8 in) of crushed rock base and a cap of 6cm (2.5 in) minus gravel. Gravel would be obtained from the active quarry and rock crushing operation on PTA.

Training Activities and Usage of FOBs:

Training scenarios require groups of vehicles traveling in a convoy. The majority of convoys would consist of HMMWVs and other trucks. A minority of the CLF exercises would involve amphibious assault vehicles, the only tracked vehicle currently used at PTA. There are eight training events/objectives along the course: two entry control point escalation of force objectives - one each at course start and end; a sniper event; two near/urban ambush objectives (east and west sites); a blocked ambush with IED/small arms objective; a far/urban ambush event; and a rocket propelled grenade reaction event. Obstacles, disabled vehicles, IED scenarios, and safety considerations require that the road provide for two lanes of passage by combat vehicles. Firing would occur from the road from positions inside and outside vehicles. Training activities may also involve civilian and military personnel as role players. CLF training along a portion of the proposed course currently takes place approximately 60 days per year. The frequency of training exercises by Marine units is approximately one battalion training cycle per quarter, or approximately 8-15 days per quarter. This Marines usage of approximately 60 days per year would continue under the proposed action. Use of the course by Army and other units is currently approximately 20-25 days per year, and would increase to approximately 60 days per year, for a total proposed usage of approximately 120 days per year for all users combined.

Historic Property Survey Results for FOBs:

An inventory survey has been completed by Garcia and Associates for areas that encompass the APEs of FOBs located at Firing Point 428 and 438. These results are discussed in report 2063-1 dated April 2006. This report was sent to all parties identified in Enclosure 1 in May 2006. A reconnaissance survey was completed for the area that includes the APE for FOB Outlaw by Garcia and Associates in February 2003 (Archaeological Reconnaissance of Training Areas 1, 3, and 4 U.S. Army Pohakuloa Training Area, Island of Hawaii, Contract No. DACA83-01-D-0013, Task Order No. 0013 dated May 2004). Fifteen new archaeological sites were identified during this survey however none exist within the APE of FOB Outlaw. No historic properties have been indentified within the proposed FOB APEs and no historic properties will be affected by perimeter wall construction.

Grenade/Shoot House.

The facility would be constructed on existing Range 10 at PTA and is illustrated at Enclosure 2 (Figures 1, 6, 9 and 10). Range 10 is an Infantry Platoon Battle Course facility that currently supports live-fire and maneuver tactics using small arms, training practice grenades, up to ¼ lb TNT, Claymore mines, and high explosive, white phosphorus, and illumination mortars (60mm, 81mm, and 120mm). The existing range consists of a series of access roads, stationary and moving targetry, and trenches that are used for trench-clearing training.

The site would be graded approximately level, which might involve excavating high points and filling low points of the construction site. Approximately 0.5km (0.3 mi) of access trail would be constructed from existing range roads to the grenade/shoot house site. Trail sections would be graded using heavy machinery and built up with 7-15cm (3-6 in) aggregate from rock sources within PTA. The structure would be approximately 18×12m (60×40 ft) and one story tall with an open roof. The facility would have approximately three to six rooms, one to three corridors, and approximately two entry/exit points.

The grenade/shoot house would be constructed from modular wall panels made from shock-absorbing concrete (SACON). SACON, developed by the U.S. Army Corps of Engineers, is a foamed, fiber-reinforced concrete that does not produce bullet ricochets, is fire resistant, and can be used with grenades. Each panel is approximately 2.5m (8 ft) high, 0.7-1.3m (24-41 in) wide, and weighs 1.6 tons. SACON panel edges overlap to prevent rounds from passing between the panels. The panels would be erected using a heavy duty crane, and are supported by a 15×15cm (6×6 in) steel frame. The outside corridor walls provide blast protection for trainees waiting to use the grenade house. Also, a corrugated steel canopy provides protection from falling shrapnel for those waiting to enter the facility. SACON panels would be placed on a conventional reinforced concrete footing approximately 0.5m (2 ft) thick and 1m (4 ft) wide. The footing would either be placed below grade, which would require excavation, or placed above grade and subsequently protected from blasts/bullets with additional SACON blocks along the interior wall bases. Floors would be packed sand from a local PTA source.

Training Activities and Usage of a Grenade/Shoot House:

Training would consist of squad-sized units entering the facility in small groups and using grenades and small arms fire to clear each room of potential threats. Ammunition used at this facility would consist of 5.56mm ball and tracer, 7.62mm ball only, hand grenades (practice and fragmentation fuse), and flash/bang type grenade simulators. Marine usage of the proposed facility, sometimes in conjunction with other training at Range 10, would be approximately 10 to 60 days per year by Company-sized units (140-200 personnel per

event). The proposed facility would also be used by Army units and other users of PTA. Training would take place during the day and at night. Additional grenade/shoot house training at the Ulupa'u Range Training Facility on O'ahu would continue as planned.

Historic Property Survey Results for Grenade/Shoothouse

The proposed location of the Grenade/Shoot House Facility is within an area that has been inventory surveyed by Garcia and Associates. The results are discussed in project report 2049 dated April 2006. This report was sent to consulting parties identified in Enclosure 1 in May 2006. No historic properties have been identified within the APE of the grenade shoothouse project and therefore there will be no historic properties affected from this undertaking.

Modular Military Operations in Urban Terrain (MOUT) Training Facility

The modular MOUT facility illustrated at Enclosure 2 (Figures 6 and 11) would be located in the vicinity of Pu'u Lehue near firing points 414, 419, 421, 423, and 424. The modular MOUT site would consist of seven clusters of containers that would simulate various urban settings (e.g., marketplace, residential, town square). The number and size of modular units comprising each cluster would vary, as would the acreage occupied by each cluster. The total area of proposed urban terrain is approximately 7.8 ha (19 ac). Containers would sometimes be stacked to simulate two-story buildings. Modular walls approximately 1.8m (6 ft) tall would be constructed within some of the clusters to simulate compounds containing several "buildings" or "houses."

Concrete wall footings approximately 0.6m (2 ft) deep and 0.6m (2 ft) wide would be excavated to anchor the wall system. Specific courtyard locations and sizes would be determined following placement of the modular containers. Existing roads and trails would be used for training. Some construction of connector roads and road upgrades consisting of gravel addition using native material might be done along road sections within the APE for the modular MOUT complex. Road development would not exceed 2km (1.2 mi) total, and road upgrades would not exceed 2km (1.2 mi) total. Road development would consist of leveling, grading, and compaction using construction equipment, followed by the addition of 15-20cm (6-8 in) of crushed rock base course and a cap of 6cm (2.5 in) gravel. Gravel would be obtained from the active quarry and rock crushing operation on PTA.

Training Activities and Usage of the MOUT Facility:

The facility would be used to train squad through company-size units in urban combat operations. Missions and training operations supported would include seizure of key objectives and terrain, infiltration, route security, logistics and supply, force protection,

control of entry points, attack on buildings, entry and clearing of rooms and buildings, and various scenarios for small-unit assault, support, and security. MOUT doctrine has been developing rapidly, along with the increase in urban military operations. The modular MOUT facility would be used approximately 180 days per year by MCB Hawaii units. The facility would also be used by Army units in Hawaii and other units up to approximately 120 days per year.

