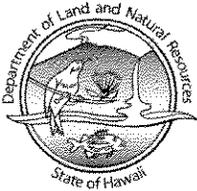
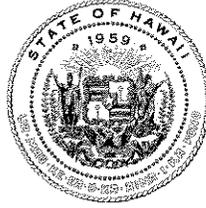


LINDA LINGLE
GOVERNOR OF HAWAII



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FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

REF:OCCL:TM

CDUA HA-3250/CC HA 06-01

Acceptance Date: August 24, 2005
Exp. Date: February 15, 2007

NOV 27 2006

MEMORANDUM

TO: Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control

FROM: Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands

SUBJECT: Final Environmental Assessment for Conservation District Use Application (CDUA)
HA-3250 for Hand Quarrying of Volcanic Ash Located at Pu'u Nene, Humuula,
North Hilo, island of Hawaii, portion of TMK: (3) 3-8-001:001

The Department has reviewed the Final Environmental Assessment (FEA) dated November 2006 for the subject project. The Draft Environmental Assessment was published in OEQC's September 8, 2005 issue of the Environmental Notice for the subject project. We have determined that this project will not have significant environmental effects and therefore we are issuing a Finding of No Significant Impact (FONSI). Be advised that this finding does not constitute approval of the proposal.

We have enclosed four copies of the FEA for the project. Please publish this notice in OEQC's upcoming December 8, 2006 Environmental Notice. The OEQC Bulletin Publication Form is attached. Please contact Tiger Mills of our Office of Conservation and Coastal Lands staff at 587-0382 if you have any questions on this matter.

Attachments

Samuel J. Lemmo
REC'D OF ENVIRONMENTAL QUALITY CONTROL
NOV 28 AM 10
RECEIVED

2006-12-08 - HA - FEA HAND-QUARRYING OF VOLCANIC ASH AT
PUU NENE

DEC - 8 2006

**FINAL ENVIRONMENTAL ASSESSMENT
HAND-QUARRYING OF VOLCANIC ASH
AT PU'U NENE**

TMK (3rd): 3-8-001:001 (por.)

November 2006

Prepared for:

Geohazards Consultants International, Inc.
P. O. Box 479
Volcano, Hawai'i 96785

and

Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawai'i 96801

Prepared by:

Geometrician Associates LLC
P.O. Box 396
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HONOLULU
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE OF HAWAII

2006 NOV 24 A 10:41

REC'D
QUALITY CONTROL

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FINAL ENVIRONMENTAL ASSESSMENT
HAND-QUARRYING OF VOLCANIC ASH AT PU'U NENE

TMK (3rd) 3-8-001:001 (por.)
Pu'u Nene, North Hilo, Island of Hawai'i, State of Hawai'i

APPLICANT:

Geohazards Consultants International, Inc.
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APPROVING AGENCY:

Department of Land and Natural Resources
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CONSULTANT:

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CLASS OF ACTION:

Use of State Land
Conservation District Use

This document is prepared pursuant to:

The Hawai'i Environmental Protection Act,
Chapter 343, Hawai'i Revised Statutes (HRS), and
Title 11, Chapter 200, Hawai'i Department of Health Administrative Rules (HAR).

TABLE OF CONTENTS

SUMMARY	2
PART 1: PROJECT DESCRIPTION, PURPOSE AND NEED AND E.A. PROCESS	3
1.1 Project Background and Location	3
1.2 Project Description	3
1.3 Summary of Regulatory Requirements	4
1.4 Public Involvement and Agency Coordination	4
1.5 Property Ownership	5
PART 2: ALTERNATIVES.....	5
2.1 No Action	5
2.2 Alternative Locations and Strategies	5
PART 3: ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION.....	6
3.1 Physical Environment	6
3.1.1 Geology, Soils and Geologic Hazards.....	6
3.1.2 Drainage, Water Features and Water Quality	7
3.1.3 Flora, Fauna, and Ecosystems	7
3.1.4 Air Quality, Noise and Scenic Resources	9
3.1.5 Hazardous Substances, Toxic Waste and Hazardous Conditions	9
3.2 Socioeconomic and Cultural	9
3.2.1 Socioeconomic Characteristics	9
3.2.2 Cultural Setting	10
3.2.3 Archaeology and Historic Sites.....	12
3.3 Infrastructure	12
3.3.1 Utilities	12
3.3.2 Roadways.....	12
3.4 Secondary and Cumulative Impacts.....	13
3.5 Required Permits and Approvals.....	13
3.6 Consistency With Government Plans and Policies	13
3.6.1 Hawai'i State Plan.....	13
3.6.2 Hawai'i County General Plan and Zoning	13
3.6.3 Hawai'i State Land Use Law	14
PART 4: DETERMINATION	17
PART 5: FINDINGS AND REASONS	17
REFERENCES	19
 LIST OF TABLES	
TABLE 1 Project Site Plant Species List	9
 LIST OF APPENDICES	
APPENDIX 1 Figures	
1. Project Area Map	
2. Project Site Air Photo	
3. Project Site TMK Map	
APPENDIX 2 Archaeological Report	
APPENDIX 3 Kumu Pono Associates: Memorandum Report: Pu'u and Cultural Landscape of the 'Ōma'okoili-'Ōma'okanihae Hills of Humu'ula, Hilo District, Island of Hawai'i (TMK 3-8-01: por. 01)	
APPENDIX 4 Pre-Consultation Comments	
APPENDIX 5 Comments to Draft EA and Responses	

**SUMMARY OF THE PROPOSED ACTION,
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

The project site is at Pu'u Nene adjacent to the Saddle Road in Humu'ula Saddle between Mauna Kea and Mauna Loa. The hill has a long history of quarrying. The project will involve temporary removal of no more than 3,520 square yards of surface soil overburden about one foot thick, and excavation of the underlying unique ash to a depth of two to three feet below the original ground surface. The material will be hand-excavated, dried, and then passed through a series of dry stainless steel sieves from 1 cm to 1 mm in mesh size on vibrating tables - no water will be used. The final desired product will consist of up to 125 tons of this refined and purified ash, which will be shipped to Wisconsin for use in scientific experiments and educational programs. The excavated area will then be backfilled with the removed topsoil ~~along with the fraction of the coarser-grained ash material that is screened out.~~ The surface will then be allowed to revegetate naturally with the plants presently found at the site. Although small loaders and pick-up trucks will be used on the existing road below the cinder cone, no heavy equipment will be used on the slopes of Pu'u Nene, and all excavation work will be done by hand. The work area where the material will be dried, sieved, and prepared for transport has been severely disturbed by previous quarrying activities. The project will employ up to a dozen laborers and student interns, under the supervision of a geologic technician.

The proposed quarry area on Pu'u Nene is dominated by alien vegetation, has no archaeological or cultural sites, and has already been extensively disturbed by nearby quarrying. No water sources or wetlands exist in the project area and there will be no impacts to flood areas or drainage. Traffic impacts will be negligible, due to the small scale of the project and the light volume of traffic on nearby Saddle Road. The site is barely visible from any public viewpoint and impacts to scenery will be negligible during hand quarrying; after revegetation the project site will appear almost identical to before.

**PART 1: PROJECT DESCRIPTION, PURPOSE AND NEED
AND ENVIRONMENTAL ASSESSMENT PROCESS**

1.1 Project Background and Location

Scientists and engineers studying Mars require materials that can be used as simulants for the surface of that planet for experiments on problems such as vehicular rover performance, food production, and equipment maintenance. About a decade ago, NASA scientists studying satellite imagery found that the Saddle region of the Big Island had unique altered ash deposits, called palagonitized tephra, which very closely resemble loose material on Mars. This deeply-weathered volcanic ash is found as a narrow layer beneath the surface. Dr. John P. ("Jack") Lockwood of Geohazards Consultants International, Inc., of Volcano, was contacted in 1996 to see if small quantities of this ash could be extracted and processed for use in NASA experiments. Because of its history of extensive quarrying disturbance and its location adjacent to the Saddle Road, Pu'u Nene was chosen as a site for an initial trial (Figs. 1-3). This cinder cone hill is part of a State property identified as TMK (3rd) 3-8-1:001 (Fig. 3). The latitude and longitude of the project site is approximately 19° 41' 49" N. Lat., 155° 29' 49" W. Long. The 1997 effort, coordinated with the Department of Hawaiian Home Lands, successfully produced about 30 tons of sieved ash from a shallow pit 8 by 20 yards in extent. Scientists have found the material quite suitable for their investigations over the last decade.

Following up on this initial extraction, ORBITEC Corporation, of Madison, Wisconsin, contacted Dr Lockwood in 2004 to inquire about obtaining more palagonitized tephra (henceforth called "ash"). The ash would be sold to various agencies, including NASA, and also schools and private firms conducting experiments or teaching about Mars. After reviewing various potential sources, Dr. Lockwood determined that Pu'u Nene was still the most suitable source for the operation. He then discussed the project with officials from the Department of Land and Natural Resources (DLNR), the agency that had been since determined to have jurisdiction over the site, and began the process of obtaining a Conservation District Use Permit for the activity.

Hawai'i is uniquely suited to supply this material, which is important to advancing our national commitment to space exploration and fostering our State's involvement in scientific education and research.

1.2 Project Description

The currently proposed project is to extract up to 125 tons of volcanic ash from Pu'u Nene by methods similar to those used in 1997. The project will involve hand-quarrying by shovel within one or both of two rectangular areas – called "A" and "B" - on the slopes of Pu'u Nene (see Fig. 2). The first steps are to remove the surface soil overburden to a depth of about one foot, move it downslope by gravity in steel chutes, and temporarily stockpile it at the base of the slope. Then, workers will excavate the underlying unique ash to a depth of two to three feet below the original ground surface. This material will then be moved downslope in the chutes to the processing area, which will be located at the foot of the slope alongside the existing roadway that skirts the periphery of Pu'u Nene and allows access from the Saddle Road (SR200). The material

will be passed through a series of dry stainless steel sieves ranging from 1 cm to 1 mm in mesh size on vibrating tables powered by a portable generator. No water will be used in any part of this process. For ease of drying, some processing may occur offsite in a commercial or industrial area. The material will then be transported by ship and rail to ORIBTEC on the mainland.

Periodically during the extraction process, excavated areas will be backfilled with the removed topsoil ~~along with the fraction of the coarser-grained ash material that was screened out.~~ The surface will then be allowed to revegetate naturally with the plants presently found at the site. Although small loaders and pick-up trucks will be used on the existing road below the cinder cone, no heavy equipment will be used on the slopes of Pu'u Nene, and all excavation work will be done by hand. The project will employ up to a dozen local laborers and University of Hawai'i student interns, under the supervision of a geologic technician. The entire process is expected to involve intermittent operation and to last several years, depending on weather and ash demand – the applicant is requesting DLNR to allow five years of work.

The specific areas delineated as "A" and "B" have been selected because of their ability to produce the proper material, efficiency of processing, and lack of environmental sensitivity. Based on initial evaluations, it appears likely that Area "A", which encloses about 1,660 square yards, will provide at least 125 tons, the maximum capacity requested. Use of "Area B", which measures about 1,860 square yards, has been requested as a back-up for Area "A", in case there are any problems in obtaining source material from the preferred area.

1.3 Summary of Regulatory Requirements

This Environmental Assessment (EA) process is being conducted in accordance with Chapter 343 of the Hawai'i Revised Statutes (HRS), which require an EA when State land is used and/or for actions in the Conservation District." This law, along with its implementing regulations, Title 11, Chapter 200, of the Hawai'i Administrative Rules (HAR), is the basis for the environmental impact process in the State of Hawai'i. According to Chapter 343, an EA is prepared to determine impacts associated with an action, to develop mitigation measures for adverse impacts, and to determine whether any of the impacts are significant according to thirteen specific criteria. Part 4 of this document states the anticipated finding that no significant impacts are expected to occur; Part 5 lists each criterion and presents the preliminary findings for each made by the applicant. If, after considering comments to the Draft EA, the Department of Land and Natural Resources concludes that, as anticipated, no significant impacts would be expected to occur, then the Department will issue a Finding of No Significant Impact (FONSI), and the action will be permitted to occur. If the agency concludes that significant impacts are expected to occur as a result of the proposed action, then an Environmental Impact Statement (EIS) will be prepared.

1.4 Public Involvement and Agency Coordination

The following agencies and organizations were consulted in development of the environmental assessment.

Federal:

Geological Survey, Hawaiian Volcano Observatory
Natural Resources Conservation Service
Commandant, Pohakuloa Training Area

Fish and Wildlife Service
Army Corps of Engineers

State:

Chair, Department of Land and Natural Resources
Office of Hawaiian Affairs
Department of Land and Natural Resources, Historic Preservation Division

Hawaiian Homes Commission
Department of Health

County:

Civil Defense
Police Department
Planning Department

Fire Department
County Council

Private:

Sierra Club

Copies of communications received during preconsultation are contained in Appendix 4. About 20 people informed by a notice in the *Hawai'i Tribune-Herald* or through various e-mail lists attended a presentation on the project held at the Division of Forestry and Wildlife Offices in Hilo on April 6, 2005. Appendix 5 contains written comments on the Draft EA and the responses to these comments. In addition, as part of the Conservation District Use Process, a Contested Case Hearing was held on October 12, 2006. Transcripts from the hearing are not yet available. Various places in the EA have been modified to reflect input received in the comment letters and some of the main points made at the contested case hearing; additional or modified non-procedural text is denoted by double underlines, as in this paragraph.

1.5 Property Ownership

TMK 3-8-001:001 is State of Hawai'i property under the control of the Department of Land and Natural Resources. Several parties at the contested case hearing questioned whether the property was correctly identified and also disputed State ownership.

PART 2: ALTERNATIVES

2.1 No Action

Under the No Action Alternative, quarrying and sieving of the material would not be performed. ORBITEC and its research and educational clients would be obliged to seek a different and lesser quality site from which to extract this unique ash material. University of Hawai'i students and others would not benefit from the employment and educational opportunity.

2.2 Alternative Locations and Strategies

Scientists have made extensive worldwide searches for naturally-occurring analogs for Martian surface materials, and have concluded that weathered volcanic ash from the Island of Hawai'i are

uniquely suitable for Martian simulants. Samples of altered volcanic ash from Iceland, Alaska, Antarctica, Mexico, New Mexico and Hawai'i were collected and investigated by NASA in the 1970's (Allen et al 1981), but it was found that material from Pu'u Nene, an extensively-quarried cinder cone on Hawai'i Island matched Martian characteristics better than any other site tested (Evans and Adams 1979; Morris et al 1993, Allen et al 1998).

The material found on Pu'u Nene, a particular composition of "palagonite", may be unique in the world, but it is not unique on Hawai'i. Similar material is found on many of the pu'u on Mauna Kea volcano, three miles north of Pu'u Nene. This material was assumed not to be available for exploitation, however, because of important cultural and conservation constraints relative to activities at the summit of Mauna Kea.

NASA asked Dr. John Lockwood to explore alternative production sites on the Island of Hawai'i in 1996, and samples of similar-appearing "yellow ash" were collected from ash deposits found in quarries in the Hamakua and Ka'u Districts, as well as windblown ash elsewhere in the Saddle area, and then analyzed in NASA laboratories, but none of these matched Martian characteristics. The samples collected from Pu'u Nene were again determined to be near-identical to Martian surface material so far as spectral reflectance characteristics, and a decision was made to proceed with production and refinement of the ash there, from a narrow layer of unique composition found beneath a soil horizon.

Similar palagonite is likely present beneath soils on other nearby pu'u on State of Hawai'i lands in the Saddle area, but samples were not collected from these pu'u, as for the most part they are pristine, do not have road access, and have never been extensively quarried. Small pockets of palagonite were noted on Pu'u Huluhulu, about two miles east, but this pu'u has been extensively disfigured by major quarrying operations and no substantial uncontaminated palagonitic material remain. Furthermore, an important native forest remnant exists on the south side of Pu'u Huluhulu. This area has been completely enclosed to keep feral ungulates from causing further damage and should probably never be quarried again. Some pu'u with possibly similar palagonite deposits occur west of Pu'u Nene, but these are within the U.S. Army Pohakuloa Training Area, and would not be available for quarrying because of security, conservation, and safety (i.e., unexploded ordnance issues). Because of its long history of quarrying operations, and its location adjacent to existing roads, this particular area on the north slope of Pu'u Nene was chosen as the one site where additional hand-quarrying operations could be carried out without significant environmental impact. No other sites are known to exist in Hawai'i or elsewhere that are environmentally suitable for production of this unique material.

Due to the relatively low environmental sensitivity, accessibility, and previous production experience at this site, along with a strong preference for the proven characteristics of the material found there, alternative sites have not been explored.

PART 3: ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION MEASURES

Basic Geographic Setting

The project site occupies a small part of the western flank of Pu'u Nene, an extensively mined cinder cone in the Humu'ula Saddle between Mauna Kea and Mauna Loa, near the eastern boundary of the Pohakuloa Training Area (PTA). Saddle Road (SR200) skirts the southern periphery of the cinder cone, which is about 200 feet tall.

3.1 Physical Environment

3.1.1 Geology, Soils and Geologic Hazards

Environmental Setting

Geologically, Pu'u Nene is located on the Humu'ula Saddle, the area between Mauna Loa and Mauna Kea, very near the summit of the saddle. Pu'u Nene is a scoria (i.e., cinder) cone, a product of the Mauna Kea volcanics, dated from 14-65,000 years before the present. Most of the immediately surrounding surface is part of the 1843 Mauna Loa lava flow, with some older (65 to 14 kya) Mauna Kea lava flows skirting the northern periphery of the cone (Wolfe & Morris 1996).

The project site soil is classified by the National Resource Conservation Service (formerly Soil Conservation Service) as cinder land (rCL), a miscellaneous type composed of bedded cinders, pumice, and ash. Cinder land usually has little soil development and material there typically used for road surfacing. Cinder lands are not given an agricultural Capability Subclass, being of little agricultural use given their small degree of soil development (U.S. Soil Conservation Service 1973).

The entire Big Island is subject to geologic hazards, especially lava flows and earthquakes. The U.S. Geological Survey assesses volcanic hazard in this area as "2" on a scale of ascending risk 9 to 1 (Heliker 1990:23), although the volcanic hazard is much lower (zone 8), just a short distance away to the north, on the slopes of Mauna Kea. The high hazard risk is based on the fact Mauna Loa is presently an active volcano. Volcanic hazard zone 2 areas have had 15-25% of their land area covered by lava or ash flows since the year 1800, but Pu'u Nene rises above these flows.

In terms of seismic risk, the entire Island of Hawai'i is rated Zone 4 Seismic Probability Rating (*Uniform Building Code, 1997 Edition, Figure 16-2*). Zone 4 areas are at risk from major earthquake damage, especially to poorly designed or built structures. Mass wasting has occurred in some previously mined areas of Pu'u Nene, where artificially steepened slopes were created.

Impacts and Mitigation Measures

In general, geologic conditions impose no substantial constraints on the proposed action due to its short timescale, and the action is not imprudent to conduct. The project has

been sited in an area of the cone where slopes are gentle enough to avoid any mass wasting, and backfilling with soil and allowing the area to revegetate will promote stability.

3.1.2 Drainage, Water Features and Water Quality

Existing Environment

The area has no lakes, ponds, streams or other watercourses due to the semi-arid climate and the high porosity of the soils.

Impacts and Mitigation Measure

Because of the limited scale of the project and the environmental setting, the risks for flooding or impacts to water quality are negligible. No impacts to stream banks or stream waters will occur, as none are present.

3.1.3 Flora, Fauna and Ecosystems

Existing Environment

The natural vegetation on cinder cones in this part of the Humu'ula Saddle consists of a low-stature forest dominated by mamane (*Sophora chrysophylla*) and false sandalwood (*Myoporum sandwicense*), with a diverse understory of native shrubs, ferns and grasses (Gagne and Cuddihy 1990). Although some native forest persists in parts of Pu'u Nene, disturbance by feral ungulates has removed the forest from the project site, and the vegetation there is dominated by weed species, with a few remnant trees (see Fig. 2). A walk-through biological survey of the project site was performed in March 2005. Table 1 is a list of plant species detected.

No listed, candidate or proposed endangered plant species were found, and in the opinion of project biologist Patrick J. Hart, Ph.D., none would be expected to be found, on the project site. A party at the contested case hearing strongly disputed this opinion, and listed a number of threatened and endangered species found in the Saddle Road area, some of which can occupy soils and slopes similar to those found on this part of Pu'u Nene. However, as stated in testimony at the contested case hearing, the project biologist maintains that the history of grazing, cinder mining and long domination by weed communities makes it highly unlikely that such species would be found on the actual project site, and in terms of conservation value no botanical resources requiring special protection are present. However, two stands of native trees are present within excavation area "A" (see Fig. 2), a mamane (*Sophora chrysophylla*) and pilo (*Coprosma montana*). The trees here will be protected and will not be affected by the excavation.

**Table 1
Project Site Plant Species List***

Scientific name	Family	Common name	Status	Life form
<i>Anthoxanthum odoratum</i>	Poaceae	sweet vernal grass	A	grass
<i>Argemone glauca</i>	Papaveraceae	pua kala	E	herb
<i>Asplenium adiantum-nigrum</i>	Aspleniaceae	'iwa'iwa	I	fern
<i>Brassica nigra</i>	Brassicaceae	black mustard	A	shrub
<i>Coprosma montana</i>	Rubiaceae	pilo	E	tree
<i>Dactylis glomerata</i>	Poaceae	cocksfoot	A	grass
<i>Deschampsia nubigena</i>	Poaceae	hairgrass	E	grass
<i>Myoporum sandwicense</i>	Myoporaceae	naio	I	tree
<i>Oenothera affinis</i>	Onagraceae	primrose	A	herb
<i>Foeniculum vulgare</i>	Apicaceae	fennel	A	herb
<i>Plantago lanceolata</i>	Plantaginaceae	narrow-leafed plantain	A	herb
<i>Pseudognaphalium sandwicense</i>	Asteraceae	'ena'ena	E	herb
<i>Rhus integrifolia</i>	Anacardiaceae	lemonade berry	A	tree
<i>Rumex brownei</i>	Polygonaceae	slender dock	A	herb
<i>Senecio madagascariensis</i>	Asteraceae	fireweed	A	herb
<i>Sophora chrysophylla</i>	Fabaceae	mamane	E	tree
<i>Styphelia tameiameia</i>	Epicridaceae	pukiawe	I	shrub
<i>Trifolium arvense</i>	Fabaceae	rabbit foot clover	A	herb
<i>Verbascum thapsis</i>	Scrophulariaceae	mullein	A	shrub
<i>Vulpia myuros</i>	Poaceae	rat-tail fescue	A	grass

A = alien, E = endemic, I = indigenous, End = Federal and State listed Endangered Species

* A supplemental survey occasioned by a comment letter also identified the common native grass *Eragrostis sp.* within the affected area.

The endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*) probably forages in the area, as it does around most areas of the Big Island, but the scarcity of trees precludes any roosting habitat. The site is adjacent to (or perhaps within) federally-designated critical habitat for Palila (*Loxioides bailleui*), but Palila are rarely – if ever – seen in this vicinity. Other native forest birds are present near the project area in low numbers, but the weedy vegetation and scarcity of trees at the project site makes it poor habitat. A party at the contested case hearing reported seeing numerous endangered 'Akiapola'au (*Hemignathus munroi*) and several Palila on the site during his visits there. The project biologist believes that this is possible but highly unlikely. Systematic bird counts in the area by professional ornithologists have not recorded these species in many years, and the area is not suitable habitat for 'Akiapola'au. Hawaiian Hawks (*Buteo solitarius*), a listed endangered species, are often seen in the Humu'ula Saddle as well as all other forested parts of the Big Island, but no trees suitable for nesting are present in or near the project site. Endangered Hawaiian Petrels (*Pterodroma sandwichensis*) and threatened Newell's Shearwaters (*Puffinus auricularis newelli*) may also overfly the site on their way to colonies on the slopes of Hawai'i's high mountains, but no nesting habitat is present. Endangered Nene (*Branta sandwicensis*) also overfly the area, but despite the assertions of a contested case party, the area is not within a Nene sanctuary and offers poor Nene habitat.

Impacts and Mitigation Measures

Because of the sparseness of vegetation on the project site, and the absence of threatened or endangered plant species, no adverse impacts to botanical resources would occur as a result of the proposed project. Although a number of threatened or endangered birds (and one bat species) may overfly or forage in the general area, the hand-quarrying operation's effects would be limited to the project site itself, where habitat is poor, and the action would be unlikely to cause adverse impacts for any of these species.

3.1.4 Air Quality, Noise, and Scenic Resources

Environmental Setting

Air pollution in the Humu'ula Saddle is minimal, due to its remote location and lack of human activities, and is mainly derived from volcanic emissions of sulfur dioxide, which convert into particulate sulfate and produce a volcanic haze (vog) that occasionally is blown into the area. The persistent tradewinds keep the project area relatively free of vog for most of the year.

Noise on the project site is low and derived mainly from motor vehicles on Saddle Road (SR 200).

The area has no scenic vistas that are mentioned as being of particular scenic beauty in the Hawai'i County Revised General Plan.

Impacts and Mitigation Measures

The proposed action would not measurably affect air quality or noise levels. Quarrying and sieving will be performed manually, producing minimal dust emissions.

There will be no effect on viewplanes or scenic sites recognized in the Hawai'i County General Plan. While the project would be visible from the existing Saddle Road, because Pu'u Nene has been extensively quarried in the past no noticeable modification to the appearance of the cinder cone would exist after revegetation. The project site is not visible from the new (realigned) Saddle Road. A comment letter and subsequent testimony from one party at the contested case hearing indicated strong disagreement with the assessment of minimal visual impact. Although the applicant believes the scale of modification is extremely minor compared to the existing, unmitigated quarry scars, he acknowledges that scenic impacts are to some degree subjective.

3.1.5 Hazardous Substances, Toxic Waste and Hazardous Conditions

Based on onsite inspection and information on file, it appears that the project site contains no hazardous or toxic substances and exhibits no hazardous conditions. No permanent or temporary land use that would result in these conditions appears to have ever occurred on the project site. Other than vehicle and generator fuel, which will be properly stored and used, no hazardous or toxic material will be used during the activity.

3.2 Socioeconomic and Cultural

3.2.1 Socioeconomic Characteristics

Apart from the close proximity of Saddle Road, the area is quite remote, with very sparse population and essentially no nearby residents. The closest human habitation is found at the US Army's Pohakuloa Training Area, approximately 5 miles west of the project site.

Impacts

The project would have minimal socioeconomic impact to Hawai'i Island. Due to the sparse population of the Humu'ula Saddle, no nearby residents would be affected by the project. The project would have a small positive economic impact by providing educational and employment opportunities to local laborers and University of Hawai'i students. Positions may also be filled with the assistance of Alu Like, Inc., a private non-profit organization that provides employment and other services to Native Hawaiians.

3.2.2 Cultural Setting

Existing Environment

The cultural resources of the area have been assessed through consultation of a 2005 report by Kumu Pono Associates (KPA): *Memorandum Report: Pu'u and Cultural Landscape of the 'Ōma'okoili-'Ōma'okanihae Hills of Humu'ula, Hilo District, Island of Hawai'i (TMK 3-8-01: por. 01)* (Appendix 3). Derived from a larger study of cultural sites, history and practices in the Saddle Road area, the report includes regional information but focuses on cultural practices and beliefs in the specific affected area of the 'Ōma'okoili Hills around Pu'u Ne'ne

Pu'u Nene is located in the *ahupua'a* of Humu'ula, North Hilo District, which extends across a portion of Mauna Kea and to the coast to the northeast. Native Hawaiian testimonies, survey records, and cartographic resources reveal that this general area of *pu'u*, or cinder cone hills, are known as 'Ōma'okoili (lit. "resting in the saddle"). The 'Ōma'okoili Hills marked the boundary between the *ahupua'a* of Ka'ohe and Humu'ula. This name is now commonly restricted to a *pu'u* located approximately one mile north of Pu'u Nene. KPA found no source for the name of Pu'u Nene, and concluded that it was a modern appellation, perhaps given by L. "Bill" Bryan, who served as manager of the Civilian Conservation Corps and as Territorial Forester on the Island of Hawai'i between the 1930s to the 1960s.

The semi-arid and remote Humu'ula Saddle, located at an elevation of over 6,500 feet and inundated in many areas by recent lava flows, has sparse vegetation and no human habitation. In pre-contact times it contained a number of trails, or *ala hele*, that linked the east and west sides of the island and also accessed sites on Mauna Kea. An important destination was the quarries of Mauna Kea, or Keanakako'i, where adze heads (*ko'i*) and other tools were fashioned. Importantly, the very name of "Humu'ula" indicates the sometimes red stone quarried to make adze heads. A number of adze quarries exist at high elevation on Mauna Kea (McCoy 1986, 1987). Other important sites were used for gathering plants and birds (for food or feathers), and for religious practices, including burials and the ceremonial deposition of a newborn's *piko*, or umbilical cords. KPA noted that travelers would traditionally make offerings at shrines along these ancient trails, referred to as Pohaku o Kane. KPA did not note the presence of either *ala hele* or shrines on or near Pu'u Nene, although evidence for these may have been inundated by the 1843 lava flow that covers much of the the area immediately around Pu'u Nene.

