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GOVERNOR OF HAWAI'I

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DEPARTMENT OF LAND AND NATURAL RESOURCES
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KAHO'OLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

FILE COPY
JUN 23 2017

Ref: OCCL:LY

CDUA: HA-3793

JUN 13 2017

To: Scott Glenn, Director
Office of Environmental Quality Control

From: Suzanne D. Case, Chairperson
Department of Land and Natural Resources

Subject: Final Environmental Assessment (FEA) for Conservation District Use Application (CDUA) HA-3793 for the Meurer Single Family Residence (SFR), located at 'Opihikao, Puna, Hawai'i
Tax Map Keys (TMK): (3) 1-3-004:008

The Department of Land and Natural Resources has reviewed the FEA for the subject project and has determined a Finding of No Significant Impact (FONSI). Please be advised, however, that this finding does not constitute approval of the proposal.

The Draft EA was published in the March 23, 2017 edition of *The Environmental Notice*. Comments on the Draft EA were sought from relevant agencies and the public, and were included in the Final EA. The FEA has been prepared pursuant to Chapter 343, Hawai'i Revised Statutes and Chapter 11-200, Hawai'i Administrative Rules. Please public this notice in OEQC's upcoming June 23, 2017 edition of *The Environmental Notice.*

We have enclosed one (1) hard copy of the DEA and OEQC publication form, as well as one (1) CD with a pdf file of the Final EA/FONSI. A separate e-mail shall be sent with the OEQC publication form in word document format for publication purposes.

Please contact Lauren Yasaka of the Office of Conservation and Coastal Lands staff at 587-0386 should you have any questions.

Attachments: *FEA, OEQC Pub Form, 1 CD*

17-530

APPLICANT
PUBLICATION FORM

Project Name:	Meurer Single-Family Residence in the Conservation District at `Opihikao
Project Short Name:	Meurer Residence at `Opihikao
HRS §343-5 Trigger(s):	Use of Land in Conservation District
Island(s):	Hawai'i
Judicial District(s):	Puna
TMK(s):	(3) 1-3-004: 008
Permit(s)/Approval(s):	
Approving Agency:	Hawai'i State Department of Land and Natural Resources
Contact Name, Email, Telephone, Address	Lauren Yasaka, Staff Planner, DLNR-OCCL 808-587-0386; lauren.e.yasaka@hawaii.gov DLNR- Office of Conservation and Coastal Lands 1151 Punchbowl Street, Room 131 Honolulu HI 96813
Applicant:	
Contact Name, Email, Telephone, Address	William Meurer 701 Linda Vista Avenue Pasadena, California 91105 C/O James Leonard 808-896-3459; jmleonard.mac.com
Consultant:	
Contact Name, Email, Telephone, Address	Ron Terry, Geometrician Associates LLC 808-969-7090 rterry@hawaii.rr.com P.O. Box 396 Hilo, Hawai'i 96721

Status (select one)	**Submittal Requirements**
___ DEA-AFNSI	Submit 1) the approving agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the DEA, and 4) a searchable PDF of the DEA; a 30-day comment period follows from the date of publication in the Notice.
_X__ FEA-FONSI	Submit 1) the approving agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEA, and 4) a searchable PDF of the FEA; no comment period follows from publication in the Notice.
____ FEA-EISPN	Submit 1) the approving agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEA, and 4) a searchable PDF of the FEA; a 30-day comment period follows from the date of publication in the Notice.
____ Act 172-12 EISPN ("Direct to EIS")	Submit 1) the approving agency notice of determination letter on agency letterhead and 2) this completed OEQC publication form as a Word file; no EA is required and a 30-day comment period follows from the date of publication in the Notice.
____ DEIS	Submit 1) a transmittal letter to the OEQC and to the approving agency, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the DEIS, 4) a searchable PDF of the DEIS, and 5) a searchable PDF of the distribution list; a 45-day comment period follows from the date of publication in the Notice.
____ FEIS	Submit 1) a transmittal letter to the OEQC and to the approving agency, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEIS, 4) a searchable PDF of the FEIS, and 5) a searchable PDF of the distribution list; no comment period follows from publication in the Notice.
____ FEIS Acceptance Determination	The approving agency simultaneously transmits to both the OEQC and the applicant a letter of its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS; no comment period ensues upon publication in the Notice.
____ FEIS Statutory Acceptance	The approving agency simultaneously transmits to both the OEQC and the applicant a notice that it did not make a timely determination on the acceptance or nonacceptance of the applicant's FEIS