The modular MOUT facility would primarily support infantry operations but would also be used for combined arms units. No live-fire or dud-producing ammunition would be used. Marines and Soldiers would move through the urban complex, both on foot and riding in tactical vehicles. Vehicles most commonly used at this facility would be high-mobility multipurpose wheeled vehicles and larger trucks, but a variety of other vehicles, including Stryker vehicles and tracked Marine amphibious assault vehicles, would also use the MOUT. Civilian and military role players (i.e., villagers) may also be used in training

scenarios. Training realism would be enhanced using "flash-bang" explosives and grenade simulators and high-tech military paintball (a.k.a. simmunitions). Simmunitions closely mimic two-way live fire and have largely replaced older laser military simulation. The 9mm plastic simmunition rounds are nontoxic, biodegradable, washable pellets of detergent that can be fired out of a minimally-modified 5.56mm combat rifle. Simmunitions can be used force-on-force when protective gear such as head and face protection are worn. The impact of the "bullet" is felt by the victim and a biodegradable detergent mark remains wherever the bullet hits, letting individuals know they have been hit.

Historic Property Survey Results for MOUT:

An inventory survey has been conducted for the area encompassing all APEs of the MOUT project. These results are discussed in report 2063-1 dated April 2006. This report was sent to all parties identified in Enclosure 1 in May 2006. No historic properties were identified in the APEs of the proposed MOUT and therefore no historic properties will be affected by the installation of the shipping containers nor during road construction.

Site Protection and Archaeological Monitoring:

The PTA Cultural Resource Program has worked closely with the USAG-HI Range Planner during the entire process of determining the location of the individual projects and is confident that historic properties have been avoided within the established APEs of each project. Efforts at avoidance have included moving targets and infrastructure on the CLF course off of pahoehoe lava flows, which have the potential for lava tube systems as well as other types of archaeological features, to `a`ā lava flows, which have no potential for lava tubes and caves and very low potential for other site types identified at PTA. The

Grenade/Shoothouse, MOUTs and FOBs are located upon a portions of Mauna Kea lava flows. No known lava tubes have been identified upon any of the Mauna Kea flows at PTA. This is due to its significant age, the erosion of the lava and as well as the presence of largely `a`ā lava for Mauna Kea flows. Subsurface remains also are unlikely upon this lava flow since it were not a chosen areas of habitation within PTA and most likely were only utilized during transportation.

Due to the above conditions and the exceptionally low likelihood of inadvertent findings during the various earth disturbing actions involved in each of these projects the cultural resource staff will be performing spot monitoring of the project performed on a once a week basis as the projects commence. Specific attention will be given to ensuring that the projects remain within the established APEs. Archaeological sites are located adjacent to the Red Leg Trail and Hilo Kona Rd, although outside of the APE of the project. With the exception of site T-031408 these sites remain well out of the APE of the road widening. However due to the fact that T-031408 exists within numerous construction areas this site will be flagged and will be monitored more intensively to ensure it is not disturbed.

A final method of site protection will be afforded by ensuring that a pre-construction meeting occurs between the construction team, including operators and the PTA Archaeologist. At this meeting a briefing will be conducted to alert the team to the sensitivities of the area in addition to the protocol for potential inadvertent discoveries. This has been a useful and successful method of ensuring added protection to inadvertent discoveries.

Inadvertent discoveries of cultural materials or human remains will following guidance outlined in Enclosure 3. Construction staff and the project manager will be provided a copy of this document. With consideration of the aforementioned mitigations and the absence of historic properties in the APEs of all project areas we therefore determined that there will be no historic properties affected by the proposed actions. Pursuant to Section 106 of the National Historic Preservation Act of 1966 as amended and 36 CFR Part 800.2(c), we are seeking your concurrence with this determination. If you have any questions please contact Dr. Laurie Lucking, Cultural Resources Manager at (808) 656-6790 or William Godby at (808) 969-1966.

Sincerely,

Matthew T. Margotta
Colonel, US Army
Commanding

Enclosures

CONSULTING PARTIES

Ms. Laura Thielen
State Historic Preservation Officer
State Historic Preservation Division
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
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Mr. Clyde Namuo
Administrator
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Honolulu, HI 96813

Ms. Lukela Ruddle
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Hilo, HI 96720

Ms. Ruby McDonald
Office of Hawaiian Affairs
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Kailua-Kona, HI 96740

Kahu Charles Maxwell
President, Board of Directors
Hui Malama I Na Kupuna O Hawai'i Nei
157 'Ale'a Place
Pukalani, HI 96768

Ms. Ruby McDonald
President
Hawaiian Island Council of Hawaiian Civic Clubs
P.O. Box 85
Kailua-Kona, HI 96745

Pohakuloa Cultural Advisory Committee
Attendees
Bi-Montly Meetings held at PTA
Headquarters