The Humu'ula Saddle figures in a number of legends, particularly concerning the chief 'Umi-a-liloa, who unified the Island in the 16th century. 'Umi-a-liloa, according to one account, loved his people so ardently that he chose to live in the center of the island, at Mauna Halepohaku (on Mauna Kea), and built *heiau* on both Mauna Kea and Mauna Loa, among other locations. As expressed in Hilo *kumu hula* and cultural specialist Pualani Kanakaole Kanahale's writings on Mauna Kea for the Saddle Road project (FHWA 1999), Mauna Kea is a *kupuna*, a grandparent or ancestor, and an *one hanau*, birthplace or home, to the Native Hawaiian. Wakea and Papa are the original parents of native Hawaiians, and they represent the marriage of sky and earth: Wakea, Sky Father and Papa, Earth Mother. Between the two all things were born. Mauna Kea is the *piko* (center of a beginning or ending) of the island. This *piko* is the initial provider of the land mass of the Island of Hawai'i. Hawai'i was also the *hiapo*, or first island child, of Papa and Wakea. The *kalo* (taro, a staple food) was Wakea and Papa's first food child and regarded as an elder brother who fed all indigenous natives, or *kanaka maoli* from the beginning of time till today. The responsibilities and resources of Hawai'i and Wakea are needed for the growth and well-being of the island and its living creatures.

In a compilation of oral history interviews performed by Kumu Pono Associates (KPA 1999) concerning traditional use of Mauna Kea, a number of interviewees related direct knowledge of their elders traveling to Mauna Kea for religious practice. These include commentary that describes Mauna Kea as the first born, or the oldest mountain of the Hawaiian chain, as well as being the center of Hawaiian spirituality. Mauna Kea was also mentioned as being home to other deities. Among these is Poli'ahu, for which a summit-area *pu'u* is named, described by Beckwith as being goddess of the snow-covered mountain, who forms a polarity with the fiery nature of her rival Pele.

KPA related a handful of native accounts of people born in the *ahupua'a* of Humu'ula, but these accounts do not refer to any unique activities that occurred in the area, and are mostly concerned with the boundaries of the area, having been recorded for that purpose. A number of accounts by non-native Hawaiians describe activities in the area in the 1800s, including sandalwood forestry and the hunting of wild ungulates that had become overpopulated. Additionally, KPA did not identify present-day traditional uses of the project area or immediate project site nor did they identify contemporary informants that could relate such information.

Impacts and Mitigation Measures

As part of the current study an effort was made to obtain information about any potential traditional cultural properties and associated practices that might be present, or have taken place, in the project area. None have been identified. The Humu'ula area is known to be rich in archaeological sites and legendary associations that relate to Mauna Kea. The activities of the proposed project are restricted to Pu'u Nene, which is surrounded by the 1843 lava flow, in an area with sparse and predominantly alien vegetation and no valuable Hawaiian plants or geologic resources.

As no resources of a potential traditional cultural nature (i.e., landform, vegetation, etc.) appear to be present on or near the project site, and there is no evidence of any traditional gathering uses or other cultural practices, the proposed hand-quarrying and processing of

ash would not appear to impact any culturally valued resources or cultural practices. A party at the original hearing requesting a contested case claimed to harvest sandalwood tree seeds at the site; no sandalwood trees are in or near the proposed quarry, and no sandalwood trees, or indeed any other trees, would be affected in any way.

3.2.3 Archaeology and Historic Sites

Existing Environment

An archaeological study of the subject area was conducted by Rechtman Consulting, Inc., (see Appendix 2). After literature review of archaeological resources in adjacent areas, an archaeologist performed a 100% survey of the small area proposed for quarrying and processing of the ash. The study found no archaeological resources at the project site and concluded that the potential for such resources to exist there is extremely remote. A metal cart/trailer and a makeshift camp, dating probably from the time of original paving of the Saddle Road in the 1940s, are present just west of the processing area.

Impacts and Mitigation Measures

No impacts to historic properties at the project site are expected, since none are known to be present, or are likely to exist. Project activities will be restricted to the project site itself, and no indirect impacts to any other sites in the Humu'ula Saddle area would be expected; indeed, there were none during a similar activity in 1997. However, in the event that any are encountered in the course of the activity, work in the immediate area of the discovery should be halted and DLNR-SHPD contacted as outlined in Hawai'i Administrative Rules 13§13-275-12.

3.3 Infrastructure

3.3.1 Utilities

Existing Facilities and Services, Impacts and Mitigation Measures

There are no utilities in the area. The proposed action would not have any impact on existing utilities, since none are present.

3.3.2 Roadways

Existing Facilities

Saddle Road (SR 200) traverses the Humu'ula Saddle, and provides the only direct route between East and West Hawaii. This two-lane highway skirts the southern periphery of Pu'u Nene. A joint State-federal construction project is currently upgrading and realigning the Saddle Road to an area further north of Pu'u Nene (FHWA 1999). Access to the project site will be maintained via the old Saddle Road.

Impacts and Mitigation Measures

Due to the short timescale and small physical scale, the project would have a negligible effect on the Level of Service (LOS) on Saddle Road. The project would involve a small number of workers and one gravel truck for transportation of the material to Kawaihae Harbor. Because of the relatively light volume of traffic on Saddle Road, and the small number of vehicle trips required by the project, no traffic control plan is needed.

3.4 Secondary and Cumulative Impacts

The proposed project will not involve any secondary or cumulative impacts, such as population changes or effects on public facilities, because of the project's small timescale and scope. The project would provide some short-term employment that would be filled by laborers and students presently on the Island.

Cumulative impacts result when implementation of several projects that individually have limited impacts combine to produce more severe impacts or conflicts in mitigation measures. The adverse effects of the project – very minor and temporary disturbance to noise and visual quality during quarrying operations – are very limited in severity, nature and geographic scale. Although a portion of the Saddle Road is currently being realigned, the proposed action is negligible in scale compared to this large road project, which, in any case, is located over a mile to the north.

3.5 Required Permits and Approvals

The project would require a Conservation District Use Permit and an approval for disposition of State Land, both involving the Board of Land and Natural Resources.

3.6 Consistency With Government Plans and Policies

3.6.1 Hawai'i State Plan

Adopted in 1978 and last revised in 1991 (Hawai'i Revised Statutes, Chapter 226, as amended), the Plan establishes a set of themes, goals, objectives and policies that are meant to guide the State's long-run growth and development activities. The three themes that express the basic purpose of the *Hawai'i State Plan* are individual and family self-sufficiency, social and economic mobility and community or social well-being. The proposed project would promote these goals by advancing our national commitment to space exploration and fostering the State's involvement in scientific education and research and by providing educational and employment opportunities to students.

3.6.2 Hawai'i County General Plan and Zoning

The *General Plan* for the County of Hawai'i is a policy document expressing the broad goals and policies for the long-range development of the Island of Hawai'i. The plan has been amended several times, and the latest version was adopted by ordinance in 2005. The *General Plan* itself is organized into thirteen elements, with policies, objectives,

standards, and principles for each. There are also discussions of the specific applicability of each element to the nine judicial districts comprising the County of Hawai'i. Most relevant to the proposed project are the following Policies and Goals:

Economics, Policies:

- Support all levels of educational, employment and training opportunities and institutions

Economics, Goals:

- Strive for diversification of the economy by strengthening existing industries and attracting new endeavors.
- Strive for full employment.
- Promote and develop the island of Hawaii into a unique scientific and cultural model, where economic gains are in balance with social and physical amenities. Development should be reviewed on the basis of total impact on the residents of the County, not only in terms of immediate short run economic benefits.

Discussion: The proposed project satisfies relevant goals and policies for Hawai'i County.

The *Hawai'i County General Plan Land Use Pattern Allocation Guide (LUPAG)*. The LUPAG map component of the *General Plan* is a graphic representation of the Plan's goals, policies, and standards as well as of the physical relationship between land uses. It also establishes the basic urban and non-urban form for areas within the planned public and cultural facilities, public utilities and safety features, and transportation corridors. The project site is classified as CONSERVATION (GP designation) in the LUPAG. The proposed project is consistent with this designation.

Hawai'i County Zoning. The project site is in the Conservation District and is therefore does not have a county zoning designation. The proposed project is a permitted use within this designation given acceptance of Conservation District use application. The property is not situated within the County's Special Management Area (SMA).

3.6.3 Hawai'i State Land Use Law

All land in the State of Hawai'i is classified into one of four land use categories – Urban, Rural, Agricultural, or Conservation – by the State Land Use Commission, pursuant to Chapter 205, HRS. The property is in the State Land Use Conservation District, Resource subzone. Any proposed use must undergo an examination for its consistency with the goals and rules of this district and subzone. The applicant has prepared a Conservation District Use Application (CDUA), to which this EA is an appendix. As the project consists of manual quarrying and sieving of cinder cone material, the action should be considered a *Mining and Extraction Use*, an identified use in Section 13-5-25 (R-7, D-1), which covers mining and extraction of any material or natural resource.

The CDUA includes a detailed evaluation of the consistency of the project with the criteria of the Conservation District permit process. Briefly, the following summary of individual consistency criteria should be noted.

1. The proposed land use is consistent with the purpose of the Conservation District;

The purpose of the Conservation District is to conserve, protect and preserve the important natural resources of the State through appropriate management and use to promote their long-term sustainability and the public health, safety and welfare. The action is small in scope and is consistent with this purpose.

2. The proposed land use is consistent with the objectives of the subzone of the land on which the use will occur;

The proposed action is consistent with the objectives of the Resource subzone, which is to develop, with proper management, areas to ensure sustained use of the natural resources of those areas.

3. The proposed land use complies with provisions and guidelines contained in Chapter 205A, Hawaii Revised Statutes (HRS), entitled "Coastal Zone Management," where applicable;

The property is not within Special Management Area (SMA) and is not otherwise subject to the provision of the CZM regulatory process. The project is not inconsistent with the goals or objectives of the CZM program.

4. The proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community or region;

Due to the project's limited scope adverse impact will be negligible. The proposed project will have no adverse impacts to historic sites or to the scenic character of the area. No substantial adverse impact will occur to existing natural resources.

5. The proposed land use, including buildings, structures and facilities, shall be compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels;

No structures are planned as part of the proposed project, and the use is compatible with the surrounding environment.

6. The existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon, whichever is applicable;

The project area will be allowed to revegetate, and will approximate the present appearance of the area after completion of the project.

7. *Subdivision of land will not be utilized to increase the intensity of land uses in the Conservation District;*

The proposed action does not involve or depend upon subdivision.

8. *The proposed land use will not be materially detrimental to the public health, safety and welfare.*

The proposed action will not be detrimental to the public health, safety, and welfare in any way.

PART 4: DETERMINATION

Based on evaluation of the environmental setting and impacts, and in consideration of the comments on the Draft EA and testimony presented at the contested case hearing, the applicant believes that the proposed action will not have a significant effect upon the environment and thus expects that the Hawai'i State Department of Land and Natural Resources will issue a Finding of No Significant Impact (FONSI).

PART 5: FINDINGS AND REASONS

Chapter 11-200-12, Hawai'i Administrative Rules, outlines those factors agencies must consider when determining whether an action has significant effects:

1. *The proposed project will not involve an irrevocable commitment or loss or destruction of any natural or cultural resources.* No valuable natural or cultural resources would be committed or lost.
2. *The proposed project will not curtail the range of beneficial uses of the environment.* No restriction of beneficial uses would occur.
3. *The proposed project will not conflict with the State's long-term environmental policies.* The State's long-term environmental policies are set forth in Chapter 344, HRS. The broad goals of this policy are to conserve natural resources and enhance the quality of life. The project is very limited in scope and is thus consistent with all elements of the State's long-term environmental policies. The project will be of minor economic benefit to the State.
4. *The proposed project will not substantially affect the economic or social welfare of the community or State.* The project would not have any adverse effect on the economic or social welfare of the County or State, and would contribute to science and education.
5. *The proposed project does not substantially affect public health in any detrimental way.* The facility would not impact public health and safety.
6. *The proposed project will not involve substantial secondary impacts, such as population changes or effects on public facilities.* No secondary effects will result from the proposed action.
7. *The proposed project will not involve a substantial degradation of environmental quality.* The project is minor and environmentally benign, and would thus not contribute to environmental degradation.
8. *The proposed project will not substantially affect any rare, threatened or endangered species of flora or fauna or habitat.* The project site supports sparse and predominantly

alien vegetation. Although threatened or endangered birds (and a bat) may be present in the general area, habitat for such on the project site is poor. Impacts to rare, threatened or endangered species of flora or fauna will not occur.

9. *The proposed project is not one which is individually limited but cumulatively may have considerable effect upon the environment or involves a commitment for larger actions.* The project is not related to other activities in the region in such a way as to produce adverse cumulative effects or involve a commitment for larger actions.
10. *The proposed project will not detrimentally affect air or water quality or ambient noise levels.* No adverse effects on these resources would occur. The impact will not affect water quality as no water resources are present in the project area. Ambient noise impacts due to operations will be minor and temporary and will affect no nearby residents.
11. *The project does not affect nor would it likely to be damaged as a result of being located in environmentally sensitive area such as a flood plain, tsunami zone, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal area.* Although the project is located in an area with volcanic and seismic risk, the entire Island of Hawai'i shares this risk, and the project is not imprudent to conduct the action. No water resources exist in the project area and the project site is not within a floodplain.
12. *The project will not substantially affect scenic vistas and viewplanes identified in county or state plans or studies.* No scenic vistas and viewplanes will be adversely affected by the project.
13. *The project will not require substantial energy consumption.* The construction and operation of the facility would require minimal consumption of energy. No adverse effects would be expected.

For the reasons above, the proposed action is not expected to have any significant effect in the context of Chapter 343, Hawai'i Revised Statutes and section 11-200-12 of the State Administrative Rules.

REFERENCES

- Allen, C. C., Gooding, J. L., Jercinovic, Michael, and Keil, Klaus, 1981, Altered basaltic glass- A terrestrial analog to the soil of Mars: ICARUS, v. 45, pp. 347-369.
- Allen, C.C., Jager, K. M., Moris, R.V., Lindstrom, D. J., Lindstrom, M. M., and Lockwood, J. P., 1998, JSC MARS-1 – A Martian soil stimulant.
- Beckwith, M. 1970. *Hawaiian Mythology*. Honolulu: University of Hawai'i Press.
- Evans, D. L., and Adams, J. B., 1979, Comparison of Viking Lander multispectral images and laboratory reflectance spectra of terrestrial samples: Lunar Planetar Science Conference Proceedings, v. 10, pp. 1829-1834.
- Federal Highway Administration (FHWA). 1999. *Final Environmental Impact Statement, Saddle Road Improvements Project*. Denver.
- Gagne, W., and L. Cuddihy. 1990. "Vegetation," pp. 45-114 in W.L. Wagner, D.R. Herbst, and S.H. Sohmer, eds., *Manual of the Flowering Plants of Hawai'i*. 2 vols. Honolulu: University of Hawai'i Press.
- Hawai'i County Planning Department. 2005. *The General Plan, County of Hawai'i*. Hilo.
- Hawai'i County Research and Development Department. Var. years. *Hawai'i County Data Book*. Hilo.
- Heliker, C. 1990. *Volcanic and Seismic Hazards on the Island of Hawai'i*. Washington: U.S. GPO.
- Kumu Pono Associates (KPA). 1999. *Mauna Kea Science Reserve and Hale Pohaku Complex Development Plan Update: Oral History and Consultation Study and Archival Literature Research*, prepared for Group 70 International. Honolulu.
- McCoy, Patrick C., *Survey and Test Excavations of the Pu'u Kalepeamo Site, Mauna Kea Hawai'i*, November 1991 for The University of Hawaii at Manoa, Facilities Planning and Management Office. Honolulu.
- McCoy, P.C. 1986. *Archaeological Investigations in the Hopukani and Liloa Springs Area of the Mauna Kea Adze Quarry, Hawai'i*. Prep for U.S. Army Engineer Division, Pacific Ocean. Honolulu.
- Morris, R. V., Golden, D. C., Bell, J. F., Lauer, H. V., and Adams, J. B., 1993, Pigmenting agents in Martian soils- inferences from spectral, Mossbauer, and magnetic properties of nanophase and other iron oxides in Hawaiian palagonitic soil PN-9: Geochimica et Cosmochemica Acta, v. 57, pp. 4597-4609.
- U.S. Soil Conservation Service. 1973. *Soil Survey of Island of Hawaii, State of Hawaii*. Washington: U.S.D.A. Soil Conservation Service.
- University of Hawai'i at Hilo, Dept. of Geography. 1998. *Atlas of Hawai'i*. 3rd ed. Honolulu: University of Hawai'i Press.
- University of Hawai'i at Manoa, Dept. of Geography. 1983. *Atlas of Hawai'i*. 2nd ed. Honolulu: University of Hawai'i Press.
- Wolfe, E.W., and J. Morris. 1996. *Geologic Map of the Island of Hawai'i*. USGS Misc. Investigations Series Map i-2524-A. Washington, D.C.: U.S. Geological Survey.

ENVIRONMENTAL ASSESSMENT
HAND-QUARRYING OF VOLCANIC ASH AT PU'U
NENE

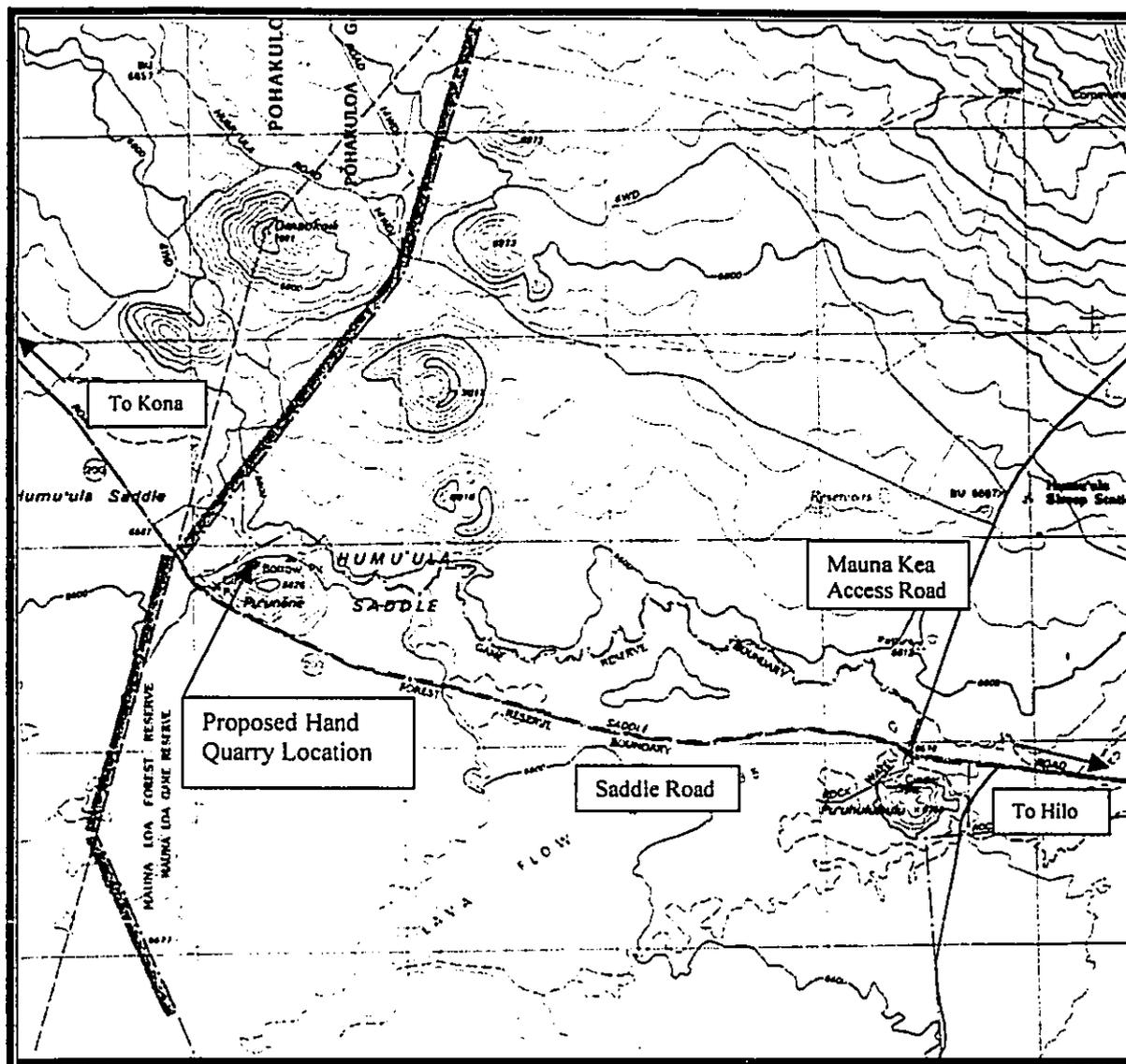
APPENDIX 1

FIGURES

Index to Figures

- 1. Project Area Map**
- 2. Project Site Air Photo**
- 3. Project Site TMK Map**

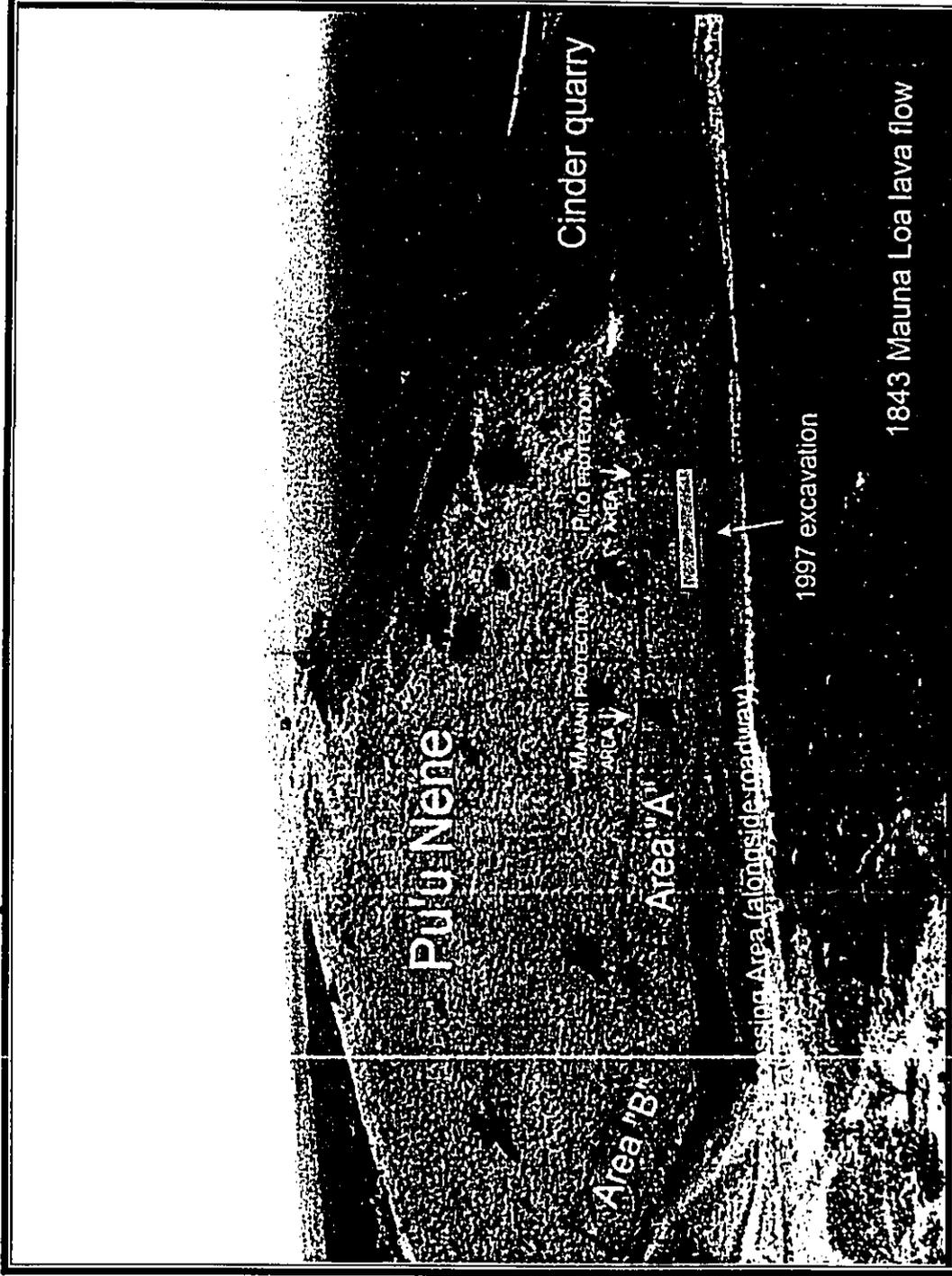
Figure 1
Project Area Map
(Saddle Road, Island of Hawai'i)



Scale: 1 inch \approx 3,000 feet

North \uparrow

Figure 2
Proposed Excavation Areas at Pu'u Nene



ENVIRONMENTAL ASSESSMENT
HAND-QUARRYING OF VOLCANIC ASH AT PU'U
NENE

APPENDIX 2

ARCHAEOLOGICAL REPORT

RECHTMAN CONSULTING, LLC

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ARCHAEOLOGICAL, CULTURAL, AND HISTORICAL STUDIES

June 8, 2005

RC-0319

MaryAnne Maigret
Assistant Hawai'i Island Archaeologist
DLNR-SHPD
74-383 Kealakehe Parkway
Kailua-Kona, HI 96740

Dear MaryAnne:

At the request of Ron Terry, Ph.D. of Geometric Associates, LLC, on behalf of his clients, John Lockwood, Ph.D. of Geohazards Consultants International Inc., Rechtman Consulting, LLC has prepared this request for determination of "no historic properties affected" in conjunction with an Environmental Assessment (EA) being prepared for a Conservation District Use Application (CDUA) for a proposed small quarry on a section of the cinder cone known as Pu'u Nēnē, located along Saddle Road in Humu'ula Ahupua'a, North Hilo, Island of Hawai'i (TMK:3-3-8-001: por. 001) (Figure 1). A portion of Pu'u Nēnē is an existing cinder quarry. The proposed use is to quarry a subsurface cinder material (found to a depth of roughly 26 inches below the surface) known as palagonite, which closely approximates a similar material found on the surface of Mars. This will be a very low-tech operation. There are two proposed quarry location and a processing location (Figure 2). The extracted palagonite material will be used to simulate Martian conditions for potential plant propagation and other experimental programs. Once the proposed quarry excavation on Pu'u Nēnē is completed, the affected area will be re-naturalized, minimizing any potential visual and aesthetic impacts to the *pu'u*.

Langlas (1999), Maly (1997), Tomonari-Tuggle (1996), and Williams and O'Hare (2001) provide comprehensive overviews of previous archaeological surveys and cultural and historical contexts for the uplands of the Mauna Kea region. Their efforts have synthesized the existing data available for this remote inland area, and the discussion below is abstracted from these and other available reports. These investigations have also helped correlate the observed archaeological record with previous summaries and regional syntheses for eastern Hawai'i and the uplands of Mauna Kea. Previous regional studies have provided possible site types likely found at these upper elevations; Precontact site types are typically associated with resource extraction activities including harvesting valued hardwoods such as *koa* for canoe construction in addition to *māmane*, *kōlea lau nui*, and sandalwood; and bird catcher activities centered on the capture of *mamo* (*Drepanis pacifica*), ducks (species unknown, but most likely the native *koloa*), and high elevation insectivores including the *'amakihi* (*Loxops virens*) and *'elepaio* (*Chasiempis sandwichensis*). Site distribution for these activities would be located in the lower forest elevations where "Bone and shell remains from food preparation and consumption might remain as midden in these sites" (Tomonari Tuggle 1996:67). Other Precontact activity centered on the multiple trail routes that coursed through the inland high elevations, and the temporary shelters (lava tubes, overhangs, platforms, enclosures, C-shapes) were likely situated near trail routes and near established or constructed water sources. Trails were used to access these remote resources and to cross the island, and during the early Historic Period native Hawaiians often served as guides, helping surveyors and bullock hunters to navigate the immense upland wildernesses. The upper elevations of Mauna Kea are also noted for interment. Burials are usually located near prominent cinder cone formations (*pu'u*), and may be marked by cairn (*ahu*) structures or platforms.