	under Section 343-5(c), HRS, and therefore the applicant's FEIS is deemed accepted as a matter of law.
____ Supplemental EIS Determination	The approving agency simultaneously transmits its notice to both the applicant and the OEQC that it has reviewed (pursuant to Section 11-200-27, HAR) the previously accepted FEIS and determines that a supplemental EIS is or is not required; no EA is required and no comment period ensues upon publication in the Notice.
____ Withdrawal	Identify the specific document(s) to withdraw and explain in the project summary section.
____ Other	Contact the OEQC if your action is not one of the above items.

Project Summary

Provide a description of the proposed action and purpose and need in 200 words or less.

William Meurer plans a single-family residence on his 0.958-acre Conservation District property in the Puna District, Island of Hawai`i. The home would have a total of 2,265 square feet of living area, lanai, carport, and porch, with a 3,000-gallon water tank. Other features include a driveway, solar panels, a water well, and an individual wastewater system. The structure has been sited and designed to minimize impact to existing sight lines from the Red Road to the sea. A hedge bordering the property will be trimmed to four feet or shorter. The habitable floor of the residence would be raised two to five feet off the ground to the 20-foot elevation and will safely accommodate a home within the flood zone designation that has been proposed for the majority of the property. The home is setback from the shoreline a minimum of 73 feet in order to avoid the effects of waves, sea spray and potential future erosion. Landclearing over less than a quarter-acre would produce short-term impacts to noise, air and water quality, and scenery, mitigated by Best Management Practices. The vegetation has been repeatedly disturbed in the past and is now primarily non-native, with no rare, threatened or endangered plants. Impacts to the islandwide-ranging endangered Hawaiian hoary bat and Hawaiian hawk will be avoided through vegetation removal timing. An archaeological survey determined that two sites were present, both of them low-stacked livestock walls. Although not required to be preserved, they will remain on the property as-is. There will be no interference with shoreline access or traditional fishing and gathering and there will be no adverse impacts to cultural practices or beliefs.

Final Environmental Assessment

Meurer Single-Family Residence in the Conservation District at ‘Opihikao

June 2017

TMK (3rd): 1-3-004: 008
‘Opihikao, Puna, County of Hawai‘i, State of Hawai‘i

APPLICANT:

William Meurer
701 Linda Vista Drive
Pasadena, California 91105

APPROVING AGENCY:

State of Hawai‘i
Department of Land and Natural Resources
Office of Conservation and Coastal Lands
1151 Punchbowl Street, Room 131
Honolulu, Hawai‘i 96813

CONSULTANT:

Geometrician Associates LLC
P.O. Box 396
Hilo, Hawai‘i 96721

Final Environmental Assessment
Meurer Single-Family Residence in the Conservation District at ʻOpihikao

TMK (3rd): 1-3-004: 008
ʻOpihikao, Puna, County of Hawaiʻi, State of Hawaiʻi

APPLICANT:

William Meurer
701 Linda Vista Drive
Pasadena, California 91105

APPROVING AGENCY:

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1151 Punchbowl Street, Room 131
Honolulu, Hawaiʻi 96813

CONSULTANT:

Geometrician Associates LLC
P.O. Box 396
Hilo, Hawaiʻi 96721

CLASS OF ACTION:

Use of Land in Conservation District

This document is prepared pursuant to:
The Hawaiʻi Environmental Protection Act,
Chapter 343, Hawaiʻi Revised Statutes (HRS), and
Title 11, Chapter 200, Hawaiʻi Department of Health Administrative Rules (HAR).