Enclosure 1

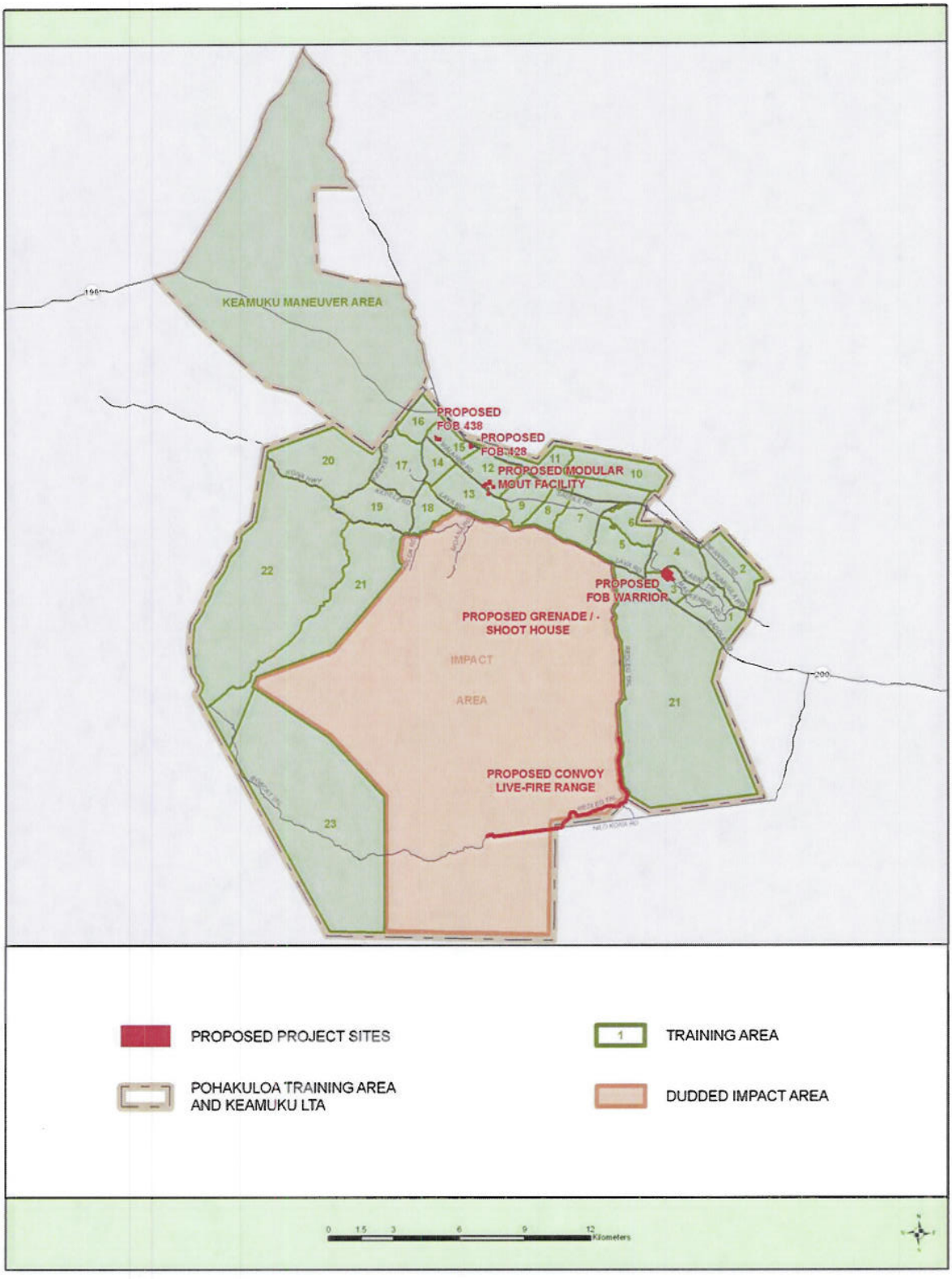

Figure 1. Locations of Proposed Actions

Enclosure 2

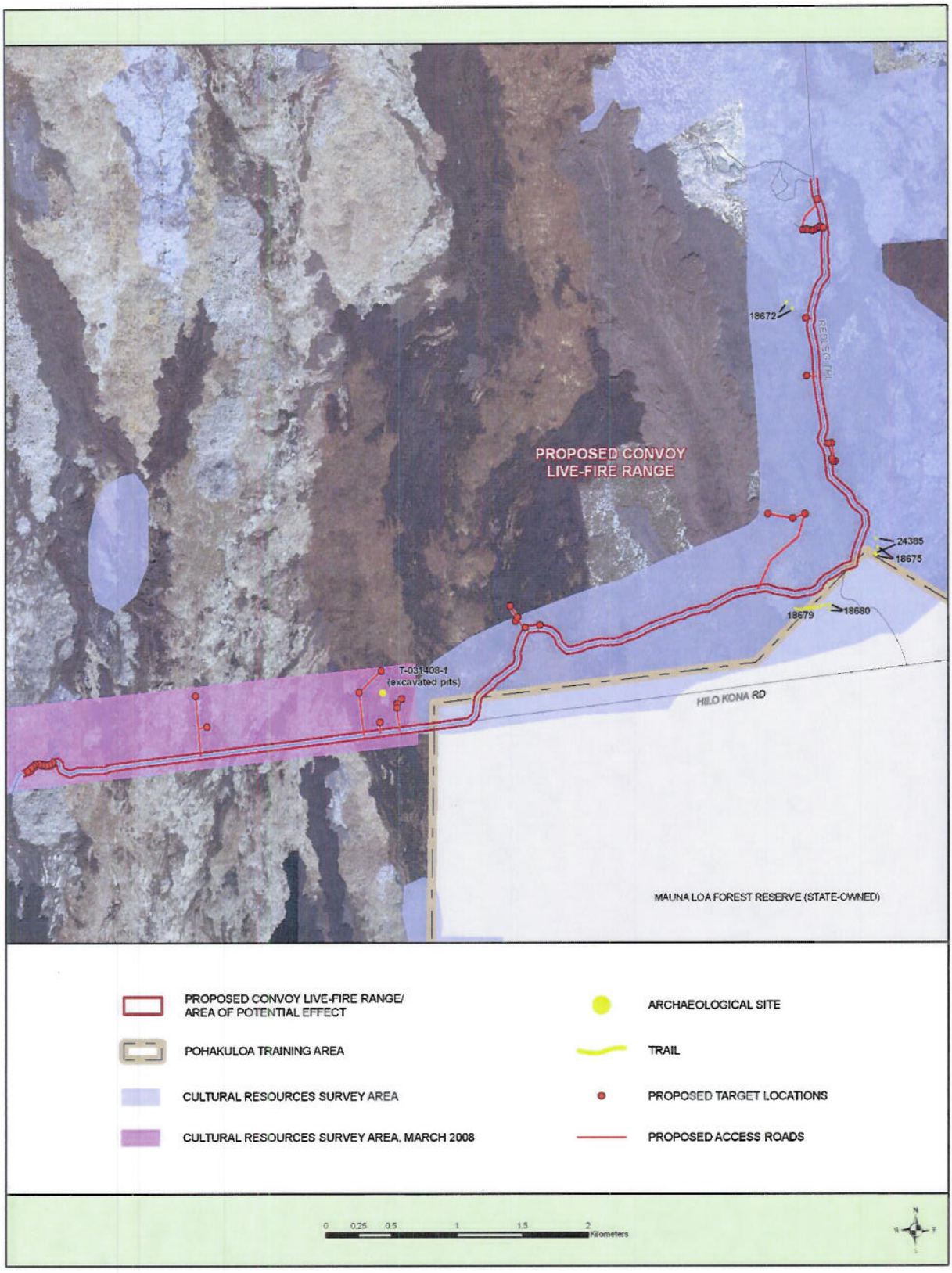

Figure 2. Convoy Live Fire Course and Area of Potential Effect (APE) showing the combined surf ace dangers zone, proposed target locations.