Historic Period activities in these upper elevations were limited primarily to early surveying efforts, wild bullock hunting, road construction activities, and eventually widespread cattle and sheep ranching activities. Site types generally associated with this period include survey marks (cairns and inscribed surveyor marks), bullock-hunting traps (examples of this activity have yet to be identified in the archaeological record), improved cobble cart paths and roadways, and numerous cabins and ranch complexes. The current project area is situated within the Montane zone and is described as having been a largely "uninhabited, and infrequently visited wilderness" (McEldowney 1979:31). The archaeological expectations for this zone have been summarized as follows:

The probability of sites . . . is higher along the possible trail routes and near ponds or other water sources. However, the high percentage of land covered with historic flows, and the apparently intermittent land-use pattern, result in an overall low probability of sites in this zone. (McEldowney 1979:31)

Kepā Maly (2005) completed a report on the cultural landscape of the current project area, and with respect to Pu'u Nēnē came to the following conclusion:

The name Pu'u Nēnē at this location, has not been found to date in any of the historical records viewed by Kumu Pono Associates, and appears to be one of fairly recent origin. The name perhaps dates from the period L. "Bill" Bryan, who served as manager of the Civilian Conservation Corps (CCC) and as Territorial Forester on the Island of Hawai'i between the 1930s to the 1960s. Native testimonies, survey records, and cartographic resources, identify the area by the name of "Omaokoili Hills," indicating that the several hills in this vicinity are known by the same name. Also, one *mo'olelo* (native tradition) records that 'Ōma'okoili's companion hill is named 'Ōma'okanihae. No further information on the latter place name has been located to date. (Maly 2005:5)

On May 20, 2005 Matthew R. Clark, B.A., under the supervision of Robert B. Rechtman, Ph.D. conducted a field inspection of the proposed project area, the boundaries of which were clearly evident. The bulk of the project area is low grasses and herb (Figure 3). The study area is accessed on an existing cinder road extending northeast from Saddle Road. This roadway breaches the Humu'ula sheep station wall (SIHP Site 7119) (Figure 4) and skirts an 1843 lava flow. A small portion of the study area had been sample quarried in 1997 (see Figure 2). There were no archaeological resources observed within the boundary of the study area and the likelihood of encountering subsurface resources is extremely remote given the location and nature of the surface and subsurface deposits. Potential historic resources were observed immediately outside of (on the opposite side of the cinder road from) the study area. A metal cart/trailer (Figure 5) and a makeshift windbreak/camp (Figure 6) are situated on the opposite side of the cinder road from the proposed processing area. These appear to date from a period of road paving associated with the construction of Saddle Road, perhaps in the 1940s. Again these potential resources are on state land outside of the area of impact.

Based on the negative findings of this study coupled with the conclusions of the Maly (2005) study, on behalf of our client we are requesting that DLNR-SHPD issue a written determination of "no historic properties affected" in accordance with HAR 13§13-284-5(b)1.

Should you require further information, or wish to visit the study area, please contact me directly.

Respectfully,


Bob Rechtman, Ph.D.
Principal Archaeologist

References Cited

- Langlas, C.
1999 The Saddle Road Corridor: An Archaeological Inventory Survey and Traditional Cultural Property Study for the Hawai'i Defense Access Road A-AD-6(1) and Saddle Road (SR 200) Project. PHRI Report 1939-043099. Submitted to Federal Highways Administration, Denver.
- Maly, K.
1997 Mauna Kea - *Kuahiwi Ku Ha'o I Ka Malie*: A Report on Archival and Historical Documentary Research, Ahupua'a of Humu'ulu, Ka'ohe, Districts of Hilo and Hāmākua, Island of Hawai'i. Ms. On file, State Historic Preservation Division, Department of Land and Natural Resources. Honolulu.
2005 Memorandum Report (KPA No. HiHumu106-041105): Pu'u and Cultural Landscape of the 'Ōma'okoili-'Ōma'okanihae Hills of Humu'ula, Hilo District, Island of Hawai'i (TMK 3-8-01: por. 01). Prepared for Geohazards Consultants International Inc.
- McEldowney, H.
1979 Archaeological and Historical Literature Search and Research Design: Lava Flow Control Study, Hilo, Hawai'i. Department of Anthropology, B.P., Bishop Museum Ms. 050879. Prepared for U.S. Army Engineer Division, Pacific Ocean, Honolulu, Hawai'i.
- Tomonari-Tuggle, M.
1996 Bird Catchers and Bullock Hunters in the Upland Mauna Kea Forest: A Cultural Resource Overview of the Hakalau Forest National Wildlife Refuge, Island of Hawai'i (Contract No. 10181-5-2193 DS). Prepared for U.S. Fish and Wildlife Service. International Archaeological Research Institute, Inc. Honolulu, Hawai'i.
- Williams, S. and C. O'Hare
2001 Final Cultural Resources Inventory, Evaluation, and Assessment for Proposed Improvements to Keanakolu Road, Hawaii: Federal Highway Administration Proposed Undertaking Number HI PLH-DRP HAFO 10 (1). Prepared for the Federal Highway Administration. Ogden Environmental and Energy Services. Honolulu, Hawaii.

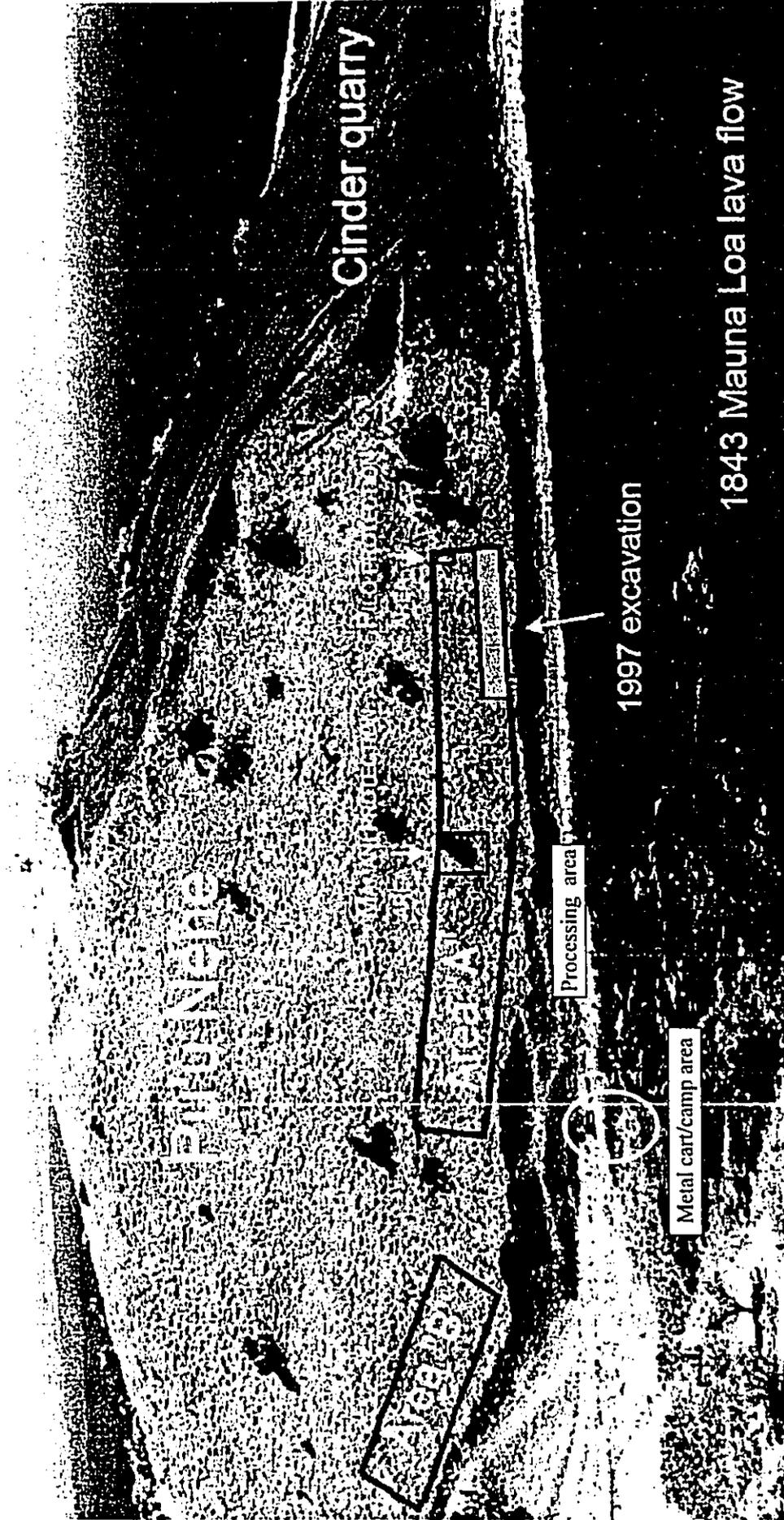


Figure 2. Aerial view of Pu'u Nene showing proposed activity areas.



Figure 3. View of the northwest side of Pu'u Nēnē showing typical vegetation.



Figure 4. Existing cinder road where it breaches SIHP Site 7119. Pu'u Nēnē in background.

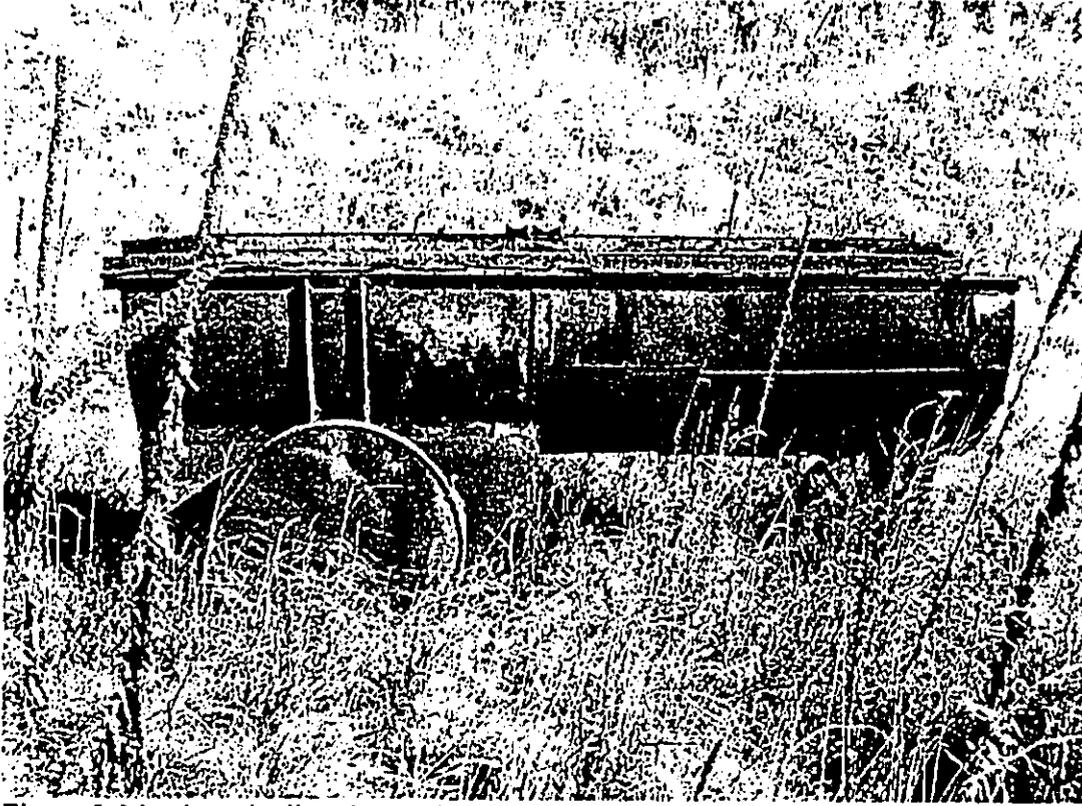


Figure 5. Metal cart/trailer observed outside of current study area.

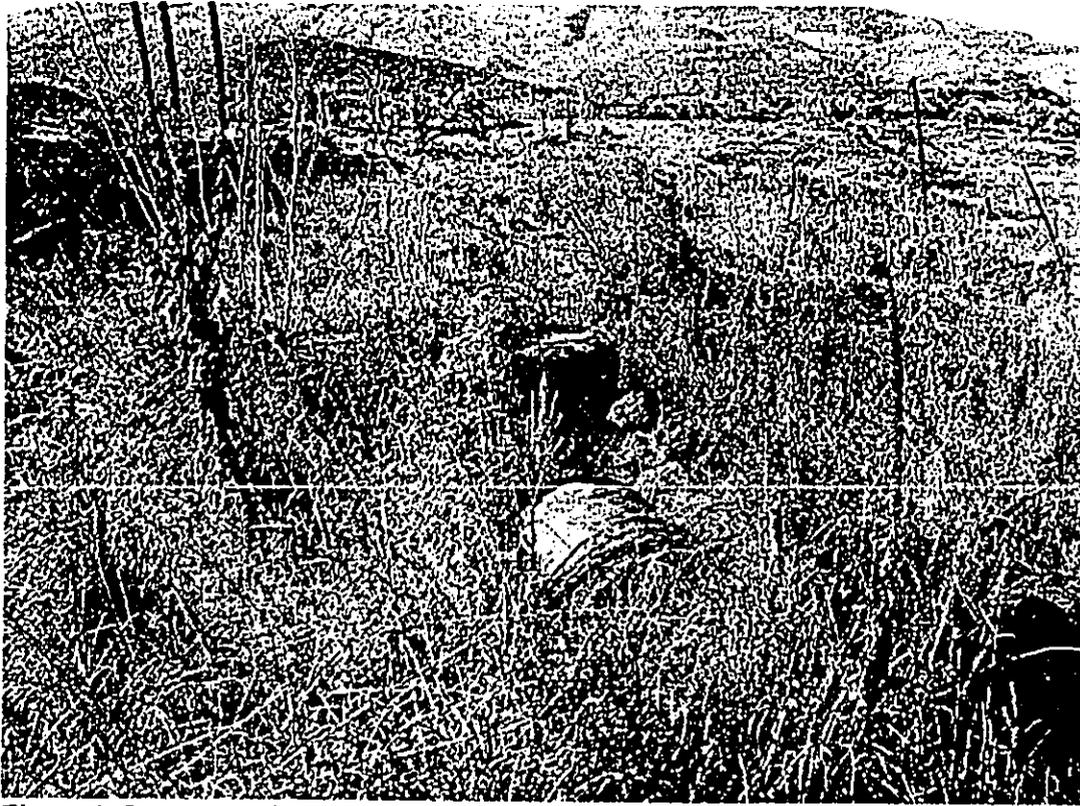


Figure 6. Camp area observed outside of current study area.

ENVIRONMENTAL ASSESSMENT
HAND-QUARRYING OF VOLCANIC ASH AT PU'U
NENE

APPENDIX 3

*Kumu Pono Associates: Memorandum Report: Pu'u and Cultural Landscape of
the 'Ōma'okoili-'Ōma'okanihae Hills of Humu'ula, Hilo District, Island of Hawai'i
(TMK 3-8-01: por. 01)*

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**Memorandum Report (KPA No. HiHumu106-041105):
Pu'u and Cultural Landscape of the 'Ōma'okoili-'Ōma'okanihae Hills
of Humu'ula, Hilo District, Island of Hawai'i (TMK 3-8-01: por. 01)**

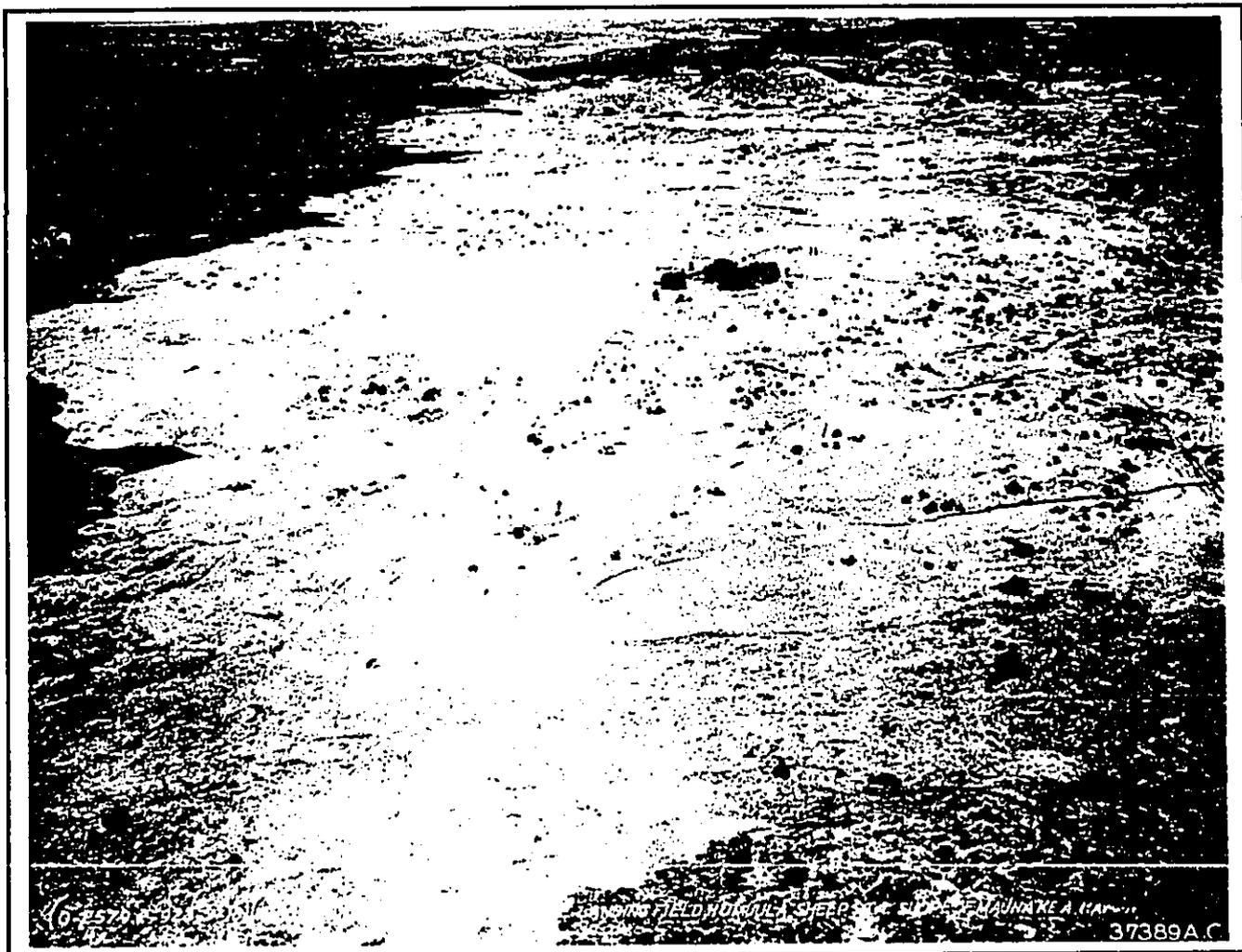


Figure 1. Humu'ula Sheep Station, Kalai'eha Section. Depicting the Upper section of the Hilo-Kalai'eha Road; 'Ōma'okoili Hills ("Puu Nene" top left pu'u, partially surrounded by the lava flow of 1843); and portion of the Kalai'eha Road to Ka'ohe Boundary. (U.S. Army Photo No. 37389 A.C.; 1941. National Archive and Records Administration).

Background

At the request of John P. Lockwood, Ph.D., Consulting Volcanologist, cultural resources specialist, Kepā Maly of *Kumu Pono Associates LLC*, prepared the following notes documenting aspects of the cultural landscape and historical use of lands in the vicinity of a hill commonly identified as "Pu'u Nene" (Pu'u Nēnē) (*Figure 2*). The notes have been excerpted from a series of detailed cultural studies and oral history interviews prepared by *Kumu Pono Associates* between 1997 to 2005, and reference historical and archival documents found in the collections of the Hawai'i State Archives, Survey Division, Land Management Division, and Bureau of Conveyances; the Bishop Museum Archives; the Hawaiian Historical Society; University of Hawai'i-Hilo Mo'okini Library; private family collections; the Parker Ranch & *Paniolo Preservation Society* (PPS) collections; the National Archives and Records Administration, and NOAA Central Library; the Houghton Library-Harvard; the USGS Central Library, Denver; the Hawaiian Historical Society; the Hawaiian Mission Children's Society Library; the Hilo Public Library; the Archives of the Institute for Astronomy; and in the collection of *Kumu Pono Associates LLC*. The studies have been multi-faceted, and include detailed narratives describing the lands of Humu'ula-Ka'ohe, Mauna Kea and Mauna Loa, and the *'āina mauna* (mountain lands), covering the periods of Hawaiian antiquity and traditions; to first-hand accounts of travel on and around Mauna Kea, dating from the early 1820s to the 1960s.

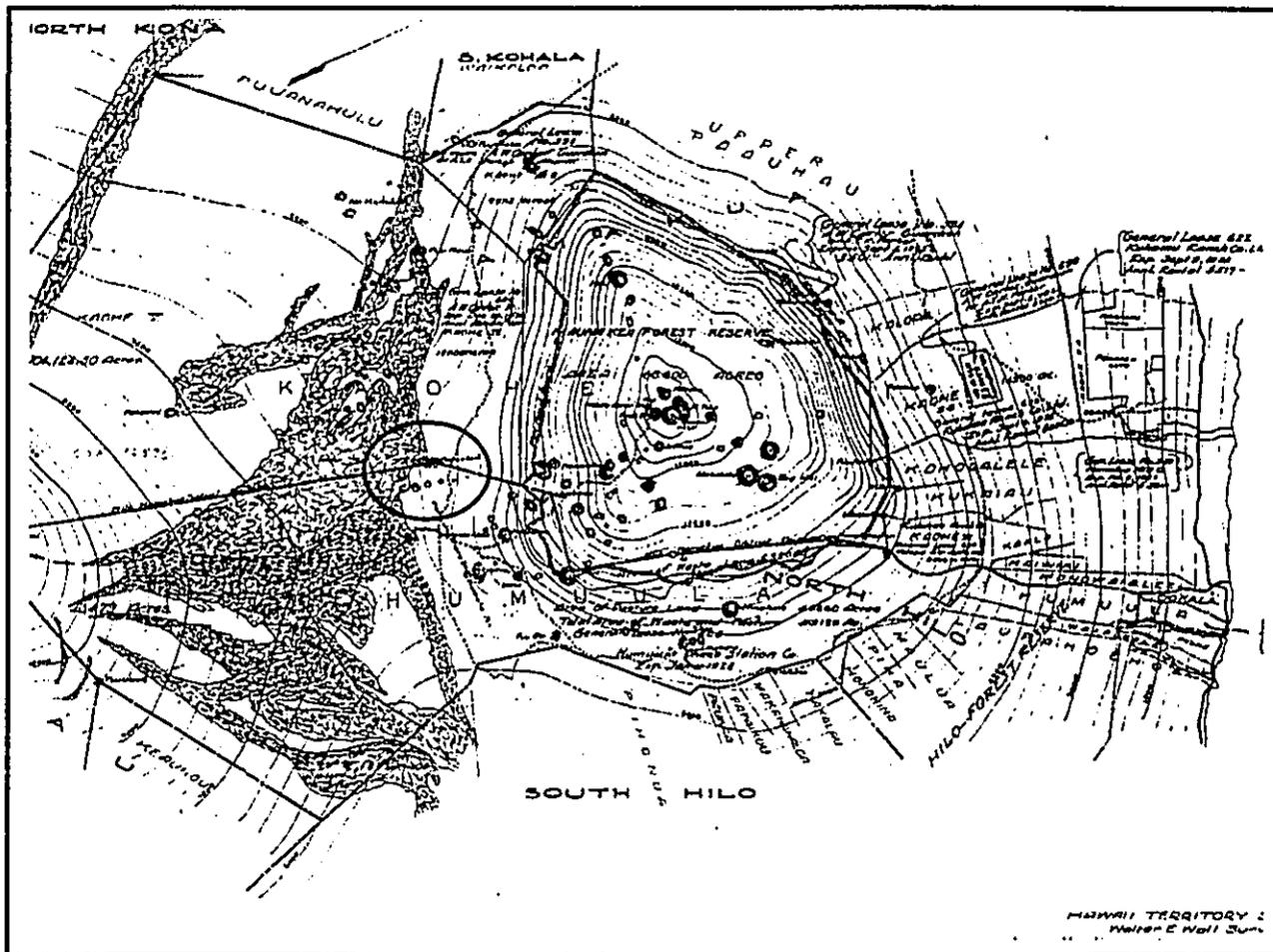


Figure 1. Hawaii Territorial Survey Plat No. 701, Depicting Mauna Kea, the lands of Humu'ula Ka'ohe, and Adjoining Ahupua'a. The 'Ōma'okoili Hills (Pu'u Nēnē) Outlined in Circle (Traced from Register Map No. 2060, Jan. 1915).

This cultural overview has been prepared in conjunction with a proposal by Dr. Lockwood, on behalf of Orbitech, to excavate a section of the cinder cone known as Pu'u Nēnē, and harvest a subsurface material known as palagonite, which closely resembles material found on the surface of Mars. The palagonite which is found to a depth of twenty-six (26) inches below the surface on Pu'u Nēnē, will be used to simulate surface conditions on Mars, in which experimental plant propagation programs and other experiments may be carried out. Once the proposed excavation on Pu'u Nēnē is completed, the affected area will be re-naturalized in order to minimize long-term visual and aesthetic impacts on the *pu'u* (cinder cone).

The Cultural Environment of the Humu'ula-Ka'ohe Mountain Lands

The myriad *pu'u* (cinder cones and hills) that dot the landscape of the Humu'ula-Ka'ohe mountain lands are significant facets of the natural and cultural landscape of Hawai'i. A review of native lore and historical documents (including cartographic resources), reveals that there are many named locations—many of them *pu'u*—on the landscape of the *'āina mauna*. These named localities reflect the broad relationship of natural landscape to the culture and practices of the Hawaiian people. The occurrence of place names extending from the shore line to the mountain peaks, is important in that it demonstrates the Hawaiian familiarity with the sites and features that make up the various elevations of the island. Coulter (1935) observed that Hawaiians had place names for all manner of feature, ranging from "outstanding cliffs," to what he described as "trivial land marks" (Coulter 1935:10). History tells us that named locations were significant in past times, and it has been observed that "Names would not have been given to [or remembered if they were] mere worthless pieces of topography" (Handy and Handy with Pukui, 1972:412).

In ancient times, named localities served a variety of functions, including but not limited to —

- 1) triangulation points such as *pu'u* marking routes of travel, and *ko'a* (land markers for fishing grounds and specific offshore fishing localities);
- 2) residences; areas of planting;
- 3) identifying water sources;
- 4) marking trails and trail-side resting places (*o'io'ina*), such as a rock shelter or tree shaded spot;
- 5) identifying *heiau* or other features of ceremonial importance;
- 6) may have been the source of a particular natural resource or any number of other features;
- 7) or recorded a particular event or practice having occurred sometime in history (e.g., use for burials, or making of *ko'i* – adzes).

The name Pu'u Nēnē at this location, has not been found to date in any of the historical records viewed by *Kumu Pono Associates*, and appears to be one of fairly recent origin. The name perhaps dates from the period L. "Bill" Bryan, who served as manager of the Civilian Conservation Corps (CCC) and as Territorial Forester on the Island of Hawai'i between the 1930s to the 1960s. Native testimonies, survey records, and cartographic resources, identify the area by the name of "Omaokoili Hills," indicating that the several hills in this vicinity are known by the same name. Also, one *mo'olelo* (native tradition) records that 'Ōma'okoili's companion hill is named 'Ōma'okanihae (see citations below). No further information on the latter place name has been located to date.

The 'Ōma'okoili Hills lie in the native land division (*ahupua'a*) of Humu'ula, near the traditional boundary between the Hilo and Hāmākua districts. The boundary between these two districts is marked by the *ahupua'a* of Ka'ohe, which bounds Humu'ula across Mauna Kea and Mauna Loa. The land of Humu'ula extends from sea level to the 9,000 foot elevation on Mauna Kea, and to above the 13,000 foot elevation on Mauna Loa, and was apparently named for a type of stone (Red jasper stone) that was used in making *ko'i* (adze). The place name of Ka'ohe, a land area extending from

sea level to the summits of Mauna Kea and Mauna Loa, may be literally translated as "The-bamboo" or may have been named for a type of *kalo* (taro) that once grew in the lowland region (cf. Pukui, et al. 1974).