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TABLE OF CONTENTS

SUMMARY ii
PART 1: PROJECT DESCRIPTION AND E.A. PROCESS 1
1.1 Project Description and Location 1
1.2 Environmental Assessment Process 9
1.3 Public Involvement and Agency Coordination 9
PART 2: ALTERNATIVES 10
2.1 Proposed Project, Alternative Sites and Alternative Uses 10
2.2 No Action 10
PART 3: ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION 11
3.1 Physical Environment 11
3.1.1 Climate, Geology, Soils and Geologic Hazards 11
3.1.2 Flood Zones and Shoreline Setting 12
3.1.3 Water Quality 17
3.1.4 Flora and Fauna 18
3.1.5 Air Quality, Noise and Scenic Resources 21
3.1.6 Hazardous Substances, Toxic Waste and Hazardous Conditions 22
3.2 Socioeconomic and Cultural 23
3.2.1 Land Use, Socioeconomic Characteristics and Recreation 23
3.2.2 Cultural and Historic Resources 24
3.3 Public Roads, Services and Utilities 33
3.3.1 Roads and Access 33
3.3.2 Public Utilities and Services 33
3.4 Secondary and Cumulative Impacts 34
3.5 Required Permits and Approvals 34
3.6 Consistency with Government Plans and Policies 35
3.6.1 Hawaiʻi County General Plan 35
3.6.2 Hawaiʻi County Zoning and Special Management Area 39
3.6.3 Conservation District 40
PART 4: DETERMINATION, FINDINGS AND REASONS 42
4.1 Determination 42
4.2 Findings and Supporting Reasons 42
REFERENCES 45
LIST OF TABLES
TABLE 1 Plant Species Observed on Property 18
LIST OF FIGURES
FIGURE 1a Project Location Map 2
FIGURE 2 Project Site Photos 3
FIGURE 3 Site Plans 5
FIGURE 4 Flood Zone Map 13
FIGURE 5 Coastal Erosion Study Photos 16
FIGURE 6 Archaeological Sites: Site Map (2007) and Photo of Site 26265 30
APPENDIX 1a Comments in Response to Early Consultation
APPENDIX 1b Comments to Draft EA and Responses
APPENDIX 2 Coastal Erosion Study
APPENDIX 3 Archaeological Inventory Survey/SHPD Letters
APPENDIX 4 Cultural Impact Assessment

SUMMARY OF PROJECT, ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

William Meurer (the applicant) seeks a Conservation District Use Permit (CDUP) to build a single-family residence and related improvements on a 0.958-acre property. The shoreline frontage property is located *makai* of the County Road 137, the Kapoho-Kalapana Road (also known as the "Red Road"), within the village of ʻOpihikao, in the Puna District of the Island of Hawaiʻi. The vegetation of the property has been repeatedly disturbed in the past and is now primarily non-native. It consists of coconut trees along with various shrubs, herbs, grasses, vines and low trees.

The proposed home consists of a single-story residence with 1,239 square feet (sf) of living area and an additional 1,026 sf for lanai, carport, porch and a 3,000-gallon water tank. The grand total for all features would be 2,265 sf. The habitable portions of the structure would be raised off the ground surface two to five feet to an elevation of 20.0 feet above sea level and designed to safely accommodate the residential use, given the flood zone status of the majority of the property. The home would be set back from the shoreline a minimum of 73 feet in order to avoid the effects of waves, sea spray and potential future erosion. An Individual Wastewater System in compliance with State Department of Health regulations will be built. Other features include a driveway, a water well, gutters and catchment pipes, 5 solar panels, a 10-gallon propane tank, permanent underground domestic water and wastewater lines, and temporary irrigation lines.

Landclearing, vegetation removal and construction activities would occur over less than a fifth of an acre, producing minor short-term impacts to noise, air and water quality and scenery. These would be mitigated by Best Management Practices that are expected to be required as conditions of the Conservation District Use Permit and grading permit. The applicant will ensure that his contractor performs all earthwork and grading in conformance with applicable laws, regulations and standards. The design features a low-profile roof, very limited landscaping, and a location on the property such that most sight lines from the Kapoho -Kalapana Road through the property to the sea are preserved. The site has been surveyed for threatened and endangered plants and none are present. Impacts to the island wide-ranging endangered Hawaiian hoary bat and Hawaiian Hawk will be avoided through timing of vegetation removal and/or hawk nest survey. An archaeological survey determined that two sites were present, both of them low-stacked walls built to control livestock. Although not required to be preserved, the landowner has chosen to develop the project site without the need to disturb these walls, which will remain on the property as-is. In the unlikely event that additional undocumented archaeological resources, including shell, bones, midden deposits, lava tubes, or similar finds, are encountered during construction within the project site, work in the immediate area of the discovery will be halted and the State Historic Preservation Division will be contacted to determine the appropriate actions. As with most areas in Puna, the shoreline is used occasionally by local residents to fish and gather. Mr. Meurer understands and supports the right to traverse and utilize the shoreline area, and the proposed residential use will not interfere in any way with ongoing fishing access.