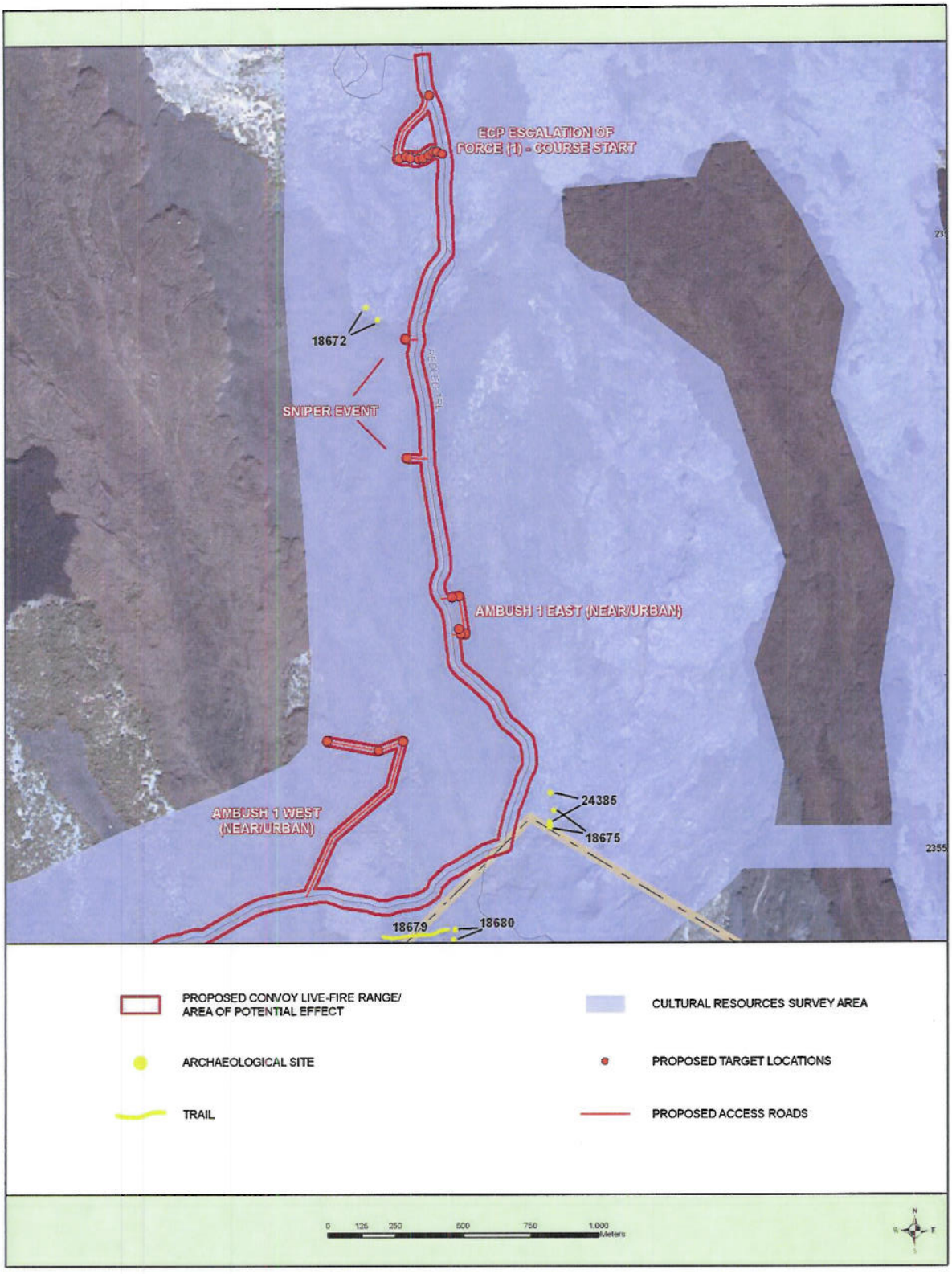

Figure 3. Detail of the first three engagement locations along Convoy Live Fire Course sho wing proposed target locations and access roads.

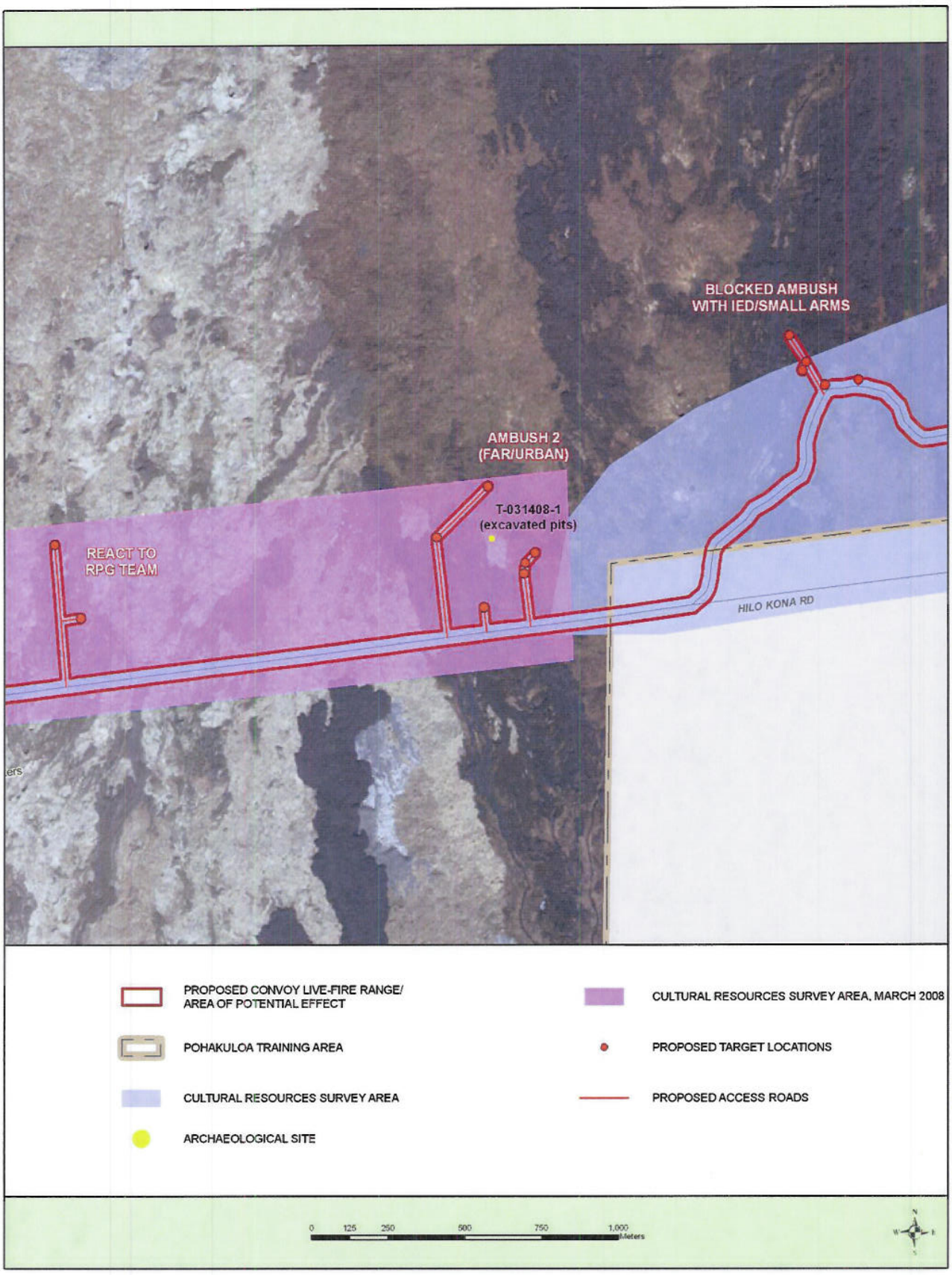

Figure 4. Detail of the three engagement locations (events 4, 5 and 6) along Convoy Live Fire Cours e showing proposed target locations and access roads.