Native Hawaiian traditions and historical accounts describe the lands of Humu'ula and Ka'ohe—those areas extending from shore to above the 6,000 foot elevation—as having once been covered with dense forests, and frequented by native practitioners. The islands were divided into a series of *wao* (regions), identified by particular resources, elevational zones, and characteristics. The region which was most often noted as the place where clouds rested upon the ground, was known as *wao akua* (region of the gods), so called as it was believed that the clouds concealed the presence of the gods. As a result, in ancient times, the *wao akua* was not one that people carelessly traveled through (cf. Malo, 1951). The 'Ōma'okoili Hills sit on the fringe of the *wao akua*—or in modern terms, the inversion layer, in this region of Hawai'i Island.

The mountain lands were known to contain a number of important resources including, but not limited to—stone quarried making *ko'i* (adze) and other native tools; birds such as the *'ua'u*, *nēnē*, *ō'ō*, and *mamo* which were eaten or whose feathers were collected for royal adornments; and various plant materials. An extensive network of *ala hele* (trails and by ways) also provided individuals with access to the larger *'āina mauna* for religious purposes; to locations where family members deposited the *piko* (umbilical cords of new-born children) in sacred and elevated areas; and with access to burial grounds. The trails were also used by those who were crossing from one region of the island to another. The narratives also record that these *ala hele* crossed plateau lands of the Humu'ula-Pōhakuloa-Ka'ohe region—and by the descriptions, in the vicinity of the 'Ōma'okoili Hills. In this mountainous region are found to the present-day, many caves and shelters that were used in ancient times. The *'āina mauna* were approached from Hilo, Hāmākua, Kohala, Kona, and Ka'ū, five of the major districts on the island. Only the district of Puna, which is cut off from the mountain lands, did not have a direct trail to the *'āina mauna*.

One early description of the practices of native Hawaiians in traveling the mountain lands was recorded in 1793-1794, by A. Menzies, who visited Hawai'i with Captain Vancouver. During the visit Menzies and crew members walked inland with native guides to botanize and take readings of the topography. While ascending Mauna Loa, Menzies observed that the Hawaiian kept "*Morai*" (*heiau* – ceremonial sites) along the trails at which they regularly stopped in prayer and with offerings (Menzies 1908:110). The following excerpts from Menzies describe this practice:

So bigoted are these people to their religion that here and there, on the sides of the path, they have little *Morais*, or spots consecrated to their Deity, which none of them ever pass without leaving something—let it be ever so trifling—to obtain his good will, and they were highly delighted, indeed, when we followed their example in throwing a nail or a few beads, or a piece of *tapa*, before their Deity, which the women were not allowed to pass without uncovering their breasts and shoulders. [Menzies 1908:110]

While the above narrative was recorded on a trip to Mauna Loa, such protocol was uniformly practiced throughout the islands, and is deeply rooted in the spiritual beliefs of the people. There remain to this day examples of small shrines, upright stones (*Pōhaku o Kāne*) and other features along trails across the mountain plateau, leading across the *'āina mauna*, and to the summits of Mauna Kea and Mauna Loa. It is uniformly recorded in oral history interviews that *pu'u* were among the important locational markers when traveling the *'āina mauna*. Indeed, today, many of the *pu'u* whose names have been retained, are so known because of their association with some traditional activity or historical land use.

In the case of the 'Ōma'okoili Hills, including Pu'u Nēnē, by the late 1800s, the area came to be known by two names, "Wether Paddock" or "Sheep Paddock I." These names were associated with operations of the Humu'ula Sheep Station Company, which around 1886, located its headquarters near Kalai'eha Pu'u (the facility now accessed by the Mauna Kea Road). Elder *kama'āina*, former ranch hands and employees of the Territorial Forestry Division, observed that the Wether Paddock,

was primarily used to hold wethers, and dry out their wool, as the cloud cover and rain in this section of Humu'ula was less than that around the sheep station headquarters. Historical documents from the Humu'ula Sheep Station, also record that the stone walls that extend from Pu'u Huluhulu, to Pu'u Nēnē, and along the Humu'ula-Ka'ohe boundary, towards the primary Pu'u 'Ōma'okoili, were built between 1890 to 1892, by Japanese stone workers employed by the sheep station.

The story of travel and access on the *'āina mauna* is an interesting one. We know from native traditions and historical accounts (written as early as the 1820s), that people traveled across the mountain plateau lands and up to Mauna Kea with great frequency. One early account dates back to the 1500s, in the time that 'Umi-a-Liloa fell into a disagreement with the chief of Hilo over a whale tooth (ivory) pendant. Traveling from Waipi'o, across Mauna Kea, 'Umi and his warriors passed into the Hilo District and camped in the uplands of Kaūmana. Native historian Samuel Kamakau (1870 & 1961) wrote that 'Umi-a-Liloa:

...conferred with his chiefs and his father's old war leaders. It was decided to make war on the chiefs of Hilo and to go without delay by way of *Mauna Kea*. From back of Ka'umana they were to descend to Hilo. *It was shorter to go by way of the mountain to the trail of Poli'ahu and Poli'ahu's spring at the top of Mauna Kea, and then down toward Hilo. It was an ancient trail used by those of Hamakua, Kohala, and Waimea to go to Hilo. They made ready to go with their fighting parties to Mauna Kea, descended back of Hilo, and encamped just above the stream of Wai-* [page 16] *anuenue without the knowledge of Hilo's people that war was coming from the upland. Hilo's chiefs were unprepared...* [Kamakau 1961:16]

Later in the time of 'Umi, we learn that the chief went on to secure all of the island of Hawai'i under his rule, and it was at that time that four *heiau* (temples)—'Ahu-a-'Umi, Pu'u Ke'eke'e, Mauna Halepōhaku, and Pōhaku o Hanalei—were built and consecrated on the mountain lands.

In 1853, an aged Hawaiian by the name of Kanuha, informed Jules Remy about the ascent of 'Umi to the position of king on the island of Hawai'i. In the account, Kanuha (in "*Na Kaa o Kekahi Elemakule o Hawaii*") described the history behind the construction of the famed *heiau* (temple) Ahu-a-'Umi, and the construction of three other *heiau* on the *'āina mauna*. In addition to 'Ahu-a-'Umi, these *heiau* included Pu'u Ke'eke'e (an area of a known *pu'u* in Ka'ohe, near Pu'u ka Pele), Mauna Halepōhaku (on Mauna Kea), and Pōhaku o Hanalei (on Mauna Loa). By description, and in some cases, by physical features on the ground, these *heiau* were situated in the lands of Humu'ula (perhaps two of the *heiau*), Ka'ohe, and Keauhou. Kanuha told Remy:

...He (Umi) also built a *heiau* (temple) below Pohaku Hanalei, it is called the *ahua o Hanalei* (altar of Hanalei); and on the side of Mauna Kea, by where one travels to Hilo, he built the third of his temples, at the place called Puukekee [also written Puu Keekee in historical texts]; and there at Mauna Halepohaku he built the fourth of his temples; there, it is said, Umi dwelt with his many people. It is said that Umi was a chief who dwelt upon the mountain, it was because of his love of his people, that he (Umi) returned and dwelt in the middle of the island [Ahu-a-Umi], that is where he dwelt with his beloved people. His commoners lived along the shores, and they brought food for them (in the uplands), from one side of the island to the other... [Ke Au Okoa; Mei 22, 1865; Maly, translator]

In 1875, Curtis J. Lyons, son of Reverend Lorenzo Lyons, of Waimea, one of the foremost surveyors of the Hawaiian Kingdom, authored a paper on "Hawaiian Land Matters" (Lyons 1875). In his discussion he provided readers a description of the boundaries between Humu'ula and Ka'ohe, and the practices of native tenants in taking birds from the mountain lands of Humu'ula and Ka'ohe:

The ordinary *ahupuaa* extends from half a mile to a mile into this [forest] belt. Then there are larger *ahupuaas* which are wider in the open country than others, and on entering the woods expand laterally so as to cut off all the smaller ones, and extend toward the mountain till they emerge to the open interior country; not however to converge to a point

at the tops of the respective mountains. Only a rare few reach those elevations, sweeping past the upper ends of all the others, and by virtue of some privilege in bird-catching, or some analogous right, taking the whole mountain to themselves... The whole main body of *Mauna Kea* belongs to one land from Hamakua, viz., *Kaohe*, to whose owners belonged the sole privilege of capturing the *ua'u*, a mountain-inhabiting but sea-fishing bird. High up on its eastern flank, however, stretched the already mentioned land of *Humu'ula*, whose upper limits coincide with those of the *mamane*, a valuable mountain *acasia*, and which starting from the shore near *Laupāhoehoe*, extends across the upper ends of all other Hilo lands to the crater of Mokuaweoweo... [Lyons 1875:111 (emphasis added)]

While no specific reference giving the name Pu'u Nēnē has yet been found in early native lore, we have found several brief references by native Hawaiians, and early historical account to the hills of 'Ōma'okoili. These references include those dating from the 1860s, in which native Hawaiian guides pointed out the 'Ōma'okoili hills as a locational reference to the boundary of Ka'ohe and Humu'ula, and one later, traditional account recorded in 1914. In a traditional account published in the Hawaiian language newspaper, *Ka Hoku o Hawaii*, native historians, J.W.H.I. Kihe and John Wise, informed readers that the hills, 'Ōma'okoili and 'Ōma'okanihae were named for beings who dwelt on the plains of Humu'ula (cf. "Kaa Hooniua Puuwai no Ka-Miki" in *Ka Hoku o Hawaii*, February 19, 1914; Maly, translator).

Historical Narratives of the Humu'ula-'Ōma'okoili Vicinity (1830-1914)

In between 1779 and 1805, cattle, goats, sheep, the European boar, dogs, cats and horses had been introduced to the Hawaiian landscape. As early as the 1820s, introduced cattle, sheep, goats, and wild dogs had made their way up to the mountain lands, and were becoming bothersome to those who traveled the *'āina mauna*. In 1834, Scottish naturalist, David Douglas was gored and killed by a wild bullock near Keahuaai on the boundary of Humu'ula and Laupāhoehoe. By 1850, the natural-cultural landscape of the *'āina mauna* was being significantly altered by the roving herds of wild bullocks, sheep and other ungulates—numbering in the tens of thousands—and ranching interests were being formalized in the region. By 1857, the Crown and Government mountain lands—including Humu'ula and Ka'ohe—were leased to Francis Spencer and the Waimea Grazing and Agricultural Company, which established ranching stations and operations around the mountain lands. As a result, the *'āina mauna* have been intensively ranched for more than 150 years.

By the early 1820s, foreign visitors, in the company of native guides, began making trips across the *'āina mauna* and to the summit of Mauna Kea. Based on their accounts, travel in the region through the middle 1800s basically followed the old trails, or cut across new areas—a result of dense forest growth, and new lava flows covering older routes.

As early as 1834, the Hawaiian Kingdom initiated its first efforts at improving access across the mountain lands, with a portion of the route passing between Kalai'eha and the Ka'ohe lands. In 1849, this program was again taken up, and efforts at improving ancient trails and identifying new routes, by which to improve travel between various locations and facilitate commerce were initiated. In 1869 the forerunner of the modern-day "Saddle Road" was surveyed between Hilo and Waimea (passing through the Pōhakuloa region). A portion of this route ran from the Kalai'eha Sheep Station headquarters, between the 'Ōma'okoili Hills and Mauna Kea, and to the vicinity of the present-day Mauna Kea State Park.

There follows below, selected historical letters and journal entries describing the 'Ōma'okoili Hills (Pu'u Nēnē vicinity) and the neighboring saddle lands.

**Gerrit P. Judd's Account of a Visit to the Summit of Mauna Kea
And Travel Across Plateau Lands between Mauna Kea and Mauna Loa in 1830**

Gerrit P. Judd, was a doctor attached to the Sandwich Island Mission Station, at Honolulu. Because of his medical expertise, he was frequently in the company of the *ali'i* and made tours around the islands. In June and early July 1830, Judd traveled around the Hāmākua-Laupāhoehoe trail to Hilo Bay, skirting the upper forest lands, and travel across the saddle lands between Mauna Kea and Mauna Loa, from the upper region of Keauhou, Ka'ū. Judd wrote:

Honolulu, August 19th, 1830
Gerrit P. Judd;
to Jeremiah Evarts, Esqr.
Missionary Rooms, Handover St., Boston:

[June 31; departing from Kilauea] Parted with Mr. & Mrs. Andrews about noon on Thursday in order to return to Waimea by a direct rout over the unfrequented country between Mauna Roa & Mauna Kea. *I found this journey excessively fatiguing. We travelled over rough lava without a path sleeping on the ground & in the huts of sandal wood cutters, without much food or water. The south & western sides of Mauna Kea are altogether unlike the North & East. The former dry and barren, the latter rich with wooded & susceptible of cultivation one third of the distance upwards...* [page 10; A.B.C.F.M. Collection, Houghton Library, Harvard]

The Journal of Hiram Bingham (notes of 1830)

In 1830, Reverend Hiram Bingham also visited the island of Hawai'i, and traveled from Kilauea overland to the plateau lands between Mauna Loa and Mauna Kea, on the way to Waimea. The trip took the group past Kalai'eha, and in the shadow of "Waihalulu" (Waikahālulu) Gulch where water was found. The narrative then describes travel through the Pōhakuloa vicinity and past Waiki'i, and on out to the Waimea plain:

...After spending about thirty hours at Pele's chief seat, we set off, towards evening, on the 21st, to cross the wilderness to Waimea, which required the time of a little more than two days and two nights. Walking till late, we laid ourselves down where we could find a place. The next day we continued our journey northwardly, towards Mauna Kea, lodging out in the wilderness, in the same manner, at night, the majestic mountain being half a day's walk to the north of us.

Rose at four o'clock from our mountain couch, — a day's journey from any human habitation; saw lightning at a great distance at sea — our elevation being 4000 or 5000 feet; packed our sleeping *kapa*; offered our morning sacrifice in these solitudes of the centre of Hawaii, and as the day dawned, set forward on our journey. We passed over several large tracts of lava, of different kinds, some smooth, vitreous, and shining, some twisted and coiled like huge ropes, and some consisting of sharp, irregular, loose, rugged volcanic masses, of every form and size, from an [page 393] ounce in weight, to several tons, thrown, I could not conceive how, into a chaos or field of the roughest surface, presenting a forbidding area, from one to forty square miles in extent, and though not precipitous, yet so horrid as to forbid a path, and defy the approach of horses and cattle. In the crevices of the more solid lava we found the *ohelo*, somewhat resembling the whortleberry, nourished by frequent showers and dew. *At ten o'clock, we halted for breakfast; raised a smoke, as a signal for the horse keeper, at the watering-place, at the south base of Mauna Kea, to approach, and moved on, till twelve o'clock, when I was*

very glad to see and mount the horse sent over from Waimea to meet me. Our company having become considerably scattered, and pressing on, under a mid-day, tropical sun, were soon collected together by the loud shout, "Here's water," made by the keeper of the horse, who had very considerately brought us a calabash from Waihalulu, cold and

sweet, for the refreshment of our weary and thirsty travellers. We drank round, and this gourd bottle soon sounded empty. I mounted and set forward with comfort and revived courage, leaving most of the company to proceed at their leisure.

One of the keepers of the horse wishing to accompany me, girded up his loins, and like Elijah before Ahab, ran cheerfully before me, westward, along the south side of Mauna Kea, about ten miles, then northward, over its undulated, western slope, about the same distance. We halted on the ridge, half an hour, then pressed on till six o'clock, when the sun, having finished his daily race, sank with great grandeur and beauty into the western waters of the vast Pacific, sending back a pleasant farewell to the clouds that hung over Hualalai, Mauna Loa, and Mauna Kea, the three Hawaiian mountains, and shooting upwards his diverging rays with peculiar beauty, after the last limb of his broad, golden disk had disappeared. About seven, we reached Waimea, thus completing my excursion of about 175 miles, with improved health for resuming the labors of the station... [Bingham 1969:394]

Huts of Sandalwood Cutters Found on the Flat Lands Between Mauna Kea and Mauna Loa in 1830

In 1830, Reverend Joseph Goodrich, who resided in Hilo, made one of his several visits to the summit of Mauna Kea. On this journey, he was in the company of natives. Goodrich reported that on the flat lands between Mauna Kea and Mauna Loa, they found many huts, formerly used by the sandal wood cutters:

***Byron's Bay, Hawaii
December 30, 1830***

Joseph Goodrich; to Jeremiah Evarts:

[departing from the summit of Mauna Kea] ...We descended again into the valley between the mountains, having Mauna Kea on our right, Mauna Loa on the left. Some part of the way is sandy, interspersed with trees & shrubberies & many huts of the sandal wood cutters, though these inhabitants have previously left them. Their present occupant disputed our entrance and we much preferred to recline out in the sun, than to contend with so many formidable oppressors.

The valley between the mountains is probably 8,000 or 10,000 feet above the level of the sea. Mauna Loa presents a most appalling aspect scarcely any is to be seen but black & weary looking lava; currents of rough & black looking lava commenced at the top of Mauna Loa, & I should think after running a distance of 50 miles or more, fell into the sea Kawaihae... [page 3; A.B.C.F.M. Collection, Houghton Library Harvard]

Road Constructed Across the Mountain Lands in 1834

In December 1834, Goodrich again wrote to the mission headquarters, about his duties, including his trip to the mountain lands to hunt for bullocks. He also observed that Governor Kuakini had ordered the construction of a road through the mountain lands, in order to facilitate travel across the island:

***Byron's Bay, Hilo, Hawaii
December 8th, 1834***

Joseph Goodrich; To Rufus Anderson:

...Respecting bullock hunting only in one instance have I been for that object only [page 5] & that was when this station was first taken & that was with the approbation of those who were with me; the main object then was to take a young calf & bring it down & raise it that we might have a cow at some future time. I succeeded in taking a calf, it did not live a great while, all the other times that I have been about not exceeding half a dozen times, & always had some other object in view either to go through Hilo & preach going & returning are to go up directly through the woods from here in order to find out a suitable place to make a road to Waimea, as it is now & has been heretofore to go from here

there. I also acted in compliance with the Gov.'s request, so that a road is now making through the woody region from here to Waimea which when it is done it will only be a days journey from here to W. Now it is 3 or 4 days journey between us... [page 6]

You will doubtless have heard of the lamented death of Mr. David Douglas, a distinguished naturalist sent out by the horticultural society [page 13] of London who has been exploring the North West regions of America. He came to these islands last fall & spent about 3 months here in my family, after which he went to Oahu but not finding an opportunity to leave the islands he set out to return here in July and in crossing over *Mauna Kea* he by some fatal step, fell into a pit in which was a wild bull, & was soon killed, as he was found dead shortly after by some natives passing that way. There was no person with him when he fell into the pit, that is we have no knowledge of any person being with him, as he parted with his guide a few hours previous... [page 14; A.B.C.F.M. Collection, Houghton Library Harvard]

The Mauna Loa Eruption of 1843

Titus Coan, who assumed responsibility for the Hilo Mission Station in 1836, frequently traveled across the mountain lands, and was particularly interested in the volcanic phenomena. The Mauna Loa lava flow of 1843 spread around most of the *pu'u* today identified as Pu'u Nēnē. The following letters, provide detailed descriptions of the forests leading out of Hilo to the saddle lands between Mauna Kea and Mauna Loa. Of particular interest are Coan's comments on the thousands of birds, whose songs filled the forest, and his graphic descriptions of the nature and extent of the lava flows.

March 15, 1843

Hilo. Sand. Islands

Titus Coan; to Rev. R. Anderson:

On the 11th of Dec. I wrote you a letter of 13 sheets, & on the 20th Ult. another of 2 sheets. Should these, with the one now commenced reach you in due time, you will think that my letters are neither "pro" nor "for between."

In my last I gave you some account of the recent volcanic eruption on Mauna Loa. The present communication, is designed as a continuation of the same subject; as a subsequent visit to the mountain, & a pretty thorough exploration of the scene described, will furnish some additional facts of interest. On Mond. the 6th Inst. Bro. Paris & myself, set off for the mountain at 3 P.M. *We did not take the usual rout, taken by Capt. Wilkes & others, via Kilauea, but bent our course directly for the stream of lava, as it was seen flowing on the high plains between Mauna Loa & Mauna Kea. Our general course was W.S.W. and our path lay through a mighty forest, so interwoven with jungle as to render it impenetrable in most places.* As the season was peculiarly dry we chose for our path the rocky bed of a river, called the river of destruction [Wailuku], from the quantity & the fearful rage of its waters, during seasons of great rain. The stream was now so low that we could pass up its bed & under its banks by leaping from rock to rock, frequently crossing from side to side, & now & then, ascending its banks & beating our way for a short distance through the brush wood, to avoid deep water, perpendicular precipices, or the accumulated masses of drift wood, consisting often of majestic trees, which had been torn violently from their places, &, with roots, trunk & branches, carried down the stream to some narrow pass, where their [page 1] progress was arrested by the approaching banks, by vast rocks or by a sudden bend in the stream, and thus leaving them as impregnable *chevauxdefrise* against the traveller. On the first day of our journey we advanced but 7 or 8 miles as we started near evening and slept in the out skirts of the forest. *On the second day we entered the bed of the stream and pursued our romantic course along its serpentine and rocky channel & between its precipitous & often overhanging banks which sometimes presented frowning battlements of dark, naked lava, and sometimes retreated in graceful hopes of luxuriant soil, adorned with trees, shrubs, vines, & parasitical plants, or spread with a splendid carpet of soft velvet moss. In*

this lofty & deep forest, & amidst these everlasting solitudes, unbroken except by the gurgling of the wasted stream, the dashing of the cascade, or the mighty rush & the deep thundering note of the mountain torrent, and I should add, by the enchanting notes of the ten thousand songsters whose jocund strains, seemed to fill every leaf, & shrub & tree with animated joy. I say, in these deep & spirit soothing solitudes, we pursued our quiet way, till the out stretching shades of evening admonished us, to prepare for repose. Our whole party consists of nine, viz. 7 natives, Mr. Paris & myself. We halted, &, on a little terrace or niche in the bank of the river, we soon formed a booth of branches & ferns, where, after partaking of our welcome repast and blessing Him who is ever present, ever felt.

In the void waste as in the city full. We reposed in peace for the night.

Early the next morning which was Wednesday, we pursued our way up the stream, and at noon found [page 2] ourselves fairly out of the forest with the lofty summit of Mauna Kea, rising in hoary grandeur before us. We were now at its base, & in the high open country occupied by herds of wild cattle. We now went our course S.S.W. over a beautiful rolling country, sprinkled here and there with clumps of low, spreading trees, which looked like orchards in the distance. Our way was along the upper skirts of the forest, having Mauna Kea, with its numerous peaks and lateral craters, on our right. At evening we came in full view of Mauna Loa, bearing S. by W. from us. We pitched our tent under an ancient crater, 400 feet high & now covered with trees & grass. Here we had a splendid view of the great terminal crater on the summit of the mountain, about 25 miles distant, and also, of the vast flood of lava which had flowed down the northern side of the mountain to the plains below, some part of which, lay burning at our feet, say distant 4 or 5 miles. We were now 7000 or 8000 feet above the level of the sea, and, as we stood upon these elevated hills, we could see the dark clouds gather & the lightning blaze below us, while the deep toned thunder rolled at our feet. At the same time a storm of hail spread along the shore, & fell upon the station at Hilo. This was the first hail seen at our station since we have been at the islands. The same evening, at twilight a smart shock of an earthquake, which lasted 30 seconds, added to the sublimity of the scenes around us, while a blazing comet hung over us in the vaulted sky. As darkness gathered around, the lucid fires of the volcano began to glow with fervid heat, & to gleam upon us, from the foot of Mauna Kea, over all the plain between the two mountains, and up the side of Mauna Loa to its snow covered summit exhibiting [page 3] the appearance of vast and innumerable furnaces, glowing with intense vehemence, & throwing out a terrible radiance around them. During the night we had thunder & lightning, and in the morning both mountains, were beautifully mantled in snow, from their summits nearly to their bases. It was now Thursday, and we left our encampment & proceeded 3 or 4 miles toward the new stream of lava, and again pitched our tent on the side of an old crater 200 feet high, & covered with trees & shrubbery to its summits but surrounded at its base by a vast field of naked scoria of the most jagged character, the deposit of some former eruption which had flowed around the little fertile hill, & left it like an island in the ocean, or like an oasis in the desert. Leaving our natives, to prepare our encampment & to collect fuel, water &c. we set off for the nearest stream of active lava, distant about 2 miles. Our road was over through jagged lava, thrown up in tumultuous confusion, but we soon made our way to the molten stream, & thrusting our steps into the viscid mass, took out & cooled specimens which we brought home with us. You will understand that we were now on the great plain between Mauna Loa & Mauna Kea, about 7000 feet above the level of the sea, not having yet commenced the direct ascent of the mountain. On this plain, between the bases of the two mountains, we spent the day in traversing, & surveying the immense streams of fresh scoria & slag which lay smouldering in wild confusion farther than the eye could reach. Some cooled, some half cooled, & some still in a state of igneous [page 4] fusion. The scoriform masses, which formed the larger portion of the flowings, lay piled in mounds, & extended in high ridges of from 30 to 60 feet elevation above the subterranean on which it rested, & forming a barrier so

indescribably jagged & rough as to be nearly intraversable. It seems as if this vast sea of earthy & rocky fusion, had been suddenly solidified while in a state of the most tumultuous action. Besides these high & broad ridges of scoria, there were parallel streams of slag, solidified on the top like ice on a river. This was smooth, of lustrous black, & in vibuscent state, forming the superincumbent crust to a river which rolled beneath, and which betrayed its burning course at innumerable cracks & seams & blow holes in which the fiery fluid was seen, or through which it was vomited in gory jets. We spent the whole day in exploring this vast sea of lava, and were astonished at its immense area. *In rolling down the side of the mountain, one broad stream, had that off in a westerly direction towards Kona. Another mighty river had flowed northward till intercepted by the base of Mauna Kea, when it divided into two branches, one, flowing in a north west direction towards the plains of Waimea, & the other arm, stretching N.E. & flowing towards Hilo. These three main branches united, would probably form a river 5 or 6 miles broad, & the most extended of them cannot I think, have progressed less than 25 or 30 miles. They are all still flowing, but their progress, at present, is slow, as they are on a vast plain, and as their velocity is retarded by fissures & caverns & by fields of old scoria which covers those high regions.* [page 5] Should the eruption continue, and should the quantity of fusion be sufficient to overcome the obstacles & reach the regions where the face of the country declines rapidly towards the sea, the descent will then be quick and easy to the coast, both on the eastern & western shores. This may take place, though I am rather of the opinion that the fires will have spent their force before they reach the sea. Besides the three great branches described, there are numerous smaller ones, shooting out laterally & irregularly, from the main streams, both on the side & at the base of the mountain. All these form an indescribable labyrinth, & I leave them where the breath of the Almighty left them. After travelling hard all day without being able to reach the extreme ends of the two great western branches of the eruption, we returned at evening, to our tent, weary but gratified, nearly to oppression, by the vastness & the terribleness of the scenes we had witnessed. We felt good to contemplate these awful illustrations of God's power and to meditate on the works of Him who [illegible] on the earth & it trembleth, who toucheth the hills & they smoke. To reverence & adore Him under whose feet the mountains are molten, at whose presence the hills melt like wax, and whose breath like a stream of brimstone, sets on fire the foundations of the mountains, & burneth up the earth with her increase.