PART 1: PROJECT DESCRIPTION AND E.A. PROCESS

1.1 Project Description and Location

William Meurer (the applicant) seeks a Conservation District Use Permit (CDUP) to build a single-family residence and related improvements on a 0.958-acre property. The shoreline frontage property is located *makai* of the County Road 137, the Kapoho-Kalapana Road (also known as the “Red Road”), within the village of ‘Opihikao, in the Puna District of the Island of Hawai‘i (see location maps in Figure 1 and photos in Figure 2).

The proposed home consists of a single-story residence with 1,239 square feet (sf) of living area and an additional 1,026 sf for lanai, carport, porch and a 3,000-gallon water tank. The grand total for all features would be 2,265 sf. The habitable portions of the structure would be raised off the ground surface two to five feet to an elevation of 20.0 feet above sea level and designed to safely accommodate the residential use, given the flood zone status of the majority of the property. The home would be set back from the shoreline a minimum of 73 feet in order to avoid the effects of waves, sea spray and potential future erosion. An Individual Wastewater System in compliance with State Department of Health regulations will be built. Electric power would be supplied by five 40x76” solar panels situated on the flat portions of the roof, with a battery/inverter sited inside a small equipment room. Hot water would be provided by an on-demand propane water heater, housed in an exterior cabinet along with a 10-gallon propane tank. Other features include a driveway from the existing northern gate to the property, which will be moved 10 feet further into the property, a water well, and gutters and catchment pipes. Construction staging will occur in the southwestern part of the property on a level, disturbed area. One foot-wide trenches will be dug to house the ¾-inch domestic water line extending from the well to the storage tank and house. The wastewater piping to connect the house to the septic system will require a 2-foot wide trench that would extend approximately 65 feet. The trenches will be backfilled with the excavated material, and the excess, estimated at less than six cubic yards, will be deposited in a natural depression near the roadway and outside of the floodplain, which will reduce the drop-off behind the hedge into the property.

The vegetation of the property has been repeatedly disturbed in the past and is now primarily non-native. It consists of coconut trees along with various shrubs, herbs, grasses, vines and low trees. Because of the removal of trees by a previous owner of the property several years ago, there are sightlines from the Red Road through the shoreline (see Figure 2). The house site was chosen to avoid disturbance to native shoreline vegetation and recreation activities while taking advantage of a corridor providing sunlight, breezes and views. The design features very limited landscaping utilizing primarily native and Polynesian plants and a location on the property such that most sight lines from the Red Road through the property to the sea would be preserved. An existing two-foot wide *Rhapis excelsa* palm hedge will be maintained at less than four feet in height, retaining room for walking between the edge of the road pavement and the hedge. Temporary drip-irrigation lines will be installed above ground using ½-inch polyethylene piping. These will be placed primarily in the area directly *makai* of the residence where new fruit trees and Samoan coconut palms are planned. No permanent irrigation will be required.

An archaeological survey determined that two sites were present, both of them low-stacked walls built to control livestock. Although not required to be preserved, the landowner has chosen to develop the project site without the need to disturb these walls, which will remain on the property as-is. As with most areas in Puna, the shoreline is used occasionally by local residents to fish and gather. Mr. Meurer understands and supports the right to traverse and utilize the shoreline area, and the proposed residential use will not interfere in any way with ongoing fishing access.