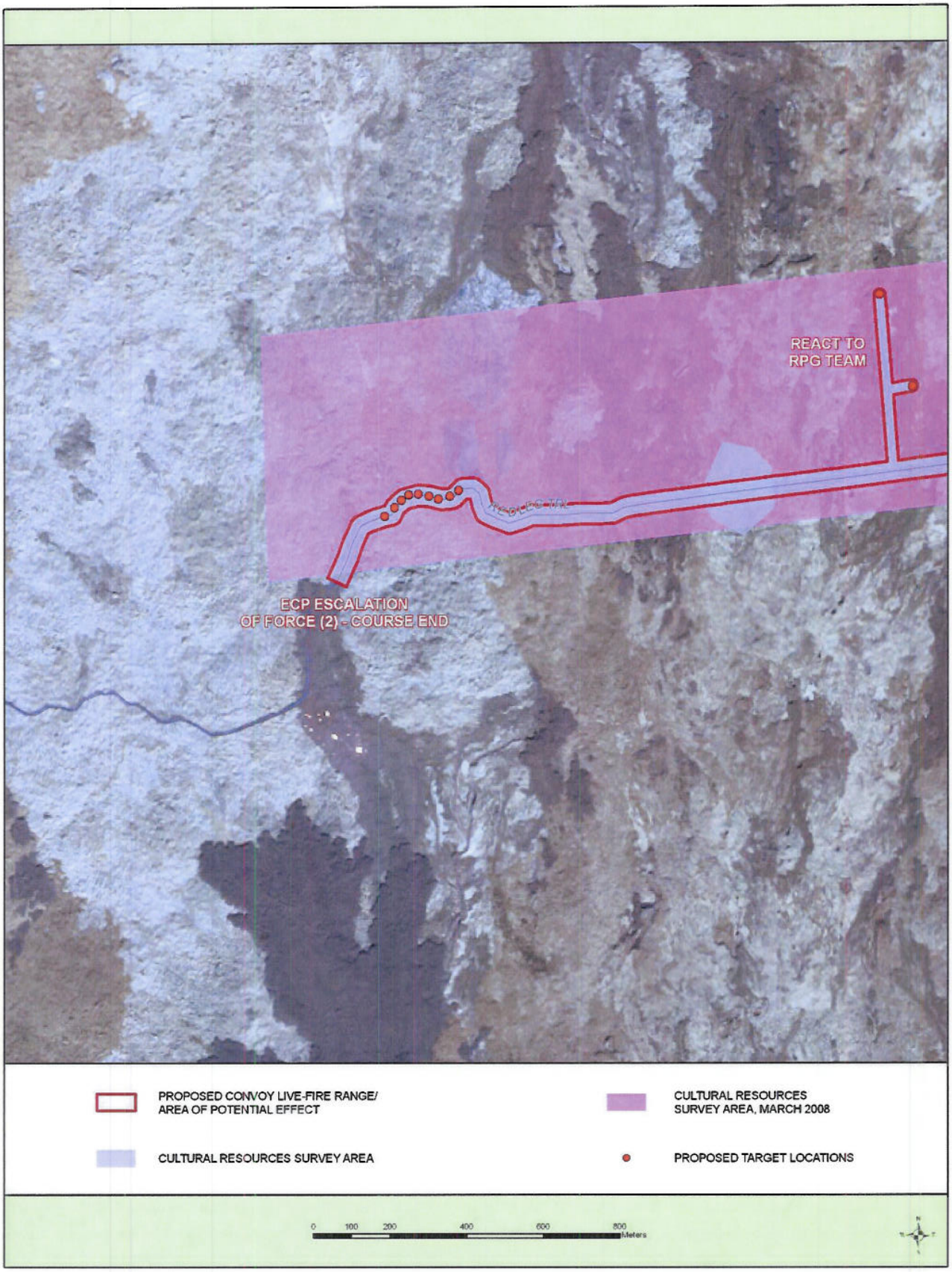

Figure 5. Detail of the final engagement location (event 7) and the Convoy Live Fire Course end sh owing proposed target locations and access roads.

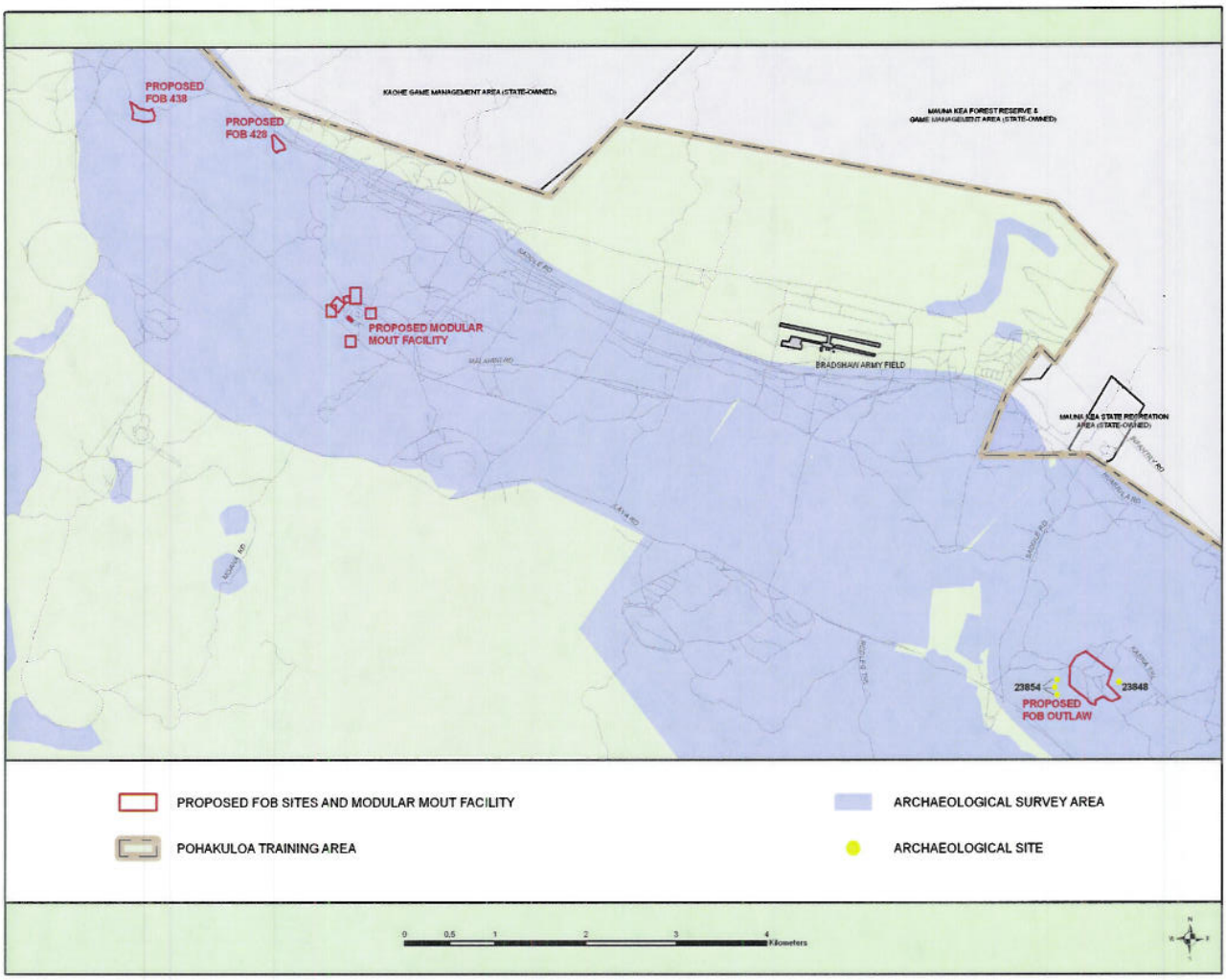

Figure 6. Proposed Forward Operating Base (FOB) enhancement locations and the Modular MOUT facility location in relation to surveyed areas and known archaeological sites.