When night had closed upon us, a dense & dark cloud settled down upon the little green hill where we were encamped, charged with electric fluid which [page 6] soon began to blaze in terrific splendor around us, accompanied by such instantaneous, rapid & startling peals of thunder, as to assure us that we were in a sea of electricity, and that the rending cloud, not only rested upon, but filled our tent. It was an hour of awful grandeur, & we were made to feel the terrible sublimity of that majestic language, the God of glory thundereth. He maketh the clouds his chariots & flaming fire his ministers. His pavilion sound about him were dark waters & thick clouds of the skies. There went up a smoke out of his nostrils and devouring fire out of his mouth. The earth shook & trembled, the foundations also of the hills moved & were shaken. At length the cloud passed off; the bottles of heaven were stayed; the trembling & mute tenants of our drenched cabin, began to breathe softly & to rustle in their couching places; the mild moon looked serenely upon us from the opening clouds, the thunder was heard only in its distant & retiring roar. The lightening gleamed from afar, the vaulted heavens were again studded with ten thousand brilliants, and the volcanic fires, which had been concealed by the dark tempest resumed their merry dance, spouting, hissing, and evolving their gory masses in fantastic & ever varying forms, at different points, from mountain to mountain, along the whole line of eruption; a distance of 25 or 30 miles. The wheels of nature which seemed to stand still, & the whole visible creation which had been held in silent awe, while Jehovah spoke in thunder, now resumed their mystic movements, & we, trembling worms, crawled from our nestling places in the grass, gazed upon the pure [illegible] and upon the majestic mountains, covered with fleecy snow, & jet melting with consuming fire,

and blessed the Lord that his hot thunder bolts had showed us that we were still alive.
[page 7]

The next morning, which was Friday, we rose early and prepared to visit the summit of the mountain, distant about 20 miles. We had finished our survey of the immense tracts of lava on the great plains between the bases of the two mountains, & the object now before us was, to make our way directly to the foot of Mauna Loa, and following the great stream of recently solidified lava, trace it to its source at the great terminal crater on the top of the mountain. As we did not suppose it possible to reach the summit and return to our camp the same day we provided ourselves with caps, flannels, mittens, cloaks, comfortables, etc. etc. for sleeping upon the lava on the side of the mountain; and taking a little food & a calabash of water, we committed our luggage to two strong natives, leaving the rest of our company, to keep the camp in our absence. Thus prepared, we set off, expecting to spend two days upon the mountain. Our way, at first, lay over a field of scoria of an indescribably sharp & jagged character, & we had not proceeded more than half a mile before we found that the two natives who carried our clothing, fell in the rear, & followed us at the rate of less than a mile an hour; the road being so inconceivably rugged, that they could not quicken their pace without the danger of stumbling at every step, & breaking their calabashes & tearing their flesh. We therefore halted suddenly, held a short consultation, set down our calabashes on the lava, took a little biscuit in our pockets, laid our cloaks & umbrellas on our guides, & leaving all else behind, set out again for the summit of the mountain. After passing this tract of scoria, we came to a field of [page 8] more compact & smooth lava, lying along the borders of the new stream. Here we moved on rapidly, at the rate of 3 ½ or 4 miles an hour. As we had left most of our clothing & food, with all our water, behind, & as we clung to the hope of reaching the original point of eruption, which is a vast, active crater, within a few hundred feet of the highest part of the mountain, we felt it necessary to press hard & improve every movement as we must return the same day, or probably perish with cold amidst those high regions of snow and tempest. To describe our road, would be tedious if not impossible. Sometimes we were on ancient deposits & sometimes on the new; sometimes on broad fields & smooth, shining lava, & sometimes crossing extended tracts of the sharp, spurry kind before mentioned; now, climbing a high ridge of loose scoria & slag, & then feeling our way down a ravine amidst poised & [illegible] masses, that seemed to say, "touch us not lest we bury you from the light of day." Now, we were moving erect & firmly like rapid pedestrians, again we were like quadrupeds, "on all fours," and amen, we were neither the one nor the other, but thrown pell-mell, & lying prostrate in a direct line, or curvated or angulated, as the case might be. Our "woebegone" shoes & garments soon took a sad tale of the weary way but this was nothing, if we could but keep flesh & bones from harm, which by the by, we could not do. At 10 o'clock we were fairly at the foot of the mountain proper, & began a more regular & rapid ascent, though we had been gradually rising for an hour or two previous. The new streams of lava, were spread to the breadth of several miles over the side of the mountain and for the most part nearly cooled, but in many places burning hot and exhibiting smoke, steam & pungent gasses. At noon we lost sight of our native attendants, who were [page 9] unable to keep up with us in our refined & forced march, and we saw them no more during the day. We were now on the new eruption, & our ascent became more & more steep, while the rarity of the atmosphere affected our respiration so that it was difficult to proceed many rods without stopping to pant & to recover breath. The lava on which we were treading, gave indescribable evidence of powerful igneous action below, as it was hot & full of seam from which smoke & gas were escaping. But we soon had a demonstration of what was the state beneath us, for in passing along we came to an opening in the super- [illegible] stratum of 20 yards long & 10 wide, through which we looked, &, at the depth of 50 feet, we saw a vast tunnel or subterranean canal, lined with smooth vitrification & forming the channel of a river of fire which swept down the steep side of the mountain with amazing velocity. The sight of this

covered aqueduct, or if I may be allowed to coin a word, of this pyroduct, filled with mineral fusion, & flowing under our feet at the rate of 20 miles an hour, was truly startling.

One glance at the fearful spectacle was worth a journey of a thousand miles. We gazed upon the scene with a kind of entrancement knowing that we had been travelling for hours over this river of fire, & crossing & re-crossing it at numerous points. As we passed up the mountain, we found several similar openings into this canal, through which we cast large stones, which, instead of sinking into the viscid mass, were borne instantly out of our sight upon its burning bosom. Mounds, ridges & cones, were also thrown up along the line of the flow, from the latter of which steam, gasses & hot stones were ejected into the air with terrible hissings & belchings. We had purposed to commence our return down the Mt. at one P.M. but the hour came & we were still far from the top. We then added half an hour to the descent. This passed [page 10] and still the increasing prospect tired our longing eyes. We went on adding half hour to half hour till 3 o'clock when we reached the verge of the great crater where the eruption first took place, near the highest point of the Mt. This was in the region of snow, & to reach it had passed through snow for the last 3 miles. There we found two immense craters, of vast depth & in terrific action, in close continuity; but we had no movement left to do a survey then; but kneeling among these awful scenes, to bless the Hand which had led us thus far, & to ask protection on our return, we turned our faces down the mountain & although weary & way worn almost to the last degree we felt that we must regain our tent, long lost in the distance or run the hazard of perishing upon the Mt. for want of suitable clothing during the night: We ran, walked, clambered, descended, stumbled &c, feeling unable at every step to drag one foot after the other & yet necessity impelling us to proceed. At length night came on & we were still in a trackless waste of flowing lava, & not less than 8 or 10 miles from our camp. But by the glowing aid of a moon in her first quarter, we were able to trace the distant outlines of the green hill, on which our cottage of branches stood. We plodded on alternately walking & resting, at rapid intervals, until a fog came up shutting out at once, the hill, the heavens, and even the volcanic fires from our sight. We could not now keep our course, as we could not see our compasses. We wandered some but not far from the track. Still there was little hope we should reach our camp. In about an hour however the fog dispersed, the moon & stars, looked benignantly upon us, & the volcanic fires began again to play on our left, and after persevering toil & with indiscernible weariness, we reached our tent at a few minutes before 11 at night. I need not say that our thirsty, exhausted & [illegible] frames, welcomed rest, refreshment not that our thankful spirits, felt untold satisfaction in view of the wondrous & stupendous scenes we had witnessed during this laborious & eventful day. Of the two natives who set out with us, one reached home before us, & the other we found waiting for us one or two miles before we arrived at our tent. Though lame & sore we set out for Hilo on the next day, Saturday, spent the Sabbath in the forest, &, amidst the gurgling of the crater & the thousand warblers in the branches we preached to our little audience of 9 souls. It was a day of sweet & calm rest, we trust, a day of good to us all.

This was [page 11] the first Sabbath I have been absent from the great congregation, except when on the ocean, since we have been at the Sand. Islands. On Monday we resumed our journey & reached home the same evening, thankful for all we had seen & for all the love we had experienced. Though this tour, exposed us to fatigue & danger, yet we felt it a pleasure & a duty to make it. We are commanded to magnify the works of the Lord, and trust his words are great, sought out by all those who have pleasure therein... [page 12; A.B.C.F.M. Collection, Houghton Library, Harvard]

April 5, 1843

Hilo, Hawaii

Titus Coan; to Bro. Armstrong:

...I am touring in these days & have little time to write. Just returned from Hilo & am off day after tomorrow to Puna, if the Lord will.

I have also been to Mauna Loa with Bro. Paris, & explored the new eruption. We went up through the forest, directly in rear of our station, and came out at the foot of M. Kea. The eruption has flowed from the summit of M. Loa to the base of M. Kea, where it separates into two [page 2] broad streams, one flowing towards Waimea & the other towards Hilo. Another great stream has flowed along the base of M. Loa towards Hualalai in Kona. These streams are still flowing, & their progress is 25 or 30 miles from the crater on the top of the Mt. The quantity of lava, is immense. Many miles wide and the whole scene is wonderful. We followed the stream to the top of the Mt. through cold, snow etc. etc. Two great active craters in close contiguity — near the summit. Lava does not flow over these craters now, but is conveyed down the side of the mountain in a subterranean duct from 50 to 100 feet below the surface at the swift rate of 15 or 20 miles an hour. We saw this awful river of fire by looking down through openings in the surface. We also crossed & redressed it several times & travelled up mountain directly over it for a long distance, like ascending a river on the ice. Peril [page 3] exposure & indescribable fatigue attended our way, and I go slip-shod, carrying the mark of the journey in my body to this day, 3 weeks later. But what we saw amply renewed us for all & to God be ascribed the promise of our safe return. I have only hinted at the matter here. Cannot describe it now... [page 4; A.B.C.F.M. Collection, Houghton Library, Harvard]

Survey of the Hilo-Waimea Mountain Road in 1869

While several efforts were made to improve travel across the island of Hawai'i, between Mauna Kea and Mauna Loa, the work went unfinished. The routes of access through the region, followed basically those ala hele which had been traveled for generations. In 1869, Samuel Wiltse was contracted to survey a route for the Hilo-Waimea Mountain Road (*Figure 3*). The survey of the route was completed in August 1869, and by early 1870 construction of the road was underway. The Kalai'eha-Waiki'i portion of the alignment remained basically the same until after the outbreak of World War II, and the paving of the "Saddle Road" in the 1940s.

Waimea, Hawaii

August 2, 1869

S.C. Wiltse. to Minister of Interior

(Regarding Proposed Route of the Hilo-Waimea Mountain Road):

With this, please to receive my report survey re — of a Rout for a Road from Hilo to Waimea in South Kohala. I drew the Plan on cap paper with the intention of copying it, but I found that I had not time to do so, and forward it by this mail. Should your Excellency wish it drawn on better paper, I will do it some other time.

The expenses amount to more than I expected, but they were unavoidable. I used every economy possible.

I received no assistance whatever from the People of Hilo or Waimea.

For my own Service, I will be perfectly satisfied with whatever amount your Excellency may be pleased to allow me, I will be greatly obliged if your Excellency can make it convenient, to let me have some money, by the return mail, as I have been compelled to borrow money to help me through...

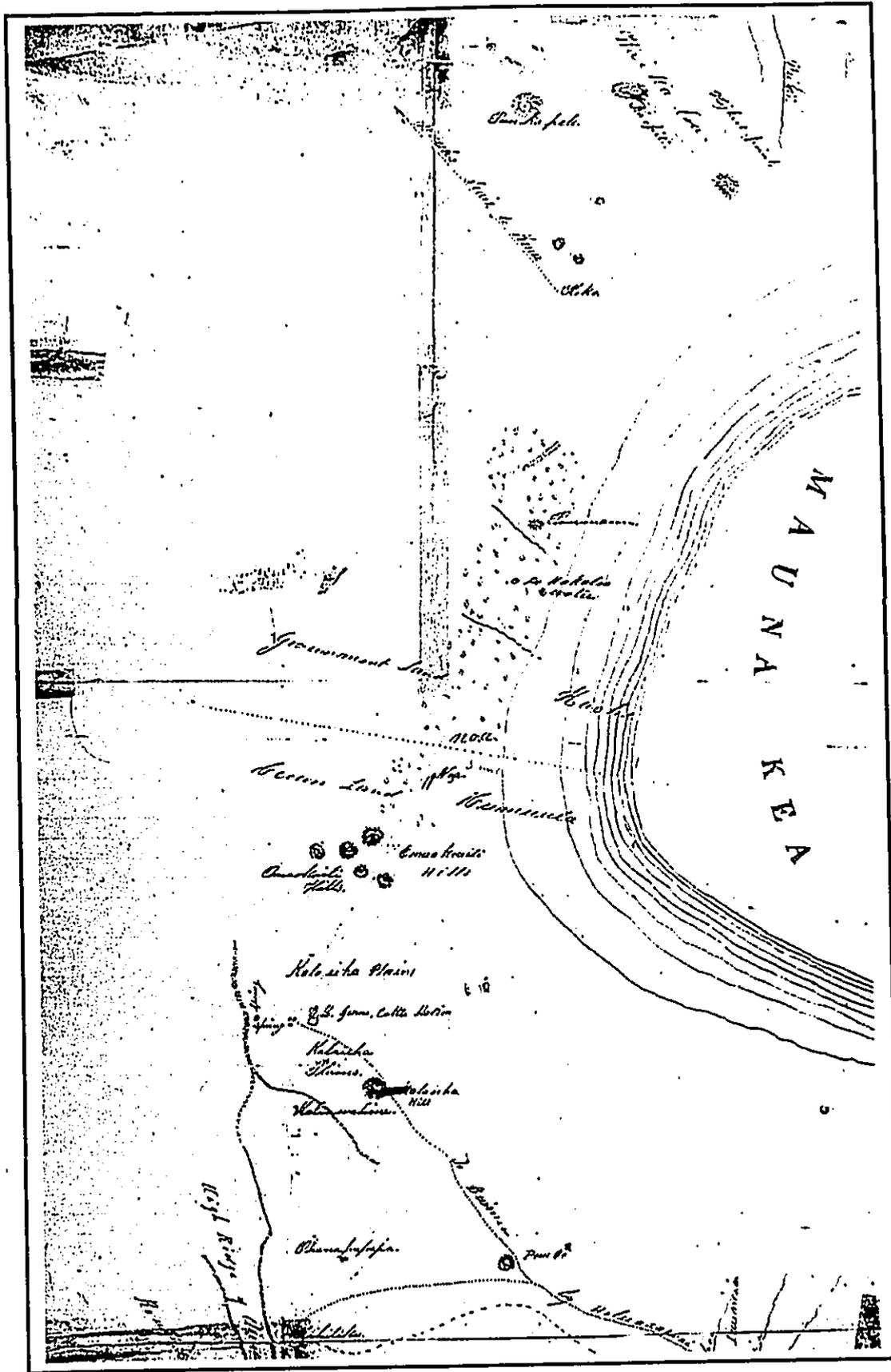


Figure 3. Portion of Register Map No. 528, Depicting Kahiliku to Ahumoa Section of the 1869 Alignment of the Hilo to Waimea Road via Kalaieha – Passing the “Omaokoli Hills” (in collection of Hawai’i State Archives; Copy Photo KPA-2130)

Expenses of Surveying a Rout for a Road from Hilo Bay, to Waimea in South Kohala. As made in July 1869 by S.C. Wiltse.

To B. Macy Chainman 13 days	13.00	
To G. Kembal Chainman 13 days	13.00	
To Kekekawai Kaamina 13 days	13.00	
To Kamalo Kaamina 9 days	9.00	
To Kailihakuma Paeku 8 days	8.00	
To Kahooikaika Paeku 8 days	8.00	
To Kahooikaika for 2 Pack Mules 2 days	3.00	
To Kauloa for taking our horses from Hilo back to Waimea	5.00	
To board of 5 men in Hilo 2 days		5.00
To Kauailana, self horse & mule 6 days	10.00	
Outfit & Provisions for the Sup	16.00	
Total Expense	\$103.00	
Cash received on a/c of	\$ 50.00	
Bal Due	\$ 53.00	

[HSA, ID Roads, Fldr. 5]

Omaokoili Identified in the Boundary Commission Proceedings of 1873-1891

In 1862, a Commission of Boundaries was established to establish the boundaries of *ahupua'a* awarded as a part of the *Māhele 'Āina* (Land Division). On the island of Hawai'i, the commissioners sought out, and took the testimony of hundreds of elder native witnesses, who had learned the traditional boundaries of lands on the island. The boundaries were almost uniformly described in association with the rights and practices of native tenants of the given lands. Below, are excerpts from the early testimonies, which reference 'Ōma'okoili, and traditional and customary practices in the region of the saddle lands between Mauna Kea and Mauna Loa.

***Humuula Ahupuaa
District of Hilo, Island of Hawaii
Boundary Commission, Hawaii, Volume B:28-59***

The *Ahupuaa* of Humuula, District of Hilo, Island of Hawaii, 3d J.C.

On this, the 3d day of November A.D. 1873 by adjournment from the 30th October, the Commission of Boundaries for the Island of Hawaii, 3d J.C. met at the Court House in Hilo, on the application of J.O. Dominis, Agent of Crown Lands for the settlement of the boundaries of Humuula, situated in the District of Hilo, Island of Hawaii.

Notice personally served on owners or Agents of adjoining lands, as far as known. Also served by publication in the Hawaiian Gazette of _____ and *Kuokoa* of _____.

Present, E.G. Hitchcock for applicant, for Mrs. L.K. Dominis, Her Excellency, R. Keelikolani, the Estate of Kamehameha V, C.R. Bishop and self, D. Kamai for Hawaiian Government Lands in Hilo, and D. Alapai.

For Petition see Folio 238, Book A.

Testimony... [Volume B page 28]

Kahue^K Sworn:

I was born at Humuula, am seventy three years of age, and a *kamaaina* of the land and know its boundaries. Kalaimaka, Mohaiku, Eekamoku (all dead) were *kamaaina* of Humuula and pointed out the boundaries to me... Kahoahuna runs into the woods, but

where the oo [native honey creepers] are, is Humuula... [Volume B page 33]

...Puuoo is a hill *mauka* of Nahuina above the woods, thence to Elekalua, a *kauhale* in the woods, *makai* of Kahiliku, a *lae laau* [a section of forest that extends out from the surrounding forest on to an open area], outside of the woods. Thence to Mawae, a crack in the woods that runs from *makai*. I have heard that Waiakea joins Humuula here, but I do not know which side of the lava flow of 1854 or 1855, the lands join. Thence the boundary of Humuula runs to Kawauwauwai a *kauhale*; the boundary running to this point in scattering bush. The forest ends at Elekalua.

I have never seen the boundaries beyond Kawauwauwai. From thence (I have heard), it runs to Puuoo, a hill covered with trees *mauka* of Hoaa; thence to Keanaokauakii, a cave above the woods. Thence to Puumanu, a hill on the *aa* way above the woods (I have been there). Thence to Pohakuloa, an *ahu* [cairn] of stones, now called Keahu o Kuakini, as Kuakini built a new *ahu* there. Kapapala is said to cut Humuula off to Pohakuhanalei. Boundary runs near Puuonioni on Humuula; the boundary is a little beyond. Wekahuna [Uwēkahuna] is a hill on Humuula. Waiakea ends at Pohakuloa, and from there Humuula is bounded by Kapapala to Pohakuhanalei (I do not know whether Kapapala extends to Pohakuhanalei). From Pohakuhanalei to Koahe it is bounded by Kaalaala of Kau. I have been to Koahe after sandalwood, it is a point on the road running over Mauna Loa. Pohakuhanalei is a large rock high up on the side of Mauna Loa towards Kalaieha.

Koahe is on Mauna Loa, a *koa* there, Koahe joins to Puualala a cave. Thence to Puuulaula, a red hill on the side of Mauna Loa near its base. Thence along the land of Koahe to Omaokoili, two hills. The boundary running between them. Thence to Kaiwaiwa a hill on Humuula near boundary, near the base of Mauna Kea. Thence to Kahawai Koikapue, a gulch where mele were sung... [Volume B page 35]

Hilo, November 4 1873 Commission met according to adjournment, Kahue not appearing, and being told he was unable to appear, sent to see and proceeded to examine. See note Folio 36 of this book.

Waiki^K Sworn:

I live at Humuula, was born there after the battle of Kekuakalani [1819], and know the boundaries of the land. My parents told them to me. Eekamoku was my father and Koapunini my grandfather, they were bird catchers and canoe makers. Kalaimaka, father of my wife pointed out the boundaries and told them to me... [Volume B page 38]

...Thence to Waikē, a branch of the Wailuku. Thence to where the *aa* commences. Thence to Kahiliku, *makai* of Puuoo, near the woods, Kahiliku *kauhale manu* [a bird catcher's house is at Kahiliku]. Thence to Kaelewa, where there is now water. Thence to Kawauwai by the edge of the forest. Thence to *Kaieie*; Waiakea and Piihonua join Humuula between these two places. Thence along the edge of the forest to Kalapaohelo. I have been there with my parents, on old lava ground. Thence to Pohakuloa, a large rock where Kaehu Paki laid down on the side of the mountain towards Kau of Kalapaohelo. There I [Volume B page 40] staid with my *kupuna* and they said the boundary runs from here up the mountain to Pohakuhanalei, a rock on the slope of the mountain towards Kaleieha. Waiakea bounded it to Pohakuloa, but they did not tell me what lands bounded Humuula from there to Pohakuhanalei. We went to Kaleieha and to Omaokoili, they there pointed out a red hill called Kole, below Pohakuhanalei, and they said Koahe bounded Humuula from Pohakuhanalei to this hill. *Can see this hill from Omaokoili, hill near Kaleieha. They said the boundary runs from Kole to Omaokoili, the hill makai of the cart road to Waimea from Kaleieha. Thence to base of Mauna Kea, to Puuokalau a hill bounded by Koahe.*

Thence along Kaohe to Lanikepue, a pali. Thence to Kaluakaakoi, a cave where they used to get stone adzes out. Thence to Poliahu, a cave where Lilinoi [Lilinoe] used to live... [Volume B page 41]

Waikillili^K Sworn.

I was born at or near Humuula, district of Hilo, and have always lived in said district. I have often been on the mountain catching bullock, and know the boundaries of Humuula at shore. When I was on the mountain I was told that the boundary on Mauna Kea between Kaohe and Humuula was where the *mamani* ceases to grow, and that the *pukeawe* is on Kaohe. *Was told that Humuula extends to Pohakuhanaiei. I have not heard where Kaohe ceases to join Humuula, as you go towards Mauna Loa. Have never heard that Humuula extends to Waiau. I have not heard in olden times what land Poliahu is on. Have always heard that Humuula takes the pili and mamani. I have been told that if our kupuna caught birds on ohia trees, Piihonua people took them away; and that if Piihonua folks took the birds from the mamani, our kupuna would take them away from them.* In olden times we did not hear of Humuula cutting off Hilo lands in the forest, but at the edge of the forest. Never heard of any road running from Humuula to Piihonua through the woods in olden times.

The old road has never been pointed out to me. I have not been with *kamaaina* along above the woods, and had the lands pointed out to me... [Volume B page 53]

Decision

It is decided that the Boundary between the Crown Land, Humuula, District of Hilo, and Kaohe, and other lands of the Hawaiian Government, District of Hamakua, Island of Hawaii, is as follows:

Commencing at the South corner of Kaala, as surveyed, Land Commission Award 9971 at a point in the Kaula gulch near "Lahohinu," by the upper edge of the forest, and run up the main branch of the Kaula gulch called "Waikulukulu," between Humuula and Kaala, to a point near "Puu Kalepa," thence along the Waikulukulu gulch, between Humuula and Kaohe, to "Kanakaleonui," thence in direct lines along the boundary between Humuula and Kaohe, to "Kaupakuhale," thence to "Kole," thence to "Lepe a Moea," thence to the west side of "Omaokoili" hills, thence to "Pohaku Hanalei," on the North slope of Mauna Loa. Surveys to be made and filed before certificates of Boundaries are issued.

F.S. Lyman, Commissioner of Boundaries, 3d Judicial District, Hawaiian Islands
Hilo, Hawaii, October 3, 1891... [Volume D page 57]

Ranching Operations of the Humuula Sheep Station, Company

Construction of the Walls of Sheep Paddock I—the Vicinity of the 'Ōma'okoili Hills

Bullock hunting operations were formalized on the lands of Humu'ula and Ka'ohe by a lease in 1857. For about twenty years, the operation was managed by Francis Spencer and partners of the Waimea Cattle and Grazing Company. In 1876, James Gay secured the lease of Humu'ula, and established The Humuula Sheep Station Company, with the headquarter initially established at Keanakolu, and later moved to Kalai'eha. In 1887, James Gay removed himself from the business enterprise at Humu'ula, and August and Armin Haneberg assumed management responsibilities of the Humuula Sheep Station Company¹. On November 5, 1889, an annual meeting of the Humuula Sheep Station Company took place, and officers were elected, they were: August Haneberg, President; Armin Haneberg, Vice President; J.F. Hackfeld, Secretary and Treasurer (A.W. Carter, Humuula File; Parker Ranch Collection). With this action, the Haneberg brothers took over operation of the station, with its primary headquarters having been established in past years at Kalai'eha.

¹ The date is based upon August Haneberg's testimony before the Commissioner on Boundaries in 1891, as no conveyance was located.

From the surviving Journal of August Haneberg (1890-1892), we learn much about the history and development of the sheep station, and use of lands in, and adjoining the *ahupua'a* of Humu'ula. The following selected notes provide readers with an overview of the documentation recorded in the journal of August Haneberg, President and manager of the Humu'ula Sheep Station Company (ca. 1887-1898). The citations below include references to activities at Sheep Paddock I (the area around the 'Oma'okoili Hills); identify individuals who built the walls around the hills; and also document efforts of the Kingdom survey party on 'Oma'okoili Hill.

Haneberg's documented that the walls were constructed primarily by Japanese labor in 1891 to 1892. The Pu'u Huluhulu section walls were under construction by October 5, 1891, and the boundary between Ka'ohe and Humu'ula was being laid out on June 29, 1892 (Haneberg Journals, 1891:122 – 1892:201).

Monday, October 6th 1890.

Japanese Shirimoto left for Olowalu, Maui; Ellerbrock shoots a heifer at *Laumaia*; 4 Japanese, stone pens *Aina Ho*; Kramer sorts out 107 sheep for Honolulu and changes wethers to upper part of Padd I.

Weather, fog and mist early morning, then dry, some rain afternoon, very calm by South wind evening, warm and soft. [page 28]

Monday October 27th 1890.

Spohler fence Sheep Padd II, saw 5 dogs outside the fence at Puu Kumu; Kramer paints and bales wool; Japanese shear wethers for Honolulu; Moto washes;

Went to *Waiakeakua* [Auwaiakeakua], saw Ah Ano; Ernest Campbell not there.

Weather, Wind changed over night to southerly direction, kept dry all day; very calm evening, warm. [page 33]

Saturday, December 27th 1890.

Kramer fixes fence on Puu Huluhulu, then takes old posts out on Ram Paddock; 4 Japanese work on wall sheep Padd III; several outside, one sheep standing on top of wall trying to eat Mamani leaves; put several hundred sheep through small gate at Shepard's horse Padd from Padd III into Padd II; Horses Lakaloa, Billy and Freten went out of Horse Padd III into Sheep Padd I lower part; fence not damaged.

Weather cold, fog early morning, dry afterwards, evening fog again; Trade wind. [page 47]

Wednesday, December 31st 1890.

Left for Waimea; Kramer with salt to *Laumaia* to pack hides back; Kosina and Taniguchi & Masaki finished sheep then make wall *Sheep Padd I at Omao Kooli Hills higher*; Kuramoto sick. [page 48]

Monday, January 5th, 1891.

Taniguchi and Kosina enlarge wall at Omao Kooli hills Sheep Padd I; Kramer to Puu Oo to kill out Australian weed.

Left with 2 mules to bring poison to *Keanakolu* and a mule for Muir to ride over to *Kalaieha*. Arrived at *Keanakolu* at ½ past 2. Tasbure is getting very poor, Puakea mare of *Aina Ho*, Blossom, foal of white wild mare probably dead; ordered all horses to be put in Bullock pen; notified Muir to be over at *Kalaieha* to take teams down on Wednesday next week; Wilbur and Muir received bill of J. Sandh [?].

Met Mr. McKinley at *Hopuwai*, who proceeded to *Laumaia*. Left Mule Tow Tow at *Keanakolu* to pack over coal oil.

Met Waltjen on trail close to stone pen.

Weather dry, some fog about noon, soon disappeared, then dry again. [page 49]

Thursday, January 15th 1891.

Muir left with team for *Kawaihae* late; Kramer returned with beef and hides from *Laumaia*; *Kosina* and *Taniguchi* *Wall Sheep Padd I Omao Koili hills*; Horses "Springer" and "Coldwater" not to be found.

On a hill way into the Paahoehoe below Omao Koili hills, have been plenty of sheep as an abundance of manure and a dead sheep prove, also a lot of dog manure all along the Paahoehoe.

Weather bright but dry and clear till 5 o'clock, a few heavy showers and slight thunderstorm; Trade. [page 52]

Monday, January 26th 1891.

Kosina and Taniguchi wall on Sheep Padd I Omao Koili hills.

Weather hot all day, some rain during afternoon and sunset; Trade. [page 55]

Monday, June 8th 1891.

McLane makes his wagon ready and bundles hides; Bormann paints Buckboard and helps McLane; Pakenia and Ernest Campbell bring all horses (breed stock) from Wether Padd into Sheep Padd II; *5 Japanese finished garden work and then start on Telephone line again*; Matsu ½ day house work ½ day Wool bags; then kill cow caught the previous day; Two Messrs Castle from Honolulu passed with a native for Waimea; *Baldwin and staff moved from Puu Oo to beyond Omao Koili hill.*

Weather hot and bright forenoon, afternoon fine shower of rain; fog evening; Trade wind. [page 87]

Tuesday, June 9th 1891.

McLane left with Team for *Kawaihae*; Bormann finishes Buckboard, then files gate hooks for *Aina Ho* pens; then started on other wagon to paint; Pakenia and Ernest ride colts; Matsu house work; *5 Japanese sew grass seeds in Shearing pen. The half white Kelsoni in from Surveyor Camp Omao Koili to get water and provisions.*

Weather fine, during afternoon very threatening for rain, but only a little mist; Trade. [pages 87-88]

Tuesday, June 16th 1891.

Waltjen in from *Laumaia*, returned, reported 2 bulls in Padd III, plenty cattle close outside the fence, no more cartridges; *Baldwin and men moved from Omao Koili to Hale Aloha*; commenced shearing sheep; Pakenia, Taniguchi, Hatsubare, Kosina and Iwahei shear sheep, Kumahei takes up fleece and bundles them; Bormann presses wool; Ernest Campbell fixes fences, shears a dead sheep Wether padd upper part; waters horses; McLane and John Donahue cart for wood then load wagons with wool for *Kawaihae*. Matsu house work.

Weather hot and dry all day, towards nightfall dark and slight mist; Trade. [page 89-90]

Saturday, July 4th 1891.

McLane returned with team alright; Masaki sick, all other hands shear sheep; Matsu garden work; Bormann presses wool and looks at fences; *Ernest fixes mauka fence Sheep Padd I and then wall into Aina Ho.*

Weather fog early morning and with interruptions all day; evening fog and mist; Trade wind. [page 96]

"Omaokooli Triangulation Station" (1891)

As a result of work conducted by E.D. Preston on Mauna Kea, in partnership with the Survey Division of the Kingdom of Hawai'i, a record and description of primary triangulation stations on Mauna Kea were furnished to the Coast and Geodetic Survey. These records, now a part of the National Archives and Records Administration (NARA) collection series RG-23, record survey coordinates compiled by W.D. Alexander and C.J. Lyons from 1876 to 1892. Among the stations recorded was the Omaokooli Station, which mark is described in the following narrative and figure (*Figure 4*):

Omaokooli

Station mark [triangle] on solid imbedded bomb, with 3 ridges of imbedded stones radiating from the centre thus.

Altitude 7090 feet.

Reference Objects:

Lilinoe

Walau Crater

Kalaieha N. Base

Lepeamo

Kalaieha Puu

Hulkau [pages 62-63]

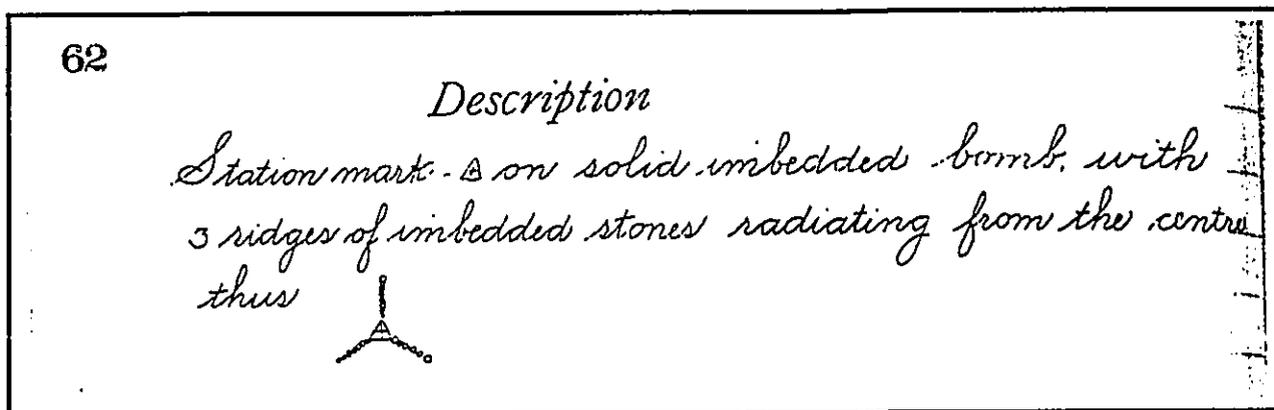


Figure 4. Omaokooli Triangulation Signal; NARA Collection, Series RG-23 (page 62)

Overview of the Humuula Sheep Station Operation (1902)

In 1900, ownership of the Humuula Sheep Station Company was turned over to Samuel Parker, who operated the venture separate of the Parker Ranch until 1914. The operation was described in a detailed article published in the December 1902 edition of the *Paradise of the Pacific*. The author, "Blacksheep," reported on the background of the station, the layout of the paddocks, and also described the shearing process:

Sheep Raising in the Hawaiian Islands

The Humuula Sheep Station largest of its kind in the Hawaiian Islands and is one of the vast estates owned by the Honorable Samuel Parker and ably managed by his son, Samuel Parker, Jr. Humuula is situated between the mountains of Mauna Kea and Mauna Loa at the average elevation of 6000 feet, and is the highest point of habitation on the Island of Hawaii as well as the coldest, for, during the winter months, when the higher paddocks are covered with snow, the thermometer has been known to show twenty-eight degrees. The station was started by the late James Gay, but most of the laying out of the paddocks and fences was done by Mr. A. Haneberg, who had acquired it, and from whom the present owner bought it. The station is composed of 250,000 acres and is divided into five sub-stations with the head station at Kaleieha, about thirty-eight miles distant from Waimea, and are all connected with a private telephone, the one extreme station from the other being about thirty-five miles.

The stock of sheep varies in number from twenty to thirty thousand head and is chiefly composed of the Merino breed, which not only seems to thrive better than any other in this climate but produces the best wool. Although the average weight of the sheep in these Islands is much lower than that on the mainland or in other countries, sheep raising, if properly attended to, is a very profitable investment, although one must have a large tract of land to raise them on, allowing at the most three sheep to the acre. Mutton brings ten cents a pound and the sheep when shorn average five pounds of wool, for which fifteen cents a pound is paid. The Humuula horse and mules, of which there are a good number, are noted for their size, speed and endurance, and in any market realize the highest prices for Hawaiian-bred stock. The greatest pest and enemy of the sheep are the wild dogs, which are very numerous in the mountains of Hawaii and are eradicated only by the laying of poison by the boundary riders along the fences and by shooting them when seen, which, however is very seldom, as they generally hide or sleep during the day time and do their mischief at night.

The shearing season is always the busiest time of the year on the station and generally begins in June. Japanese from all over the island come to work during that period, either as shearers or roustabouts, and the best of the former average about one hundred head a day during the season, which compares very favorably with that in other countries. The sheep having been driven over night into the pens in the large wool-shed at Kaleieha, where the shearing generally takes place, the head overseer rings the bell at 6 o'clock in the morning and shearing commences. As each sheep is shorn, an overseer, one on each side of the shed, puts distinguishing marks with red ochre on the ewes, wethers and rams, at the same time looking at the teeth to see the age, and as this is done, calls it out to the tally man, who enters it in his books. A roustabout then picks up the fleeces and carried it to a long table where two men are constantly at work rolling the fleeces up ready for the wool-press. Two men are at work pressing the fleeces in the press with their feet, and when a bale is pressed and the bag sewn it is weighted, numbered and addressed, and is ready for market, and generally averages about 275 pounds.

One of the chief things the overseers must watch is to see that the shearers are not racing with each other, for this is a very common occurrence amongst them and a way they make a little more money on the side. When they do this, their work is careless and, besides not getting off as much wool as they should, they cut the sheep with their shears. The only way of stopping them, when caught, is to warn them the first time and lay them off permanently the second. After the day's work is over, each shearer is credited with the number of sheep he has shorn and the sheep are driven from the small pens around the wool-shed into the larger ones awaiting the time of dipping, which commences when the season is about half over. The dip generally used, into which each and every sheep is put for two minutes, is a mixture of sulphur and lime, which destroys all vermin, scab or disease that a sheep is subject to, and also promotes the growth of the wool. It is after the shearing and dipping is over that the sheep are classified and parted generally, the

wethers for market going to the fattening paddocks and ewes, lambs and rams being put in paddocks reserved for them.

The officers of the company are Hon. Samuel Parker, President; Samuel Parker, Jr., Vice President; G.J. Waller, treasurer; and Carl A. Widemann, Secretary. Mr. Fred Wundernberg is the Honolulu agent. ["Blacksheep" in Paradise of the Pacific, 1902 Vol. 15 No. 11:28]

Overview of the 'Ōma'okoili – Pu'u Nēnē Landscape

Storied landscape of the 'Ōma'okoili and 'Ōma'okanihae Hills are named for deity and guardians of the mountain lands.

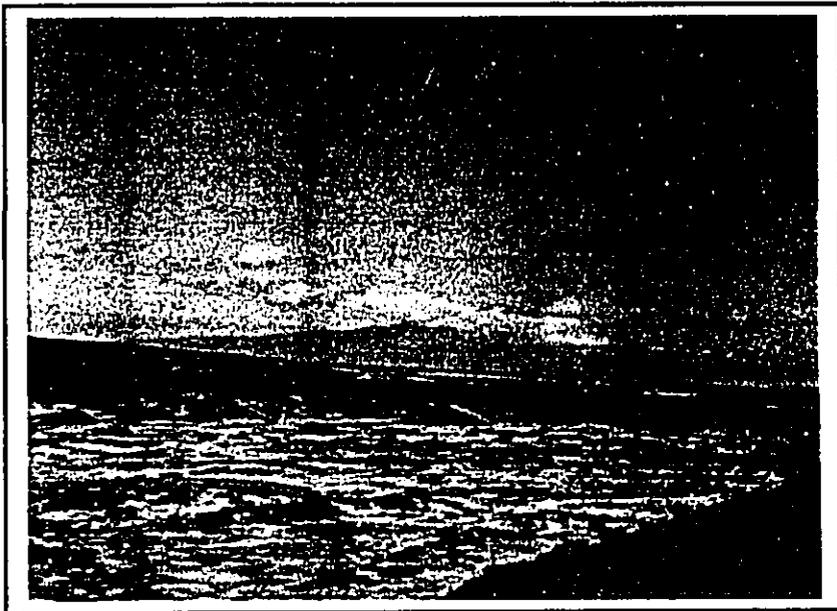


Figure 5. Photo KPA-N007



The 'Ōma'okoili and "Wether" Paddock stone walls of the Humu'ula Sheep Station (interviews with Johnny Ah San, Teddy Bell, Sr., Rally Greenwell, and Jiro Yamaguchi).

View towards 'Ōma'okoili, with Mauna Kea in background.

Figure 6. Photo KPA-3806

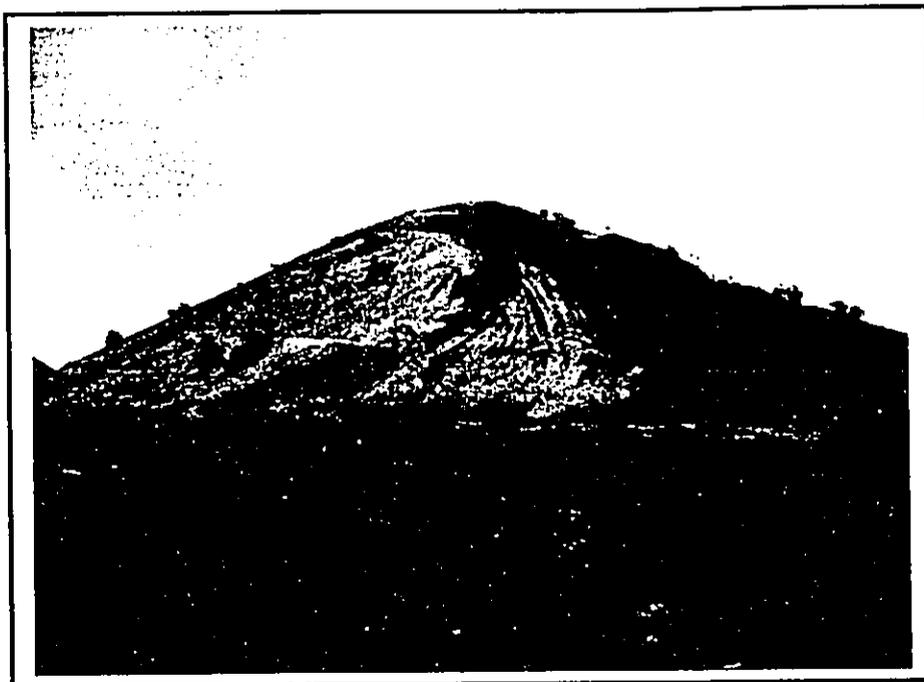


Figure 7.
"Pu'u Nēnē" – 1843 Lava
flow and 'Ōma'okoili
Paddock Wall in Foreground.
Area Quarried under State
Permits (Right to Middle of
Photo); Rectangular Patch at
Left of Photo from Previous
Palagonite Collection. (Photo
KPA-N1109; Apr. 2005)

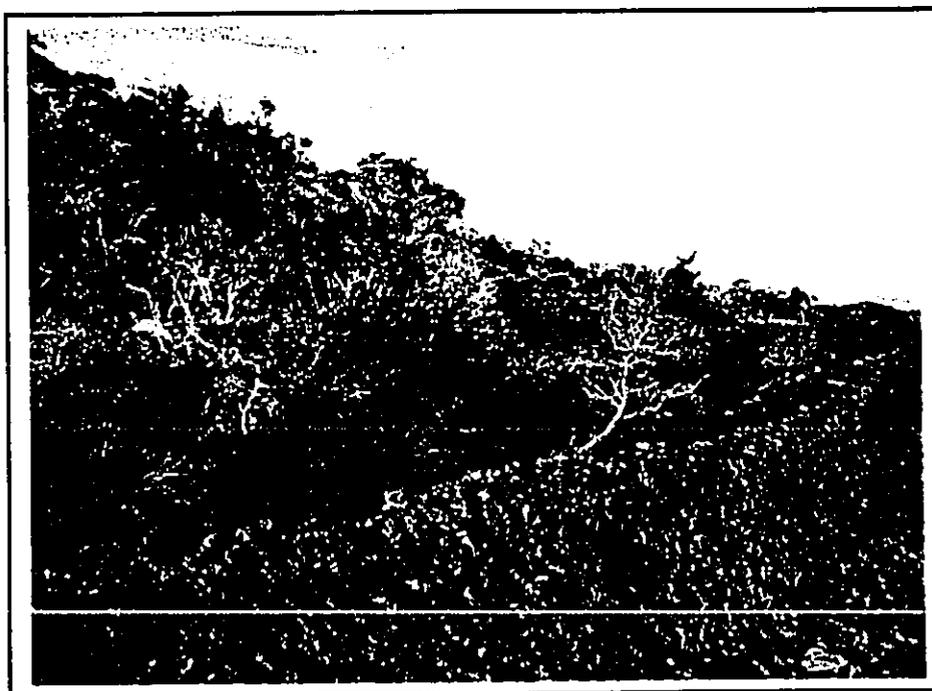
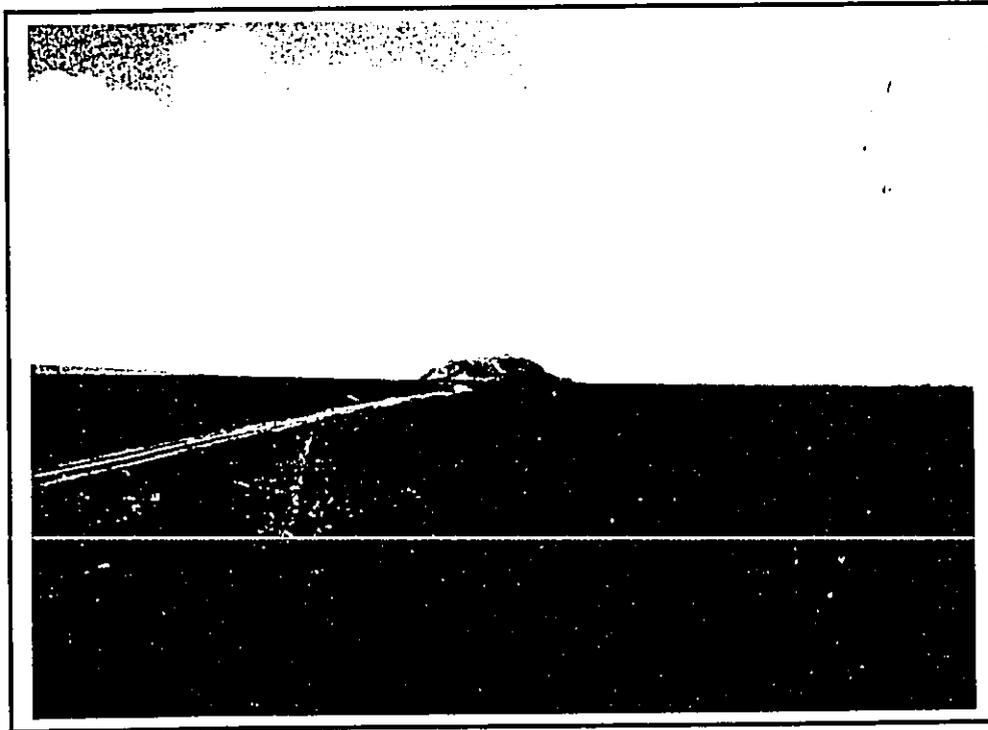
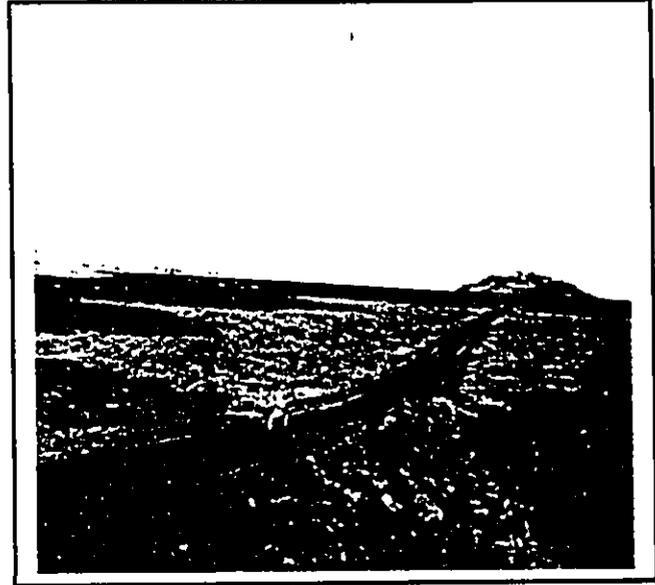


Figure 8.
Stone wall of the "Wether"
Paddock – 'Ōma'okoili Section,
along present-day Saddle Road;
towards Pu'u Huluhulu. (Photo
KPA-3930)

David Woodside and Johnny Ah San described the development of the paved Saddle Road alignment, noting that the present alignment through the Humu'ula-Ka'ohe section was specifically set out in order to protect the important *māmane* forest. It was recalled that L. Bill Bryan was insistent that the military not impact the forest and habitat resources.

*Figure 9. The "New" Saddle Road, 1942
Shot across 1935 Lava Flow, 'Ōma'okoili stone
walls, and towards Pu'u Huluhulu.
(KPA Copy Photo Courtesy of Johnny Ah San)*



*Figure 10. Saddle Road – 'Ōma'okoili Section Paddock Walls to Pu'u Huluhulu (2002)
(Photo KPA-2996).*

REFERENCES CITED

- Bingham, H.**
1969 A residence of Twenty-one Years in the Sandwich Islands. Praeger Publishers, New York, Washington & London (Reprint of 1855 edition).
- Boundary Commission Testimony**
1873-1891 Hawaii State Archives (Digitized copy in collection of *Kumu Pono Associates LLC*).
- Coulter, J.W.**
1935 A Gazetteer of the Territory of Hawaii. Honolulu.
- Handy, E.S.C., E.G. Handy, with M.K. Pukui**
1972 Native Planters in Old Hawaii, Their Life, Lore, and Environment. B.P. Bishop Museum Bulletin 233. B.P. Bishop Museum Press.
- Kamakau, S.M.**
1961 Ruling Chiefs of Hawaii. Honolulu: Kamehameha Schools Press.
- Lyons, C.J.**
1875 Land Matters in Hawaii. *Islander*, Honolulu.
- Malo, Davida**
1951 Hawaiian Antiquities. Honolulu, B.P. Bishop Museum. (Nathaniel Emerson, translator)
- Maly, Kepā (translator)**
ms. *Kaao Hooniua Puuwai no Ka-Miki* (The Heart Stirring Story of Ka-Miki). A translation of a legendary account of people and places of the island of Hawai'i, published in the Hawaiian Newspaper *Ka Hoku o Hawaii*; January 8, 1914 - December 6, 1917. (translations 1992-1999)
- 1999 "Na Kaa a Kekahi Elemakule o Hawaii." In *Ke Au Okoa May 8, 15, & 22, 1865*.
- Maly, Kepā**
1997 "Mauna Kea - Kuahiwi Ku Ha'o Mālie." A Report on Archival and Historical Documentary Research, Ahupua'a of Humu'ula and Ka'ohe, Districts of Hilo and Hāmākua, Island of Hawai'i. *Kumu Pono Associates, Hilo*.
- 1999 Mauna Kea Science Reserve and Hale Pōhaku Complex Development Plan Update: Oral History and Consultation Study, and Archival Literature Research. Ahupua'a of Ka'ohe (Hāmākua District) and Humu'ula (Hilo District), Island of Hawai'i. *Kumu Pono Associates, Hilo*. Prepared for Group 70 International, Honolulu.
- Maly, Kepā, and Onaona Maly**
2002 *Mo'olelo no ka 'Āina Mauna: Mauna Kea, Neighboring Mountain Lands, and Native Practices Described in Boundary Commission Testimonies of Kama'āina Witnesses and Residents from 1865 to 1891. Districts of Hilo, Hāmākua and Kohala Island of Hawai'i. Kumu Pono Associates LLC, Hilo, Hawai'i. Prepared for the University of Hawai'i-Office of Mauna Kea Management.*
- 2002 *He Wahi Mo'olelo no Ka 'Āina a me nā 'Ohana o Waiki'i ma Waikōloa (Kalana o Waimea, Kohala), a me ka 'Āina Mauna: A Collection of Traditions and Historical*

Accounts of the Lands and Families of Waiki'i at Waikōloa (Waimea Region, South Kohala), and the Mountain Lands, Island of Hawai'i. *Kumu Pono Associates LLC*, Hilo, Hawai'i. Prepared for the Waiki'i Ranch Homeowners Association, Waiki'i, Hawai'i.

- 2004 *Humu'ula a me Pi'ihonua: he mau 'Āina Lei Ali'i ma ka 'Āina Mauna o Hawai'i.* Humu'ula and Pi'ihonua: Lands that Adorn the Chiefs on the Mountain Lands of Hawai'i. A Collection of Native Traditions, Historical Accounts, and Oral History Interviews. *Kumu Pono Associates LLC*, Hilo, Hawai'i. Prepared for 'Ōiwi Lōkāhi o ka Moku o Keawe and Townscape, Inc.
- 2004 *He Wahi Mo'olelo No Humu'ula, Pi'ihonua, Waiākea, a me ka 'Āina Mauna o Hawai'i.* A Historical Overview of the Lands of Humu'ula, Pi'ihonua, Waiākea, and the Mountain Lands of Hawai'i (Districts of Hilo and Hāmākua, Island of Hawai'i). *Kumu Pono Associates LLC*, Hilo, Hawai'i. Prepared for International Archaeological and Research Institute, Inc.
- 2005 *Mauna Kea – "Ka Piko Kaulana o Ka 'Āina"* (The Famous Summit of the Land). A Collection of Native Traditions, Historical Accounts, and Oral History Interviews for Mauna Kea; the Lands of Ka'ohē, Humu'ula and the 'Āina Mauna on the Island of Hawai'i, *Kumu Pono Associates LLC*, Hilo, Hawai'i. Prepared for the University of Hawai'i-Office of Mauna Kea Management, Hilo.
- 2005 *He Mo'olelo 'Āina—A Cultural-Historical Study of the Upper Waiākea-Humu'ula Mountain Lands: The Proposed Kīpuka 'Āina Mauna Natural Area Reserve*, District of Hilo, Island Of Hawai'i. *Kumu Pono Associates LLC*, Hilo, Hawai'i. Prepared for the Department of Land and Natural Resources-Natural Area Reserves System.

Menzies, A

1908

An Early Ascent of Mauna Loa. Extract from "A. Menzies' M.S. Journal in Vancouver's Voyage, 1790-1794." In Thrum's Hawaiian Annual.

Pukui, M.K., S. Elbert & E. Mookini

1974

The Place Names of Hawaii. Honolulu: University Press of Hawaii.

Remy, J.

1865

"Na Kaa a Kekahi Elemakule o Hawaii." In *Ke Au Okoa*, Mei 8, 15 & 22 1865. (translated by Kepō Maly)

State of Hawai'i

Ms.

Files cited in text from the collections of the:
Hawai'i State Archives (HSA)
Department of Land and Natural Resources — Bureau of Conveyances
Department of Land and Natural Resources — Land Management Division
Department of Land and Natural Resources — State Survey Division

ENVIRONMENTAL ASSESSMENT
HAND-QUARRYING OF VOLCANIC ASH AT PU'U
NENE

APPENDIX 4
COMMENTS IN RESPONSE TO PRE-CONSULTATION

Harry Kim
Mayor



Christopher J. Yuen
Director

Roy R. Takemoto
Deputy Director

County of Hawaii

PLANNING DEPARTMENT

101 Pauahi Street, Suite 3 • Hilo, Hawaii 96720-3043
(808) 961-8288 • Fax (808) 961-8742

March 22, 2005

Mr. Ron Terry
Geometrician Associates, LLC
HC 2 Box 9575
Keaau, HI 96749

Dear Mr. Terry:

Subject: Draft Environmental Assessment
Applicant: Geohazards Consultants International, Inc.
Project: Excavation of a Martian Surface Simulant
TMK: 3-8-1:por. of 1, Puu Nene, North Hilo, Hawaii

This is in response to your February 14, 2005 letter requesting our comments on the above-referenced project. Also acknowledged is your March 21, 2005 telephone conversation with staff in which the parcel number was corrected to TMK: 3-8-1:por. of 1.

According to your letter, material was previously excavated from this same site in 1997 to be used, as a simulant for regolith believed to be present on Mars. Since the supply has been exhausted, the current project consists of the removal of an additional 150 tons to be shipped to the mainland.

We have the following to offer for the subject parcel:

1. This Mauna Loa Forest and Game Reserve, consisting of 52,981.699 acres, is designated Conservation by the State Land Use Commission. Due to this Conservation designation, there is no County zoning per se. Therefore, the Department of Land and Natural Resources has jurisdiction on any use, which occurs on the subject property.

Hawai'i County is an equal opportunity provider and employer.

Mr. Ron Terry
Page 2
March 22, 2005

2. The General Plan designation is Conservation.
3. The subject parcel is not located within the County's Special Management Area.

Please provide us with a copy of the Draft Environmental Assessment for our review and file.

If you have questions, please feel free to contact Esther Imamura or Larry Brown of this office at 961-8288.

Sincerely,


CHRISTOPHER J. YUEN
Planning Department

ETI:cd
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PHONE (808) 594-1888

FAX (808) 594-1865



STATE OF HAWAII
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAII 96813

HRD05/1748

March 22, 2005

Mr. Ron Terry, Principal
Geometrician Associates, LLC
HC 2 Box 9575
Kea'au, Hawai'i 96749

Re: Environmental Assessment for Excavation of a Martian Surface Simulant, Pu'u Nene, Island of Hawai'i TMK: 3-8-001:017

Dear Mr. Terry:

The Office of Hawaiian Affairs (OHA) is in receipt of your February 14, 2005 letter requesting comments on the proposal to recover what is described as "uniquely-altered" volcanic ash from a hand excavated pit on State of Hawai'i land on the slopes of Pu'u Nene. The ultimate objective appears to be to acquire up to 150 tons of this ash, after sifting it through dry stainless steel sieves, for transport to the National Aeronautics and Space Agency (NASA) for their use.

From the submitted information, it appears that approximately 30 tons of this material was obtained and utilized by NASA in 1997 and the supply is now exhausted. Although the materials note that an adjacent quarry operation has extensively disturbed the area, it is unclear as to the overall effect of the removal of 150 tons of refined ash will have on the *pu'u*.

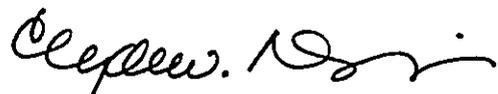
An archaeological inventory survey and a cultural impact assessment should occur with regards to this proposed project. In general, OHA is adverse to the large removal of natural resources in Hawai'i for export outside of the State, including rock, *pōhaku* and ash, *pa'u ahi*, associated with Pele.