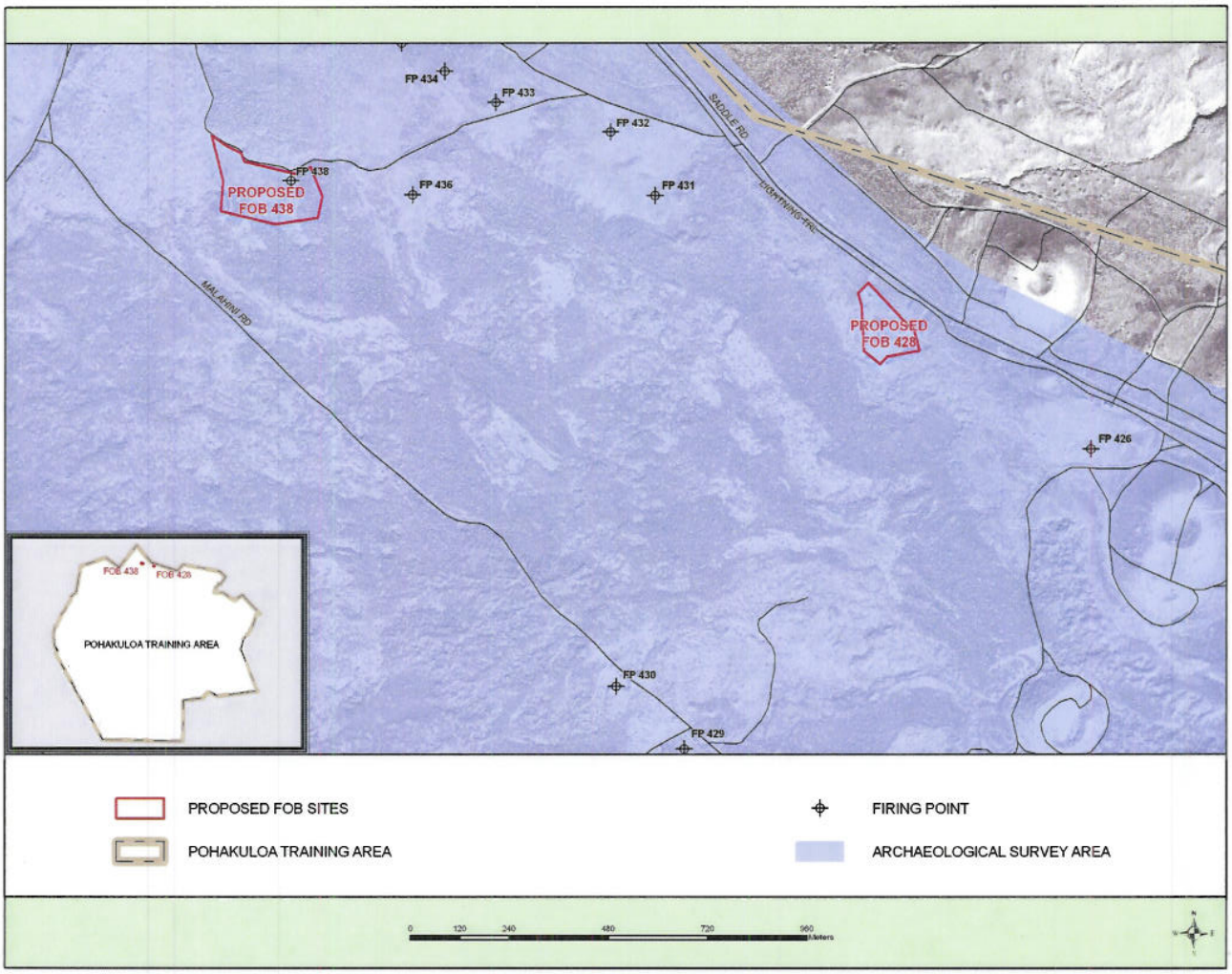

Figure 7. Aerial photo overlay map of the proposed Forward Operating Base (FOB) enhancement loc ations at Firing Points 438 and 428.

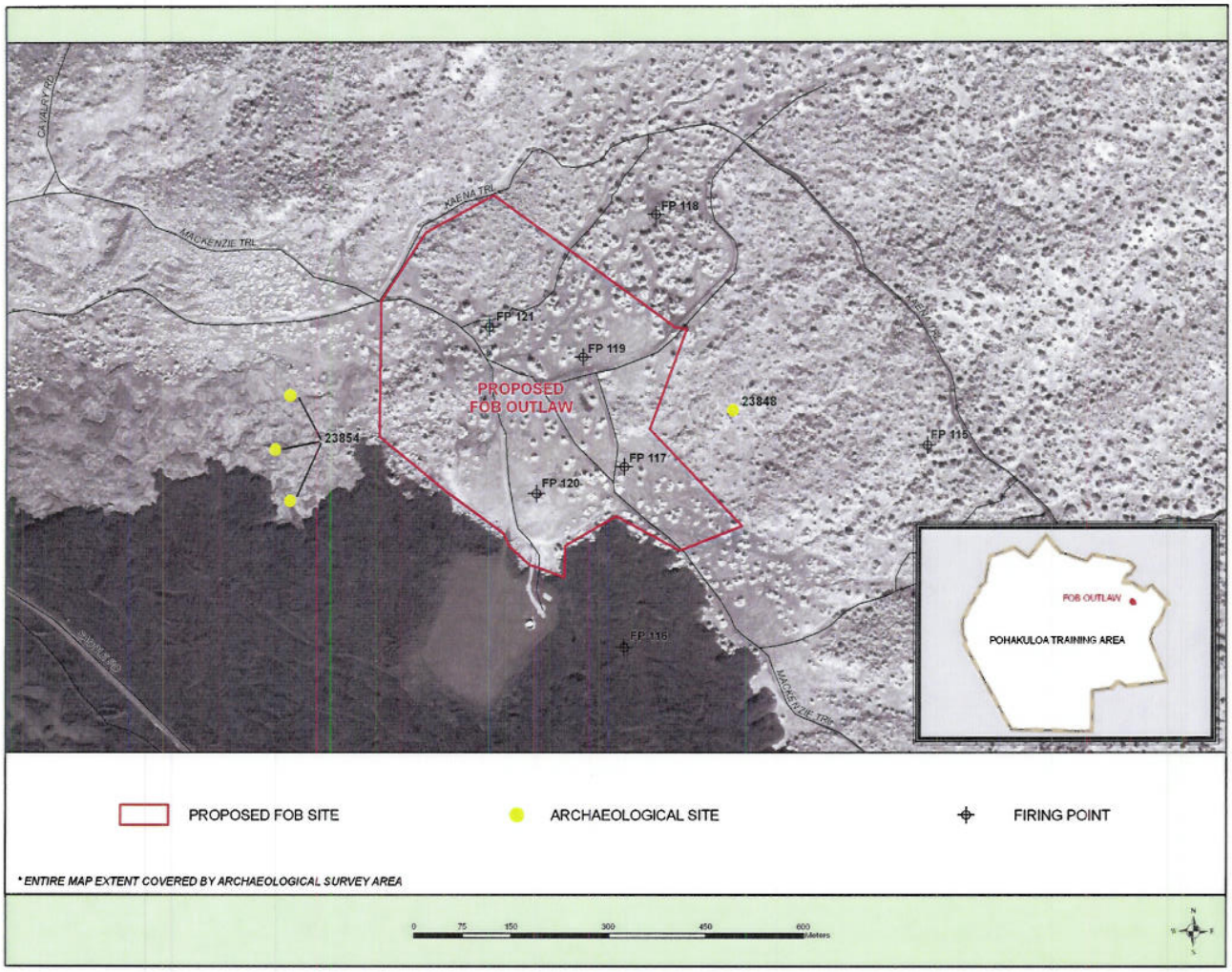

Figure 8. Aerial photo overlay map of the proposed Forward Operating Base (FOB) enhancement location at FOB Outlaw.

Figure 9. Aerial photo map of the proposed Grenade/Shoot House locatio n.