OHA would like to be kept abreast and informed of any further actions concerning this particular project including a copy of the environmental assessment once completed. We look forward to reviewing the cultural assessment required by Act 50 in 2000 and suggest that you follow the guidelines put forth by the Environmental Review Council, especially the guidelines regarding cultural impact assessments.

Mr. Ron Terry
March 22, 2005
Page 2

If you have any questions or concerns, please contact Kai Markell, Policy Advocate, at 594-1945 or kaim@oha.org. Once again, thank you for your patience during our review and assessment of this important matter.

'O wau iho nō,



Clyde W. Nāmu'o
Administrator

LINDA LINGLE
GOVERNOR OF HAWAII



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

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

In reply, please refer to:
EMD/SHWB

March 24, 2005

Mr. Ron Terry
Geometrician Associates, LLC
HC 2 Box 9575
Keaau, Hawaii 96749

Dear Mr. Terry:

SUBJECT: Environmental Assessment for Excavation of a Martian Surface Simulant
Puu Nene, Hawaii / TMK: (3) 3-8-01-17

Thank you for the opportunity to offer comments on the above document. Your request has been reviewed by the Solid Waste, Underground Storage Tank, and Hazardous Waste programs within the Solid and Hazardous Waste Branch.

We have no comments to offer at this time.

Sincerely,

A handwritten signature in black ink, appearing to read "S.Y.K. Chang".

STEVEN Y.K. CHANG, P.E., CHIEF
Solid and Hazardous Waste Branch

LINDA LINGLE
GOVERNOR OF HAWAII



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

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

In reply, please refer to:
EMD / WB

March 10, 2005

H3 8 001 017.wpd
W12 wb050102

Mr. Ron Terry
Principal
Geometrician Associates
Haleiwa, Hawaii 96712

Dear Mr. Terry:

Subject: **Environmental Assessment for Excavation of a Martian Surface Simulant,
Pu'u Nene, Island of Hawai'i**
TMK: (3) 3-8-001: 017

Thank you for allowing us the opportunity to review the above subject project which proposes to recover small amounts of uniquely-altered volcanic ash from a hand-excavated pit on State land on the slopes of Pu'u Nene. We have the following comments to offer:

We are primarily concerned with domestic wastewater generation, treatment and disposal. Although there is no County sewer service system within the area and this undertaking appears to be a short term project, we will concur with the project as long as there is a temporary wastewater facility constructed or brought in - such as a portable toilet system that is pumped out on a scheduled basis.

We look forward to receiving a copy of the Environmental Assessment or at least the "wastewater treatment and disposal" section of said document.

All wastewater plans must conform to applicable provisions of the Department of Health's Administrative Rules, Chapter 11-62, "Wastewater Systems." We do reserve the right to review the detailed wastewater plans for conformance to applicable rules.

Good luck on your excavation and delivery of the end product. Should you have any questions, please contact the Planning & Design Section of our Branch at 586-4294.

Sincerely,

A handwritten signature in cursive script, appearing to read "Harold K. Yee".

HAROLD K. YEE, P.E., CHIEF
Wastewater Branch

LNKM:erm

Harry Kim
Mayor



Lawrence K. Mahuna
Police Chief

Harry S. Kubojiri
Deputy Police Chief

County of Hawaii

POLICE DEPARTMENT
349 Kapiolani Street • Hilo, Hawaii 96720-3998
(808) 935-3311 • Fax (808) 961-2389

March 8, 2005

Mr. Ron Terry
Principal
Geometrician Associates, LLC
HC2 Box 9575
Keaau, Hawaii 96749

Dear Mr. Terry:

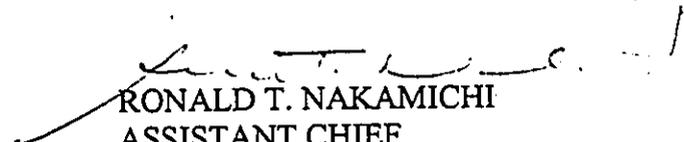
SUBJECT: ENVIRONMENTAL ASSESSMENT FOR EXCAVATION OF A
MARTIAN SURFACE SIMULANT, PU'U NENE, ISLAND OF HAWAII,
TMK (3rd) 3-8-01-17

Staff has reviewed the above-referenced Environmental Assessment and has no
comments or objections to offer at this time.

Should you have any questions, please contact Major John Dawrs of our Area II
Operations at 326-4646, extension 283.

Sincerely,

LAWRENCE K. MAHUNA
POLICE CHIEF


RONALD T. NAKAMICHI
ASSISTANT CHIEF
AREA II OPERATIONS

RTN:dmv

Harry Kim
Mayor



Darryl J. Oliveira
Fire Chief

Desmond K. Wery
Deputy Fire Chief

County of Hawai'i

FIRE DEPARTMENT

25 Aupuni Street • Suite 103 • Hilo, Hawai'i 96720
(808) 961-8297 • Fax (808) 961-8296

February 25, 2005

TO : RON TERRY, PRINCIPAL
GEOMETRICIAN ASSOC, LLC.
HC 2 BOX 9575
KEA'AU, HI 96749

FROM : DESMOND K. WERY, DEPUTY FIRE CHIEF

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR EXCAVATION OF A MARTIAN
SURFACE SIMULANT, PU'U NENE, ISLAND OF HAWAII
TMK: (3RD) 3-8-01-17

We have no comments to offer at this time in reference to the above-mentioned environmental assessment.

A handwritten signature in cursive script, appearing to read "Desmond K. Wery".

DESMOND K. WERY
DEPUTY FIRE CHIEF

JCP:cmj





REPLY TO
ATTENTION OF

Regulatory Branch

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

February 23, 2005

Ron Terry, Principal
Geometrician Associates, LLC
HC 2 Box 9575
Kea'au, Hawaii 96749

Dear Mr. Terry:

This responds to your request for comments on your Environmental Assessment preparation notice for proposed excavation of volcanic ash at Pu'u Nene, Island of Hawaii (TMK 3-3-8-01-17). We have reviewed the project information you provided in your letter with respect to the Corps' authority to issue Department of the Army (DA) permits under Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) and Section 404 of the Clean Water Act (33 USC 1344).

Based on the preliminary project information you provided, it appears that the proposed activity will not involve the discharge of dredged or fill material into waters of the United States, including adjacent wetlands; therefore, a DA permit will not be required.

Should you have questions concerning this determination, please contact Mr. Peter Galloway of my staff by telephone at (808) 438-8416, by fax at (808) 438-4060, or via e-mail at peter.galloway@usace.army.mil. Written inquiries should cite File No. **POH-2005-117** and should be sent to: Regulatory Branch (CEPOH-EC-R/P. Galloway); U.S. Army Engineer District, Honolulu; Building 230; Fort Shafter, Hawaii 96858-5440.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

LINDA LINGLE
GOVERNOR
STATE OF HAWAII



STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOMELANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

MICAH A. KANE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

BEN HENDERSON
DEPUTY TO THE CHAIRMAN

KAULANA II. PARK
EXECUTIVE ASSISTANT

February 23, 2005

Mr. Ron Terry
Geometrician Associates
HC 2 Box 9575
Keaau, Hawaii 96749

Dear Mr. Terry:

Thank you for the opportunity to review the environmental assessment summary for the excavation of a Martian surface simulat at Pu'u Nene on the island of Hawaii. The Department of Hawaiian Home Lands has no comments to offer.

Should you have any questions, please call the Planning Office at (808) 586-3836.

Aloha and mahalo,

Micah A. Kane

for
Micah A. Kane, Chairman
Hawaiian Homes Commission

ENVIRONMENTAL ASSESSMENT
HAND-QUARRYING OF VOLCANIC ASH AT PU'U
NENE

APPENDIX 5
COMMENTS TO DRAFT E.A. AND RESPONSES

Division of Forestry & Wildlife

1151 Punchbowl Street, Rm. 325 • Honolulu, HI 96813 • (808) 587-0166 • Fax: (808) 587-0160

August 23, 2005

MEMORANDUM

TO: Sam Lemmo, Administrator
Office of Conservation and Coastal Lands

FROM: Paul J. Conry, Administrator
Division of Forestry and Wildlife



SUBJECT: **Request for Authorization from the Department to Process a Conservation District Use Application on State-owned Lands. Jack Lockwood proposes to Hand Quarry Volcanic Ash at Pu'u Nene, North Hilo, Island of Hawaii. TMK (3) 3-8-001:001 por. Noted as REM R-7.**

We have reviewed the subject request and have no objections to the mining of ash as long as the tailings are put back into the excavation and allowed to revegetate. DOFAW has no problems with OCCL receiving and processing this CDUA application, since the applicant will need to do a public hearing and an environmental assessment prior to DOFAW issuing a permit. DOFAW will continue to work with the applicant to provide conditions required under the permit. DOFAW's Botanist has also reported that there maybe evidence of the endangered plant Silene hawaiiensis in the area which we will ask that the applicant complete a plant survey by a trained Botanist before any mining of ash begins. Thank you for the opportunity to comment.

C: Hawaii Branch DOFAW

Division of Forestry & Wildlife

151 Punchbowl Street, Rm. 325 • Honolulu, HI 96813 • (808) 587-0166 • Fax: (808) 587-0160

November 2, 2005

MEMORANDUM

TO: Tiger Mills, Planner
Office of Conservation and Coastal Lands

THRU Sam Lemmo, Administrator
Office of Conservation and Coastal Lands

FROM: Paul J. Conry, Administrator
Division of Forestry and Wildlife

Randall W. Kinnear

RECEIVED
OFFICE OF CONSERVATION
& COASTAL LANDS
2005 NOV 2 P 2 0

SUBJECT: Request for Authorization from the Department to Process a Conservation District Use Application on State-owned Lands. Jack Lockwood proposes to Hand Quarry Volcanic Ash at Pu'u Nene, North Hilo, Island of Hawaii. TMK (3) 3-8-001:001 por. Noted as REM R-7.

This is an amendment to DOFAW's August 23, 2005 memo to you regarding the subject CDUA above. The applicant will need to get a Commercial Harvesting Permit from DOFAW to access the area as well as other conditions relating to the permit. Our original comments are reiterated below.

We have no objections to the mining of ash as long as the tailings are put back into the excavation and allowed to revegetate. DOFAW has no problems with OCCL receiving and processing this CDUA application, since the applicant will need to do a public hearing and an environmental assessment prior to DOFAW issuing a permit. DOFAW will continue to work with the applicant to provide conditions required under the permit. DOFAW's Botanist has also reported that there maybe evidence of the endangered plant Silene hawaiiensis in the area which we will ask that the applicant complete a plant survey by a trained Botanist before any mining of ash begins. Thank you for the opportunity to comment.

C Hawaii Branch DOFAW
Michael Constantinides, DOFAW Administration

DOCUMENT CAPTURED AS RECEIVED

geometrician

ASSOCIATES, LLC

integrating geographic science and planning

phone: (808) 982-5831 fax: (808) 966-7593 HC 2 Box 9575 Kea'au Hawai'i 96749
ronterry@verizon.net

November 9, 2005

Paul Conry, Administrator
Hawaii State Division of Forestry and Wildlife
1151 Punchbowl Street, Room 325
Honolulu HI 96813

Dear Mr. Conry:

Subject: Comments on Draft Environmental Assessment (DEA)/Conservation District Use Application (CDUA-HA 3250) for Hand Quarrying of Volcanic Ash at Pu'u Nene, North Hilo, TMK 3-8-01:01

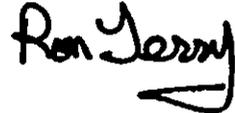
Thank you for your comment letter memos dated August 23 and November 2, 2005, on the EA and/or CDUA. In answer to your specific comments:

1. *Botany survey.* Biologist Patrick J. Hart, Ph.D., performed a botanical survey for the EA, the species list for which is included in the EA. The quarry area is heavily infested by alien grasses and herbs, and no *Silene hawaiiensis* was found in or near the area that would be affected in any way by the project.

2. *Permit conditions.* The applicant looks forward to working under any reasonable CDUP conditions that DOFAW may suggest to preserve and enhance the native biota of the area.

Again, thank you for your comment. If you have any questions about the project, please contact me at 982-5831.

Sincerely,



Ron Terry, Principal
Geometrician Associates

Cc: Sam Lemmo, Administrator, DLNR-OCCL

LINDA LINGLE
GOVERNOR
STATE OF HAWAII



STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOMELANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

MICAH A. KANE
CHAIRMAN
HAWAIIAN HOMES COMMISSION
BEN HENDERSON
DEPUTY TO THE CHAIRMAN
KAULANA H. PARK
EXECUTIVE ASSISTANT

September 19, 2005

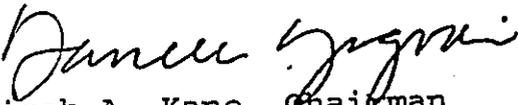
Mr. Ron Terry
Geometrician Associates
HC 2 Box 9575
Keaau, Hawaii 96749

Dear Mr. Terry:

Thank you for the opportunity to review the draft environment assessment report for the "Hand Quarrying of Volcanic Ash at Pu'u Nene" project in Hilo, Hawaii. The Department of Hawaiian Home Lands has no comments to offer.

Should you have any questions, please call the Planning Office at (808) 586-3836.

Aloha and mahalo,

for 
Micah A. Kane, Chairman
Hawaiian Homes Commission

c: Office of Environmental Quality Control
Department of Land and Natural Resources

RECEIVED
OFFICE OF CONSERVATION
& COASTAL LANDS
2005 SEP 20 P 2:17
DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

geometrician

ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 982-5831 fax: (808) 966-7593 HC 2 Box 9575 Kea'au Hawai'i 96749
ronterry@verizon.net

November 9, 2005

Micah Kane, Chairman
Hawaiian Homes Commission
P.O. Box 1879
Honolulu HI 96805

Dear Mr. Kane:

**Subject: Comments on Draft Environmental Assessment (DEA)/Conservation
District Use Application (CDUA-HA 3250) for Hand Quarrying of
Volcanic Ash at Pu'u Nene, North Hilo, TMK 3-8-01:01**

Thank you for your comment letter dated September 19, 2005, on the EA and/or CDUA,
in which you stated that you had no comments to offer. If at any point you have concerns
or questions, please contact me at 982-5831.

Sincerely,



Ron Terry, Principal
Geometrician Associates

Cc: Sam Lemmo, Administrator, DLNR-OCCL

LINDA LINGLE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
OFFICE OF CONSERVATION AND COASTAL LANDS
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
ROBERT K. MASUDA
DEPUTY DIRECTOR - LAND
DEAN NAKANO
ACTING DEPUTY DIRECTOR - WATER
AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

REF:OCCL:TM

File No.: HA-3250
Acceptance Date: August 24, 2005
180 Day Expiration Date: February 20, 2006
SUSPENSE DATE: 21 Days from
stamped date SEP - 2 2005

MEMORANDUM:

TO: The Department of Land and Natural Resources Divisions of: Historic Preservation; Engineering; Hawaii District Land Office; Forestry and Wildlife; and Conservation and Resource Enforcement

FROM: Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands

SUBJECT: REQUEST FOR COMMENTS
Conservation District Use Application HA-3250
BOARD PERMIT
Commercial Use of Hand Quarried Ash

APPLICANT: Ron Terry for
Jack Lockwood

TMKs: See Materials

LOCATION: See Acceptance Letter and attachments

PUBLIC HEARING: YES X NO

05 SEP 06 AM 09:42 ENGINEERING

Please contact Tiger Mills at 587-0382, should you have any questions on this matter.

If no response is received by the suspense date, we will assume there are no comments. The suspense date starts from the date stamp.

Comments Attached
 No Comments

Signature

Attachment(s)

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LA/NAV

REF.: OCCL:TM
FILE NO.:HA-3250
Hawaii.327

COMMENTS

- () We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Flood Zone ____.
- (X) Please take note that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Flood Zone X. The National Flood Insurance Program (NFIP) does not have any regulations for development within Flood Zone X.
- () Please note that the correct Flood Zone Designation for the project site according to the Flood Insurance Rate Map (FIRM) is ____.
- () Please note that the project must comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR), whenever development within a Special Flood Hazard Area is undertaken. If there are any questions, please contact the State NFIP Coordinator, Ms. Carol Tyau-Beam, of the Department of Land and Natural Resources, Engineering Division at (808) 587-0267.

Please be advised that 44CFR indicates the minimum standards set forth by the NFIP. Your Community's local flood ordinance may prove to be more restrictive and thus take precedence over the minimum NFIP standards. If there are questions regarding the local flood ordinances, please contact the applicable County NFIP Coordinators below:

- () Mr. Robert Sumimoto at (808) 523-4254 or Mr. Mario Siu Li at (808) 523-4247 of the City and County of Honolulu, Department of Planning and Permitting.
- () Mr. Kelly Gomes at (808) 961-8327 (Hilo) or Mr. Kiran Emler at (808) 327-3530 (Kona) of the County of Hawaii, Department of Public Works.
- () Mr. Francis Cerizo at (808) 270-7771 of the County of Maui, Department of Planning.
- () Mr. Mario Antonio at (808) 241-6620 of the County of Kauai, Department of Public Works.

- () The applicant should include project water demands and infrastructure required to meet water demands. Please note that the implementation of any State-sponsored projects requiring water service from the Honolulu Board of Water Supply system must first obtain water allocation credits from the Engineering Division before it can receive a building permit and/or water meter.
- () The applicant should provide the water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update.

() Additional Comments: _____

() Other: _____

Should you have any questions, please call Mr. Andrew Morden of the Planning Branch at 587-0229.

Signed: Eric T. Hirano
ERIC T. HIRANO, CHIEF ENGINEER

Date: 9/8/05

LINDA LINGLE
GOVERNOR OF HAWAII



Dawson



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
OFFICE OF CONSERVATION AND COASTAL LANDS
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
ROBERT K. MASUDA
DEPUTY DIRECTOR - LAND
DEAN NAKANO
ACTING DEPUTY DIRECTOR - WATER
AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAIHOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

REF:OCCL:TM

File No.: HA-3250
Acceptance Date: August 24, 2005
180 Day Expiration Date: February 20, 2006
SUSPENSE DATE: 21 Days from
stamped date SEP - 2 2005

MEMORANDUM:

TO: The Department of Land and Natural Resources Divisions of: Historic Preservation; Engineering; Hawaii District Land Office; Forestry and Wildlife; and Conservation and Resource Enforcement

FROM: Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands

SUBJECT: REQUEST FOR COMMENTS
Conservation District Use Application HA-3250
BOARD PERMIT
Commercial Use of Hand Quarried Ash

APPLICANT: Ron Terry for
Jack Lockwood

TMKs: See Materials

LOCATION: See Acceptance Letter and attachments

PUBLIC HEARING: YES X NO

Please contact Tiger Mills at 587-0382, should you have any questions on this matter.

If no response is received by the suspense date, we will assume there are no comments. The suspense date starts from the date stamp.

() Comments Attached

() No Comments

Attachment(s)

Signature

Wayde Young #54
08/24/05

2005 SEP 2 11:00 AM
RECEIVED

LINDA LINGLE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
OFFICE OF CONSERVATION AND COASTAL LANDS
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

SEP 7 2005

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
DEPUTY DIRECTOR - LAND

DEAN MAKANO
ACTING DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES IMPROVEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAIHOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

04-0709

REF:OCCL:TM

File No.: HA-3250
Acceptance Date: August 24, 2005
180-Day Expiration Date: February 20, 2006
SUSPENSE DATE: 21 Days from
stamped date SEP - 2 2005

MEMORANDUM:

TO: Jiakai Liu, Land Use Review Coordinator
Environmental Planning Office

THROUGH: Chiyome Fukino M.D., Director
The Department of Health

FROM: Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands

SUBJECT: REQUEST FOR COMMENTS
Conservation District Use Application OA-3250
BOARD PERMIT
Commercial Use of Hand Quarried Ash

APPLICANT: Ron Terry for
Jack Lockwood

TMKs: See Materials

LOCATION: See Acceptance Letter and attachments

PUBLIC HEARING: YES X NO

RECEIVED
OFFICE OF CONSERVATION
AND COASTAL LANDS
2005 SEP 22 A 7:51
DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

Please contact Tiger Mills at 587-0382, should you have any questions on this matter.

If no response is received by the suspense date, we will assume there are no comments. The suspense date starts from the date stamp.

() Comments Attached

(X) No Comments

Attachment(s)

Signature

1-0044

LINDA LINGLE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
OFFICE OF CONSERVATION AND COASTAL LANDS
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
ROBERT K. MASUDA
DEPUTY DIRECTOR - LAND
DEAN NAKANO
ACTING DEPUTY DIRECTOR - WATER
AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

REF:OCCL:TM

File No.: HA-3250
Acceptance Date: August 24, 2005
180 Day Expiration Date: February 20, 2006
SUSPENSE DATE: 21 Days from
stamped date: SEP 11 2005
RECEIVED
OFFICE OF CONSERVATION
AND COASTAL LANDS
HONOLULU, HAWAII
SEP 11 8:27 AM

MEMORANDUM:

TO: The Department of Land and Natural Resources Divisions of: Historic Preservation; Engineering; Hawaii District Land Office; Forestry and Wildlife; and Conservation and Resource Enforcement

FROM: Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands

SUBJECT: REQUEST FOR COMMENTS
Conservation District Use Application HA-3250
BOARD PERMIT
Commercial Use of Hand Quarried Ash

APPLICANT: Ron Terry for
Jack Lockwood

TMKs: See Materials

LOCATION: See Acceptance Letter and attachments

PUBLIC HEARING: YES X NO

Please contact Tiger Mills at 587-0382, should you have any questions on this matter.

If no response is received by the suspense date, we will assume there are no comments. The suspense date starts from the date stamp.

() Comments Attached

(X) No Comments

Attachment(s)

Signature

RECEIVED
LAND DIVISION
HILLO, HAWAII
SEP - 11 A.M.

geometrician

ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 982-5831 fax: (808) 966-7593 HC 2 Box 9575 Kea'au Hawai'i 96749
ronterry@verizon.net

November 9, 2005

Sam Lemmo, Administrator
Office of Conservation and Coastal Lands
Hawai'i State Department of Land and Natural Resources
P.O. Box 621
Honolulu HI 96809

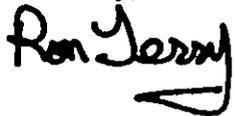
Dear Mr. Lemmo:

Subject: Comments on Draft Environmental Assessment (DEA)/Conservation District Use Application (CDUA-HA 3250) for Hand Quarrying of Volcanic Ash at Pu'u Nene, North Hilo, TMK 3-8-01:01

In the interest of a complete record on comment letters to the EA/CDUA, I would like to acknowledge receipt from your office of undated form memos checked "no-comments" from the Division of State Parks, DOCARE, and the Land Division, as well as the comment from the Engineering Division that the project is in Flood Zone "X".

If you have any questions about the project, please contact me at 982-5831.

Sincerely,



Ron Terry, Principal
Geometrician Associates

5054

LINDA LINGLE
GOVERNOR OF HAWAII



STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186
E-mail: oeqc@health.state.hi.us

GENEVIEVE SALMONSON
DIRECTOR

RECEIVED

'05 OCT -7 10:32

& NATURAL RESOURCES

September 30, 2005

Mr. Peter Young, Chair
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawai'i 96809

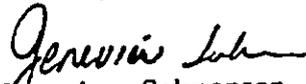
Dear Mr. Young:

Subject: Draft Environmental Assessment for the Pu'u Nene Hand-Quarrying of Volcanic Ash,
Island of Hawai'i

Thank you for the opportunity to review the subject document. We have no comments.

Should you have any questions, please call Jeyan Thirugnanam at 586-4185.

Sincerely,


Genevieve Salmonson
Director

c: Geometrician

RECEIVED
OFFICE OF CONSERVATION
AND COASTAL LANDS
2005 OCT -7 P 4: 32
DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

RECEIVED
OFFICE OF CONSERVATION
AND COASTAL LANDS
2005 OCT 10 A 8: 15
DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

geometrician

ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 982-5831 fax: (808) 966-7593 HC 2 Box 9575 Kea'au Hawai'i 96749
ronterry@verizon.net

November 9, 2005

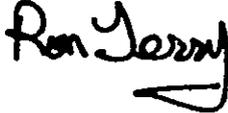
Genevieve Salmonson, Director
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu HI 96813

Dear Ms. Salmonson:

**Subject: Comments on Draft Environmental Assessment (DEA)/Conservation
District Use Application (CDUA-HA 3250) for Hand Quarrying of
Volcanic Ash at Pu'u Nene, North Hilo, TMK 3-8-01:01**

Thank you for your comment letter on the EA dated September 30, 2005, in which you stated that you had no comments to offer. If at any point you have concerns or questions, please contact me at 982-5831.

Sincerely,



Ron Terry, Principal
Geometrician Associates

Cc: Sam Lemmo, Administrator, DLNR-OCCL

PHONE (808) 594-1888

FAX (808) 594-1865



STATE OF HAWAII
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAII 96813

RECEIVED
OFFICE OF CONSERVATION
AND COASTAL LANDS

2005 SEP 27 P 4: 14

DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

HRD05/2030

September 19, 2005

Samuel Lemmo
Department of Land and Natural Resources
Office of Conservation and Coastal Lands
P.O. Box 621
Honolulu, HI 96809

RE: Proposed Hand Quarrying of Ash at Pu'u Nene, North Hilo, Hawai'i, TMK (3) 3-8-001:
001 (por.).

Dear Mr. Lemmo,

The Office of Hawaiian Affairs (OHA) is in receipt of your September 2, 2005 request for comment on the above listed proposed project, TMK (3) 3-8-001: 001 (por.). OHA offers the following comments:

OHA has no comment specific to the proposed quarrying of ash at Pu'u Nene. Please have the consultant contact Ululani Sherlock at OHA's Hilo office if you have any future questions concerning community consultation.

OHA further requests your assurances that if the project goes forward, should iwi or Native Hawaiian cultural or traditional deposits be found during ground disturbance, work will cease, and the appropriate agencies will be contacted pursuant to applicable law.

Thank you for the opportunity to comment. If you have further questions or concerns, please contact Jesse Yorck at (808) 594-0239 or jessey@oha.org.

'O wau iho nō,

A handwritten signature in cursive script, appearing to read "Clyde W. Nāmu'o".

Clyde W. Nāmu'o
Administrator

CC Ululani Sherlock
OHA Community Affairs Coordinator (Hilo)
162 A Baker Avenue
Hilo, HI 96720-4869

geometrician

ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 982-5831 fax: (808) 966-7593 HC 2 Box 9575 Kea'au Hawai'i 96749
ronterry@verizon.net

November 9, 2005

Clyde Namu'o, Administrator
Office of Hawaiian Affairs
711 Kapiolani Blvd., Suite 1250
Honolulu HI 96813

Dear Mr. Namu'o:

Subject: Comments on Draft Environmental Assessment (DEA)/Conservation District Use Application (CDUA-HA 3250) for Hand Quarrying of Volcanic Ash at Pu'u Nene, North Hilo, TMK 3-8-01:01

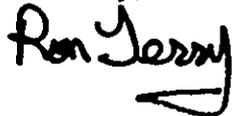
Thank you for your comment letter dated September 19, 2005, on the EA and/or CDUA. In answer to your specific comments:

1. *Community consultation.* The EA included a summary of the results of extensive consultation on resources in the Saddle area by Kepa Maly. Consultation also included a widely advertised public meeting as well as a DLNR public hearing, which attracted participation by the community, including Native Hawaiians.

2. *Finds of cultural material during construction.* All personnel will be thoroughly trained in environmental and cultural sensitivity, and part of training will include the instruction that if any iwi or Hawaiian cultural or traditional deposits are found during ground disturbance, work will cease, and appropriate agencies will be contacted pursuant to applicable laws and regulations.

Again, thank you for your comment. If you have any questions about the project, please contact me at 982-5831.

Sincerely,



Ron Terry, Principal
Geometrician Associates



DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF

September 28, 2005

File No. POH-2005-117

Regulatory Branch

Mr. Ron Terry
Geometrician Associates, LLC
HC 2 Box 9575
Kea'au, Hawaii 96749

RECEIVED
OFFICE OF CONSERVATION
AND COASTAL LANDS
2005 SEP 30 A 9:10
DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

Dear Mr. Terry:

This responds to your request for comments on the Draft Environmental Assessment (DEA) for Hand Quarring of Volcanic Ash at Pu'u Nene, North Hilo, Island of Hawaii (TMK: (3rd) 3-8-01:01 (por)). We have reviewed the DEA with respect to the Corps' authority to issue a Department of Army (DA) permit under Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) and section 404 of the Clean Water Act (33 USC 1344).

Our preliminary jurisdictional determination for your proposed activity (letter dated February 23, 2005) is included in the DEA. Based on the additional information provided in the DEA, I have determined that the activity will not involve the of discharge of dredged or fill material into waters of the United States, including adjacent wetlands; therefore, a DA permit will not be required.

If you have any questions regarding this determination, please contact Mr. Peter Galloway by phone at 438-8416, by fax at 438-4060, or by electronic mail at Peter.Galloway@usace.army.mil, and refer to above file number.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

Copy Furnished:

Director, Office of Environmental Quality Control, 235 South Beretania St. #702, Honolulu HI 96813
Sam Lemmo, Hawaii State DLNR, P. O. Box 621, Honolulu, HI 96801

geometrician

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integrating geographic science and planning

phone: (808) 982-5831 fax: (808) 966-7593 HC 2 Box 9575 Kea'au Hawai'i 96749
ronterry@verizon.net

November 9, 2005

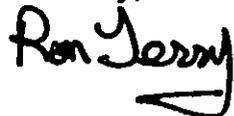
George P. Young, P.E., Chief
Regulatory Branch
U.S. Army Engineer District,
Ft. Shafter HI 96858-5440

Dear Mr. Young:

**Subject: Comments on Draft Environmental Assessment (DEA)/Conservation
District Use Application (CDUA-HA 3250) for Hand Quarrying of
Volcanic Ash at Pu'u Nene, North Hilo, TMK 3-8-01:01**

Thank you for your comment letter dated September 28, 2005, on the EA and/or CDUA, citing COE File No. POH-2005-117, in which you stated that your preliminary determination that the project would not require a DA permit was supported by the information provided in the EA. If you have any questions about the project, please contact me at 982-5831.

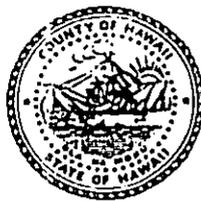
Sincerely,



Ron Terry, Principal
Geometrician Associates

Cc: Sam Lemmo, Administrator, DLNR-OCCL

Harry Kim
Mayor



Lawrence K. Mahuna
Police Chief

Harry S. Kubojiri
Deputy Police Chief

County of Hawaii

POLICE DEPARTMENT

349 Kapiolani Street • Hilo, Hawaii 96720-3998
(808) 935-3311 • Fax (808) 961-8869

September 29, 2005

Mr. Ron Terry, Ph.D.
Project Environmental Consultant
Geometrician Associates, LLC
HC2 Box 9575
Keaau, Hawaii 96749

Dear Dr. Terry:

**SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (DEA)
HAND QUARRYING OF VOLCANIC ASH AT PU'U NENE
TMK: (3RD) 3-8-001:001 (POR.)**

Staff, upon review of the Draft Environmental Assessment application, has determined that the hand-quarrying of volcanic ash at Pu'u Nene Hill, off Saddle Road, will not significantly impact traffic in the area. Therefore, we have no comments or concerns.

Thank you for the opportunity to comment.

Sincerely,

James M. Day
JAMES M. DAY
ASSISTANT POLICE CHIEF
AREA I OPERATIONS

EWR:lli

geometrician

ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 982-5831 fax: (808) 966-7593 HC 2 Box 9575 Kea'au Hawai'i 96749
ronterry@verizon.net

November 9, 2005

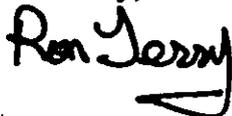
James M. Day, Asst. Police Chief
Hawaii County Police Department
349 Kapiolani Street
Hilo HI 96720

Dear Mr. Day:

Subject: Comments on Draft Environmental Assessment (DEA)/Conservation District Use Application (CDUA-HA 3250) for Hand Quarrying of Volcanic Ash at Pu'u Nene, North Hilo, TMK 3-8-01:01

Thank you for your comment letter dated September 29, 2005, in which you stated that your agency had determined that the project would not significantly impact traffic in the area, and had no further comments to offer. If at any point you have concerns or questions, please contact me at 982-5831.

Sincerely,



Ron Terry, Principal
Geometrician Associates

Cc: Sam Lemmo, Administrator, DLNR-OCCL

THE BIG ISLAND NATIVE PLANT SOCIETY

COMMENTARY

To: GeoMetrician Associates Contact: Ron Terry
HC 2 Box 9575
Kea'au, HI. 96749

From: Big Island Native Plant Society Contact: David Paul
P.O. Box 2081
Kea'au, HI. 96749

RE: Hand Quarrying of Volcanic Ash at Pu'u Nene.

Attention: Ron Terry; consultant to GeoMetrician Associates.

At the request of Keonipa'a Choy of Hawai'i, I joined him on a survey of Pu'u Nene along the Saddle Road (29 mile marker approx.) on Friday, October 7, 2005, on the Island of Hawai'i.

Keonipa'a explained; "This is a traditional hunting and gathering site of my ohana. I still gather 'iliahi / sandalwood (*Santalum paniculatum* var. *paniculatum*) seeds on Pu'u Nene." He states; "The seeds are late this year".

The following commentary depicts the Big Island Native Plant Society's critique of a Geometrician's (Ron Terry) attempt to address biological and conservation issues in a Conservation District of most extreme importance on the Island of Hawai'i.

- The consultant (Ron Terry) states that "Pu'u Nene is dominated by alien vegetation", but he failed to look on the windward side of Pu'u Nene and notice that it is covered with high quality Sub-Alpine Dry Forest. This rare habitat is dominated by nai'o (*Myoporum sandwicense*), mamane (*Sophora chrysophylla*), pilo (*Coprosma montana*), and 'iliahi / sandalwood (*Santalum paniculatum* var. *paniculatum*).
- There are also two rare understory plants found in this habitat; the Hawaiian nettle (*Hesperocnide sandwicensis*) and 'anunu (*Sicyos anunu*). *Hesperocnide sandwicensis* juveniles were so numerous in a few areas that we had to be careful to avoid stepping on them. This Sub-Alpine Dry Forest even contains three species of endemic grasses. These are two species of kawelu (*Eragrostis atropioides* & *Eragrostis leptophylla*) and Hawaiian hairgrass (*Deschampsia nubigena*).
- The leeward side of Pu'u Nene, where the defines of the project site occur, contain several components of the Sub-Alpine Dry Forest, as the consultant has confessed.

- A list of the endemic species of the Sub-Alpine Dry Forest at Pu'u Nene is represented in Figure 1., at the end of this report.
- Pu'u Nene contains a Unique Biological Community that has been impacted, but has a very high chance of Recovery.
- Recovery can be observed at Pu'u Huluhulu to the East of Pu'u Nene.
- Pu'u Nene represents the start of the Sub-Alpine Dry Forest, going over the Saddle from Hilo. Pu'u Huluhulu represents the end of the Montane Mesic Forest.
- Pu'u Nene is directly adjacent to Critical Habitat in Pohakuloa that sustains 10 species of Listed Endangered plants.
- Due North of Pu'u Nene is the Southern border of Mauna Kea Forest Reserve.
- Due South of Pu'u Nene is the Northern border of Mauna Loa Forest Reserve.

In his report, the consultant (Ron Terry) states that; "after revegetation the project site will appear almost identical to before."

Fact is, that by simple observation, anyone can see that once a pu'u is scarified, it never recovers!

In Part 5: Findings & Reasonings.

#7. The consultant states that: "The project is minor and environmentally benign and would thus not contribute to environmental degradation."

This is an inexperienced judgment call on behalf of the consultant (Ron Terry). He does not know this as a fact, and has presented no data to support his idea.

#8. The consultant states that: "The project site supports sparse and predominantly alien vegetation."

This might be true of the proposed lines of the site of excavation, but just a few feet away is a rare Sub-Alpine Dry Forest stand!

This is where the consultant (Ron Terry) needs to think outside of the box. In a unique environment such as that at Pu'u Nene, one needs to consider the entire feature.

Looking at one's own project while having a blind eye to the rest of the habitat is negligent!

- The consultant also states that, "Impacts to rare, threatened or endangered species of flora or fauna will not occur."
- He (Ron Terry) does not know that as a fact, and is not qualified to make that judgement.

In the "Background" section, the consultant disclosed that the "palagonitized tephra" soil which NASA scientists desire for "studying Mars" is found in "the Saddle Road Region of the Big Island." This means that this soil can be found in other places than Pu'u Nene.

As these are "ash deposits" they are well spread in other places than Pu'u Nene. The deposits can conceivably be located in the middle of a pasture, or from the area of the new road, rather than from the side of a pu'u.

Pu'u throughout the Saddle Road area are unique biological habitats; Pu'u Nene included.

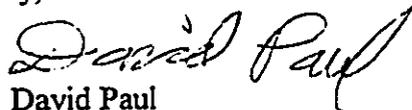
It is important that this resource in a Conservation District be preserved. Fencing and other hands-on management tactics have proven successful throughout the area.

Pu'u Nene has already had enough damage! The consultant (Ron Terry) for this project is not a Botanist or any other type of Biologist. He should not be making judgment calls on biological issues that require expertise in a field of which he is not experienced.

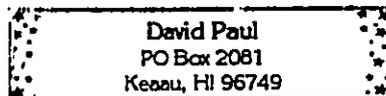
Pu'u Nene is in need of management not mining!

Pu'u Nene is a unique habitat which is capable of sustaining rare and endangered species of life. Further degradation of this environment will not help it, but rather will be it's demise. Recovery should be the goal of this precious resource.

Sincerely,



David Paul
President
Big Island Native Plant Society



CC: DLNR DDFAW
DEQC
USFWS
Jack Lockwood

Figure 1. List of Sub-Alpine Forest Species of Pu'u Nene.

<u>Genus / species</u>	<u>Common Name</u>
DICOTS	
<i>Argemone glauca</i> (Nutt.ex Prain) Pope	pua kala
<i>Coprosma moniana</i> Hillebr.	pilo
<i>Dodonaea viscosa</i> Jacq.	'a'al'i'i
<i>Hesperocnide sandwicensis</i> (Wedd.) Wedd.	Hawaiian nettle
<i>Myoporum sandwicense</i> A. Gray	naio
<i>Pseudognaphalium sandwicense</i> Gaud.	'ena'ena
<i>Santalum paniculatum</i> var. <i>paniculatum</i>	'iliahi / sandalwood
<i>Sicyos anuru</i> (St. John) Telford	'anunu
<i>Sophora chrysophylla</i> (Salisb.) Seem.	mamane
<i>Styphelia tameiameia</i> (Cham. & Schlect.) Muell.	pukiawe
MONOCOTS	
<i>Deschampsia nubigena</i> Hillebr.	Hawaiian hairgrass
<i>Eragrostis atropioides</i> Hillebr.	kawelu grass
<i>Eragrostis leptophylla</i> Hitchc.	kawelu grass
PTERIDOPHYTES (Ferns)	
<i>Asplenium adiantum-nigrum</i> L.	'iwa'iwa
<i>Pellaea ternifolia</i> (Cav.) Link	kalamoho lau li'i

REFERENCES

- Palmer, D.D., 2003. "Hawai'i's Ferns and Fern Allies." University of Hawai'i Press. Honolulu, HI. 324p.
- Wagner, W.L., Herbst, D.R., & Sohmer, S.H. 1999. "Manual of the Flowering Plants of Hawai'i: Revised Edition." University of Hawai'i Press. Honolulu, HI. 2 vol. 1919p.

geometrician

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integrating geographic science and planning

phone: (808) 982-5831 fax: (808) 966-7593 HC 2 Box 9575 Kea'au Hawai'i 96749
ronterry@verizon.net

November 9, 2005

David Paul
Big Island Native Plant Society
P.O. Box 2081
Kea'au HI 96749

Dear Mr. Paul:

Subject: Comments on Draft Environmental Assessment (DEA)/Conservation District Use Application (CDUA-HA 3250) for Hand Quarrying of Volcanic Ash at Pu'u Nene, North Hilo, TMK 3-8-01:01

Thank you for your comment letter on the EA. In answer to your specific comments:

1. *Affected area on Pu'u Nene.* Much of the basis of your criticism in your comment letter rests on the supposition that the very restricted quarrying activities on a small part of the disturbed and alien-dominated northern face of Pu'u Nene will somehow impact the forest found on the other sides of the cone. The area of pristine dryland native forest you describe on the south slope of Pu'u Nene is indeed an important ecosystem, and definitely needs protection from predation from feral ungulates (as well as from massive, unsupervised mechanical quarrying such as was carried out on the north slope of Pu'u Nene in the 1970s). This native forest is, however, located within a crater, on the opposite side of Pu'u Nene, 600-1,000 feet away from our proposed hand-quarry area. The proposed hand-quarry operation is not expected to impact the native forest. Prevailing surface winds through the Humu'ulu Saddle area blow parallel to the Saddle rather than from the north, and any minor levels of dust from the hand-dug, progressively restored pit would be blown away from the native forests on the south side of the cone. It is important to note that most parts of Pu'u Nene are not pristine – there are numerous dumps and quarries – and that the proposed activity takes place between other quarries, and not in a sensitive location. Dr. Lockwood conducted the operation here before and produced no impact on other areas of the cone, and there is no reason to believe that this time would be different.

2. *Supposed shortcomings of the botany survey.* The rare plants you cite are in an area that would be unaffected by the proposed activity. I grant that there are many botanically interesting and valuable areas in the Saddle Road, but an Environmental Assessment is not meant to be an encyclopedia of interesting facts, but an analysis of the impacts of a project.

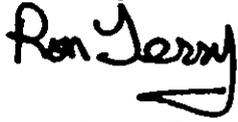
3. *Overall biological value and recovery potential at Pu'u Nene.* While we agree that with proper management and funding, Pu'u Nene could become a biological refuge similar to Pu'u Huluhulu, no element of this project is inconsistent with any program by DOFAW to do so. Over a very limited area with highly disturbed vegetation, a few feet of substrate would be extracted and all but a few inches put back on the site, with the topsoil on top. As neither DOFAW nor any other party has any current plans to restore Pu'u Nene, there is no imminent danger of delaying or disturbing any such restoration. You suggest fencing and restoration instead of the proposed project, but these are by no means mutually exclusive actions. Funds derived from the royalties of extracting the ash could benefit such restoration, if DLNR so chooses to use them.

4. *Qualifications of Ron Terry and Geometrician staff.* In your repeated assertions that I and my staff lack the expertise to make judgments about the existing environment and impacts of the project, you fail to cite our qualifications, of which you may be unaware. I have a Ph.D. in Geography, and my dissertation involved quantitative vegetation ecology. I spent three summers assessing the vegetation of the lower slopes of major Hamakua and Kohala valleys. I have training in vegetation ecology, plant taxonomy, botany, biogeography, and other biological fields. I have given papers in national environmental meetings on remote sensing and alien species, and I have written papers for trade journals on wetlands ecology in Hawai'i. Although I have spent countless months in vegetation fieldwork and can readily identify many native and alien plants in Hawaii, I do not claim to be a professional botanist. I have two associates with degrees in botany and biology, Layne Yoshida, B.A., and Patrick J. Hart, Ph.D., who collaborate with me on botanical assessments. We have performed at least 50 such assessments over the past 8 years and have been instrumental in identifying and saving many rare, threatened or endangered species on private and public land. Dr. Hart performed the botanical survey for this project, and my firm stands by his work.

5. *Alternate locations.* The palagonitized tephra can indeed be found in other locations on Mauna Kea lands, but it is associated with cinder cones, not the flat areas as you recommend. It is environmentally far preferable to work on a cinder cone that has already been mined, does not require construction of a road for access, and is adjacent to existing disturbed areas than to seek out a pristine cinder cone on which to conduct the operation. Pu'u Nene was chosen precisely because it allows the material to be extracted with minimum environmental damage, as discussed in the EA.

Again, thank you for your comment. If you have any questions about the project, please contact Jack Lockwood at 967-8579 or me at 982-5831.

Sincerely,



Ron Terry, Principal
Geometrician Associates

Cc: Sam Lemmo, Administrator, DLNR-OCCL



Mr. Jack Lockwood, CEO
 Geohazard Consultants International
 P.O. Box 479
 Volcano, HI 96785
 Sunday, September 11, 2005

Mr. Lockwood:

As a longtime citizen of Hawaii, I write to protest your company's plan to mine volcanic ash at Puuone, North Hilo, and sell it. This would constitute strip mining, on however small a scale, and inflict irreparable damage. It seems that Geohazard is a company well-named, however unintentionally.

At a time when there is great concern over the fate of our fragile ecosystem, your company is proposing to literally sell the dirt out from under us. Then, I suppose, you would dump the topsoil back in the hole, and consider the job done--or perhaps mine some more?

By careful management, we can allow our reefs and fish populations to regain their health. But once the dirt is gone, it's gone--barring a convenient volcanic eruption. Are you counting on one?

As an apparent long-time resident of Hawaii, please urge your company to abandon this idea. To them, it's only money. To us, it's the land we live on.

Mike Kala

Mr. Dave Elocan

P.O. Box 361

Volcano HI 96785 572 9639

**GEOHAZARDS CONSULTANTS INTERNATIONAL, INC.**

Appraisal of hazards - reduction of risk

September 26, 2005

Dave Slocum
P.O. Box 261
Makawao, HI 96768

Dear Mr. Slocum:

Thank you very much for your letter of 11 September. I've only now received this, as I've been traveling (in Canada) for the past three weeks.

I respect your objection to our hopes to excavate and refine a small amount of deeply weathered volcanic ash from Pu'u Nene, a prehistoric volcanic cone on the Humu'ulu Saddle near the Pohakuloa Training Area. I too am concerned about disfigurement and abuse of our 'aina, and want to assure you of my strong commitment to preservation and conservation of valuable Hawaii lands, and deep objections to projects that scar the land or cause run-off into the ocean. For whatever it may mean, I am a longtime contributor to the Sierra Club, Conservation Hawaii, and the Environmental Defense Fund.

Hopefully you will believe me when I state that our proposed project on Pu'u Nene will not alter the environment in any long-term way, and that there will be no pollution of any kind generated. This pu'u is not pristine to begin with, as it has been greatly disfigured by previous major quarrying operations (which we had nothing to do with!). As you have doubtless read, we hope to remove about a foot of topsoil from a small area to expose a uniquely altered volcanic ash layer, remove about 14-18" of the ash, sieve it to remove the fine ash fraction, then replace the coarse material and topsoil so that the presently existing exotic weed plants can re-grow and heal the small temporary scar we would make during hand-quarrying. We intend to employ a number of students and laborers for hand shoveling rather than use any power excavation equipment - to minimize our impact on Pu'u Nene.

Your comments are important, and your views need to be known to the State Officials responsible for reviewing our CDUA Application. They should be sent to the State Office of Environmental Quality Control (235 S. Beretania, Suite 702, Honolulu 96813) so that they can be entered as part of the public record. Do I have your permission to forward your letter to the EQC Office, or would you like to write them directly? Please let me know how to make sure your views are considered.

Sincerely, with Aloha,

John P. Lockwood, Ph.D.
President, GCI Inc.

P.O. BOX 479 • VOLCANO, HAWAII 96785 • USA

TEL: (808) 967-8579 • FAX: (808) 967-8525 • email: geohaz@volcanohawaii.net

Mr. John P. Lockwood, Ph.D.
President, ECR Inc.
P.O. Box 479
Melange, Hawaii 96795
Tuesday, October 4, 2005

Dear Mr. Lockwood:

Regarding your communication responding to my concerns about the proposed project at Mt. Kane: thank you very much for your most informative answer. I'm gratified to hear that you, also, are concerned for the welfare of the area.

Yes, I would greatly appreciate your passing along my letter to the Board of Environmental Quality Control.

I hope you will also be interested to learn that a letter of mine on this subject, which ran in the Maui News, was read by Mr. Charles Maxwell, the well-known Hawaiian Rights activist. He phoned me, and assured me that he would pass along word of the project to his people. He was certain they would be interested in it.

Again, Mahalo

Dave Stearns
Dave Stearns

from the desk of
John P. Lockwood
President



**GEOHAZARDS CONSULTANTS
INTERNATIONAL, INC.**

7 Oct '2005

Appraisal of hazards - reduction of risk

Dear EQC Office:

I received this undated letter,
objecting to our request for a CDUA
Permit to process altered ash at Pua
Nane on the Big Island.

I wrote Mr. Sloren, asking if
I could send his letter to you for
inclusion in the Public Record for the
Hearing scheduled for 25 Oct in Hilo.

He gave me permission to send you
his letter. That's enclosed - along with
my reply. Please include his letter as
testimony.

Katralo John P. Lockwood
Volcano, Hawaii 96785

geometrician

ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 982-5831 fax: (808) 966-7593 HC 2 Box 9575 Kea'au Hawai'i 96749
ronterry@verizon.net

November 9, 2005

November 9, 2005

Mr. Dave Slocum
P.O. Box 621
Makawao HI 96768

Dear Mr. Slocum:

Subject: Comments on Draft Environmental Assessment (DEA)/Conservation District Use Application (CDUA-HA 3250) for Hand Quarrying of Volcanic Ash at Pu'u Nene, North Hilo, TMK 3-8-01:01

Thank you for your comment letters dated September 11 and October 4, 2005, on the Hand Quarrying project. Although I believe Dr. Lockwood responded to your concerns and questions in his letters, I would like to provide a summary.

1. *Irreparable damage.* There has been irreparable damage to some parts of Pu'u Nene right next door to the proposed quarry through large-scale cinder mining. The hand quarrying project, in fact, would extract less than a net foot of substrate from the hill and would restore the surface to something close to its original condition. Considering the setting next to a large quarry, there would be negligible damage.

2. *Scale of operation.* It is important to put this project in context. There are hundreds of other quarries in Hawai'i operating daily to produce cinder for roads, house pads, farms, golf courses and other uses. The volume of material that they mine and sell is literally tens of thousands of times greater than what would be required for this very specialized product for use in scientific experiments and education. Unlike any other quarry that we know of, this one has been sited to minimize environmental damage, involves hand quarrying only (no heavy equipment), and includes surface restoration.

Again, thank you for your comment. If you have any questions about the project, please contact Jack Lockwood at 967-8579 or me at 982-5831.

Sincerely,

Ron Terry

Ron Terry, Principal
Geometrician Associates

Cc: Sam Lemmo, Administrator, DLNR-OCCL

END

CERTIFICATION

I HEREBY CERTIFY THAT THE MICROPHOTOGRAPH APPEARING IN THIS REEL OF
FILM ARE TRUE COPIES OF THE ORIGINAL DOCUMENTS.

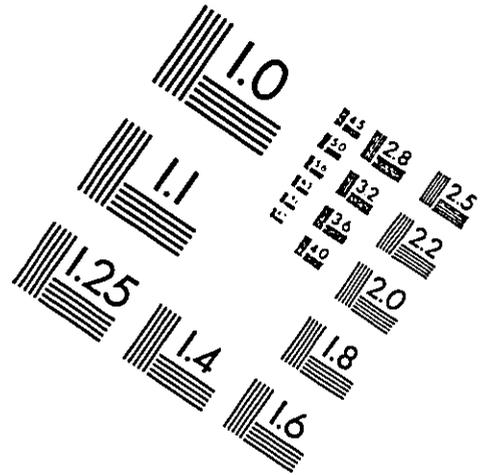
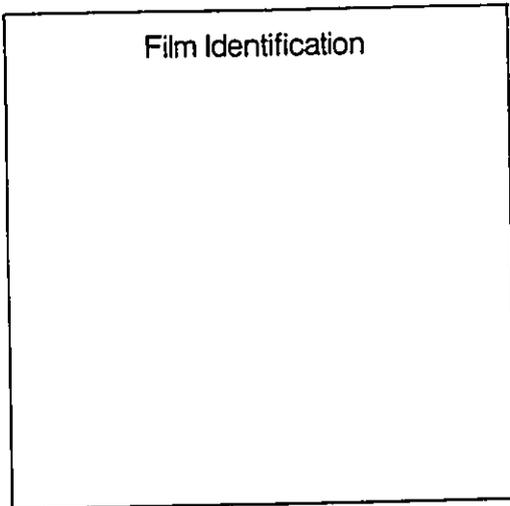
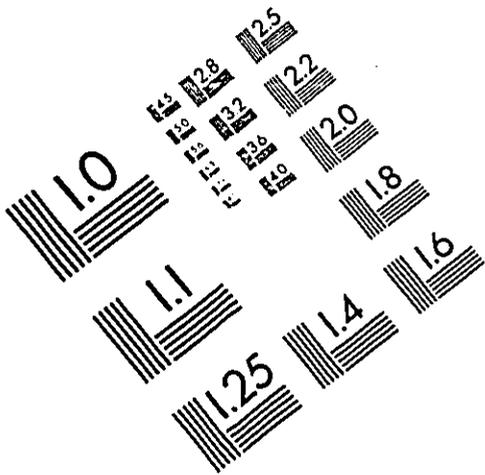
2007

DATE

J. Kaci

SIGNATURE OF OPERATOR

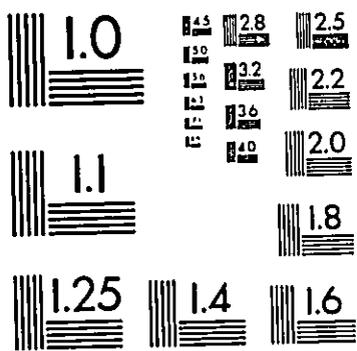
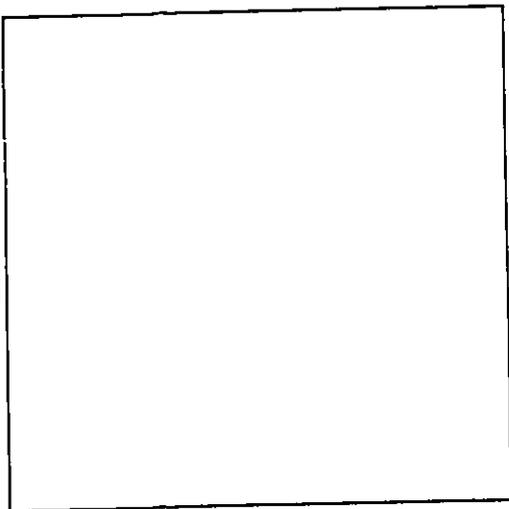
TOP



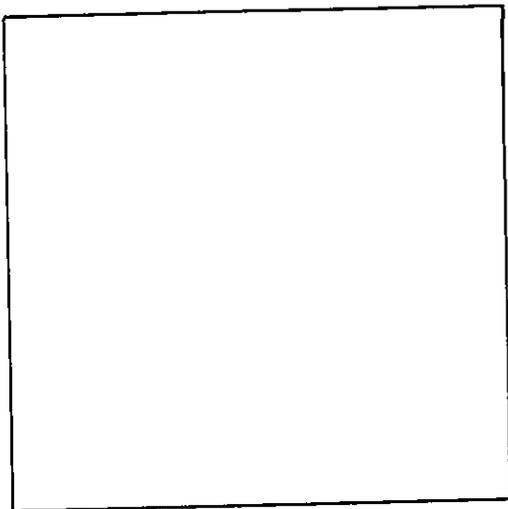
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PRECISIONSM RESOLUTION TARGETS

LEFT

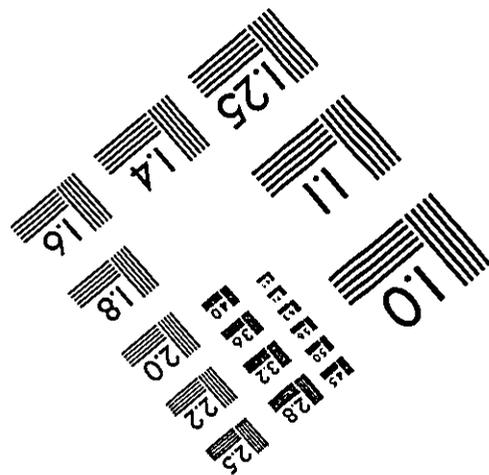
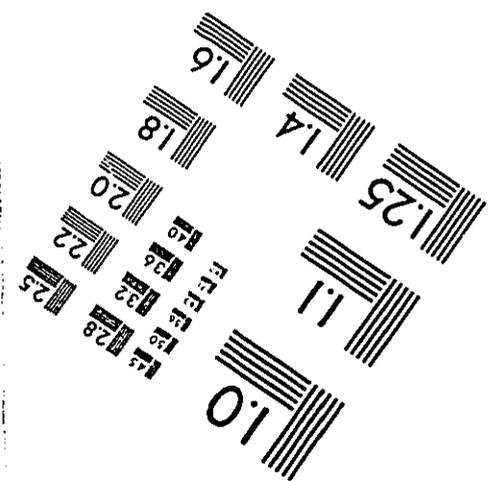


RIGHT



150 MM

6"



PA-3 8 1/2"x11" PAPER PRINTED GENERAL TARGET

DENSITY TARGET



ADVANCED MICRO-IMAGE SYSTEMS HAWAII