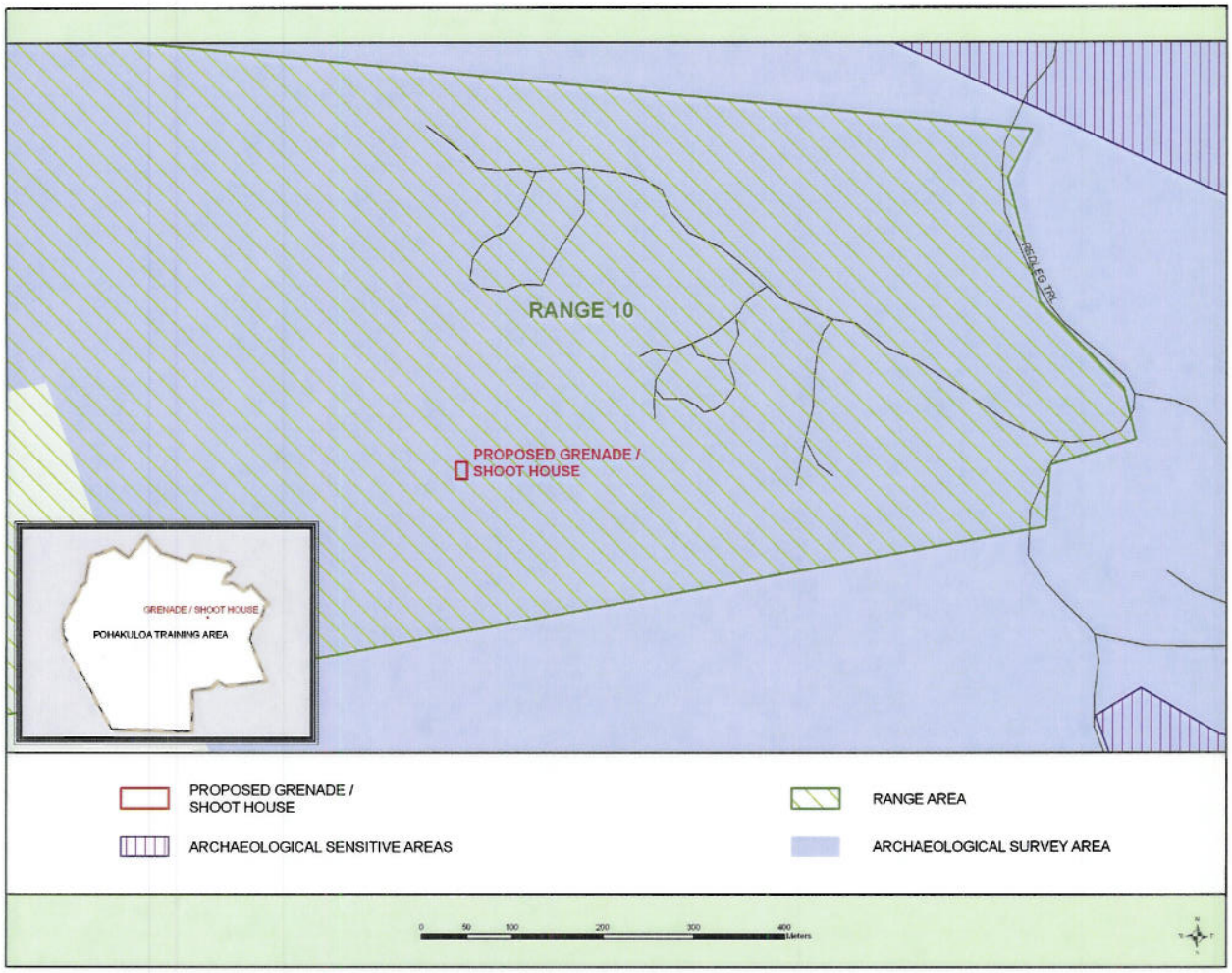

Figure 10. Map Grenade/Shoot House location relative to archaeological survey, sites and sensitive areas.

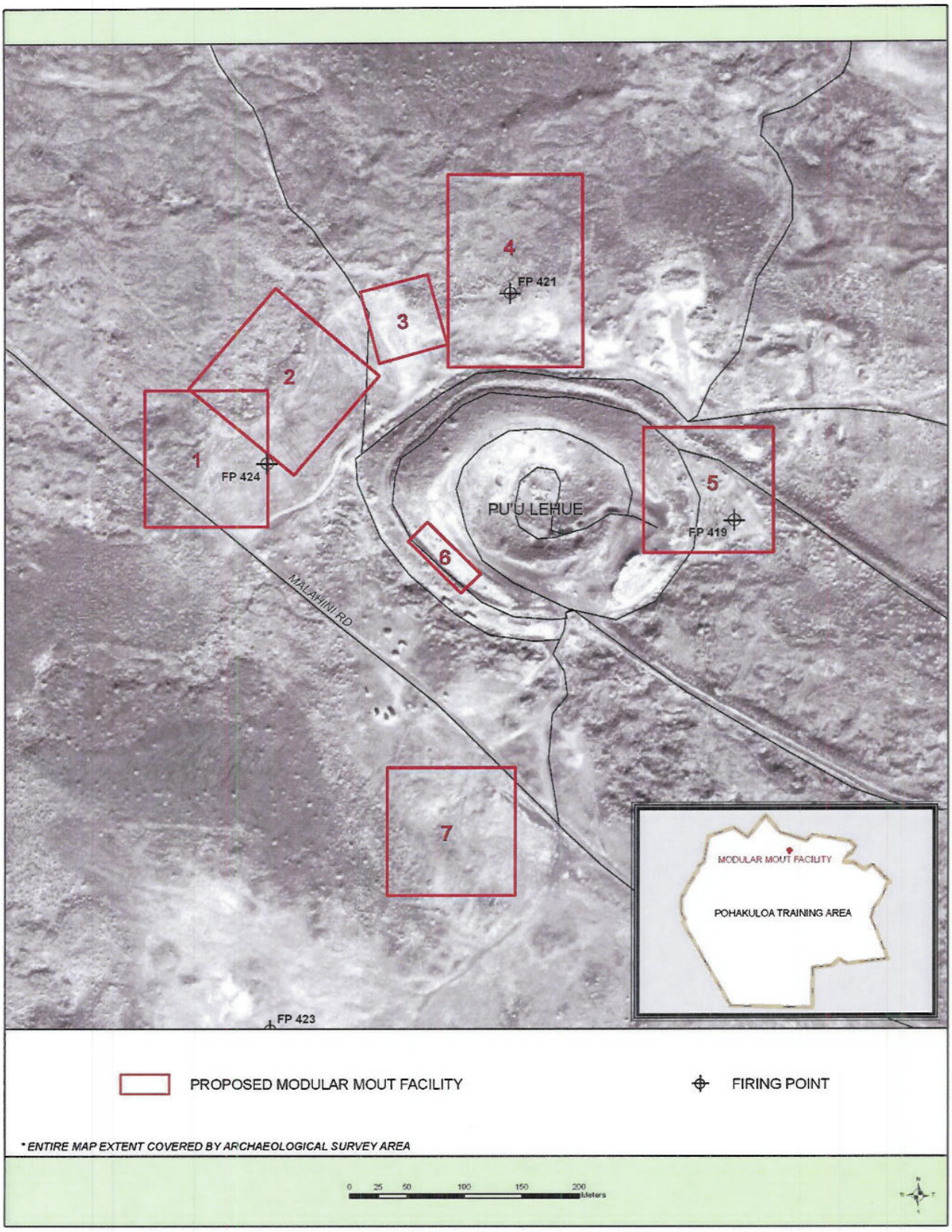

Figure 11. Aerial photo map of the proposed Modular MOUT facility

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ENCLOSURE 3

INADVERTENT DISCOVERY PLAN

1. Any employee (or contractor in the employ) of the Installation who knows or has reason to know that human remains or cultural items have been inadvertently discovered on land owned or controlled by the Installation, shall provide immediate telephone notification of the discovery, with written back-up to the Garrison Commander and the Installation Cultural Resources Manager.

2. The employee or contractor shall also stop any activity in the area of the discovery and make a reasonable effort to protect the human remains and cultural items.

3. Once contacted regarding an inadvertent discovery, the Installation will make an in situ examination of the condition, antiquity and cultural affiliation of the human remains and cultural items based upon applicable professional standards to determine whether the remains and cultural items are Native Hawaiian.

4. If the examination determines that the human remains or cultural items are Native Hawaiian, the Installation shall notify the State Historic Preservation Division, OHA and the appropriate Burial Council telephonically, via e-mail, or with written correspondence within 48 hours.

5. If the human remains and cultural items cannot be left in situ, their excavation and removal shall be undertaken by professional archaeologists employed by the Installation within 15 working days from the initial contact between the Installation and the Burial Council.

6. Prior to disposition of the human remains and cultural items, the Installation shall publish a general notice of the proposed disposition in a newspaper of general circulation in the area in which the remains were recovered. The notice shall provide information as to the nature and cultural affiliation of the remains and cultural items and shall solicit further claims of ownership. The notice shall be published at least twice, at one-week intervals, and transfer shall not takes place until 30 days after the second notice to allow for any additional claimants to come forward.

7. If re-internment is on land owned or controlled by the Installation, the location of the re-internment shall only be reported to the claimant, the Garrison Commander, and the Cultural Resources Manager for the Installation.

APPENDIX C

BOTANICAL SURVEY REPORT

Pōhakuloa Training Area

Botanical Surveys in Support of the Environmental Assessment for the

Development and Use of Military Training Facilities

on Pōhakuloa Training Area, Hawai‘i

By Lena Schnell, PTA Biologist

Introduction

Botanical surveys were conducted at proposed project sites between 10 March and 21 March 2008. Three Forward Operating Bases (FOBs), several Military Operations on Urban Terrain (MOUTs), one Grenade/Shoot House and a Convoy Live Fire (CLF) course were surveyed.

The FOBs, MOUT sites and the grenade/shoot house were located in areas that were previously disturbed and had little potential for rare plants. Each area was surveyed on foot with a maximum of 20 meters between surveyors.

The CLF course is a larger construction project that traverses areas that have a high potential for rare plants. The existing road in the CLF course is to be widened and several new service roads and targets objectives installed. The entire length of road and each service road and target objective was buffered by 20 meters and surveyed on foot by two people 10 meters apart.

Findings

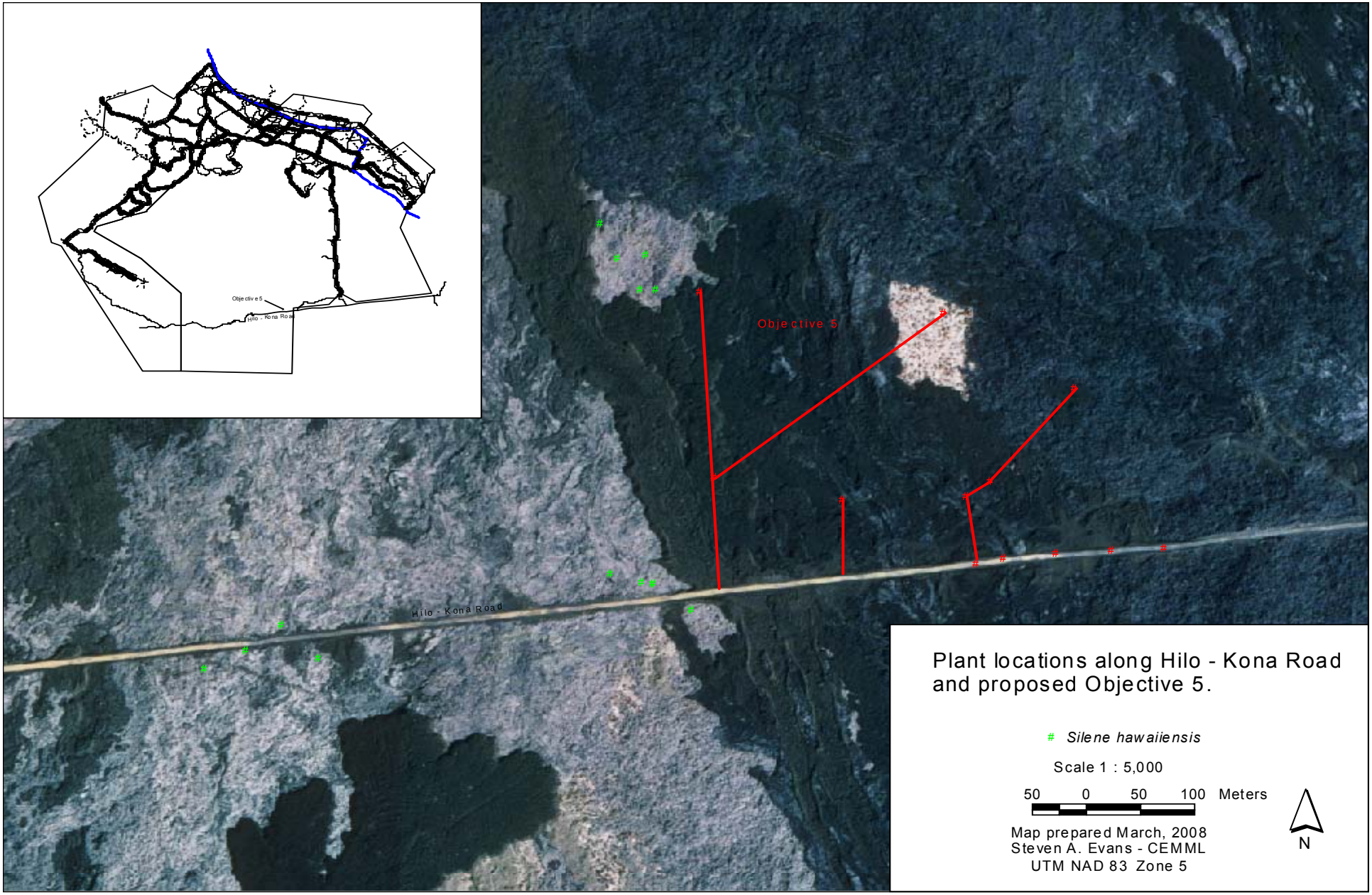
No rare plants were found at FOBs 429, 438 and Outlaw, the MOUT sites or at the grenade/shoot house ..

Approximately 86 *Silene hawaiiensis* were found primarily along road-side within the impact area (see attached map). Individual plants were not marked, but flagging was left in the middle of plant clusters. Therefore the marking is not adequate to ensure all plants would be avoided during road widening activities.

Objectives 1,2,4,6 were located on ‘a‘ā, which is not *S. hawaiiensis* habitat and were not surveyed. Objective 3 was moved by Steve Lai to old broken pāhoehoe, which is also not conducive to *S. hawaiiensis* and no plants were found at this objective. Objective 5 is located just outside a pāhoehoe kīpuka. *S. hawaiiensis* was found within the kīpuka approximately 42 meters from the proposed target installation. Steve Lai proposed moving Objective 5 to the east to leave a larger buffer between the plants and the target installation.

Recommendations

- Ensure that Objective 5 is relocated to provide a larger buffer between the plants and the targets.
- Mark each *S. hawaiiensis* along the road-side prior to road widening to avoid the plants. Have a biologist on site when this section of road is widened to avoid impacts to the plants.



Plant locations along Hilo - Kona Road and proposed Objective 5.

\# *Silene hawaiiensis*

Scale 1 : 5,000

50 0 50 100 Meters

N

Map prepared March, 2008
Steven A. Evans - CEMML
UTM NAD 83 Zone 5