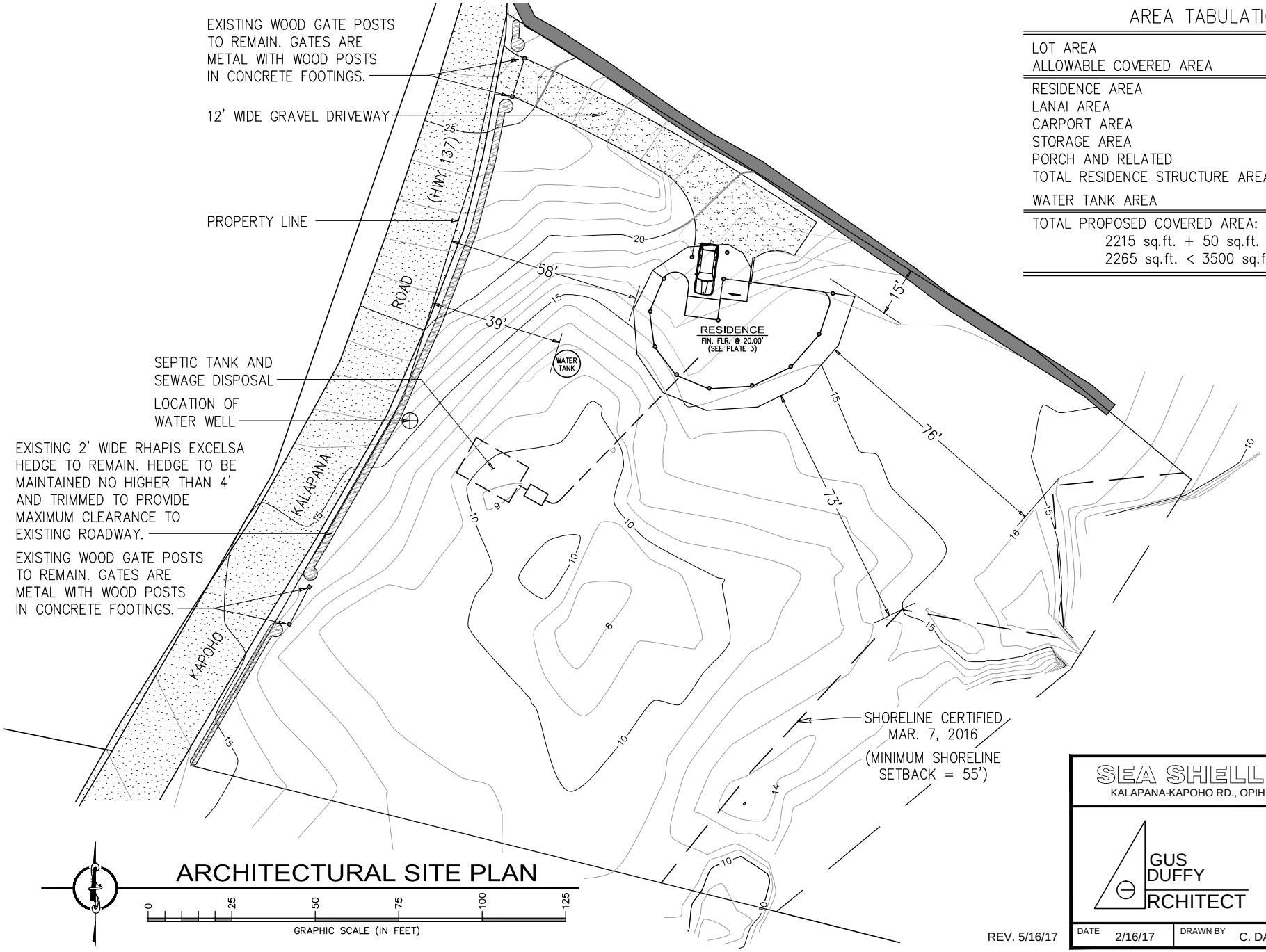
Figure 1. Project Location Map

Figure 2. Site Photos

2a. Above: View from Red Road. 2b. Below: Shoreline *makai* of property to south

Figure 2. Site Photos

2c. Above: Interior of property. 2d. Below: Shoreline *makai* of property to north



ARCHITECTURAL SITE PLAN

AREA TABULATIONS

LOT AREA	43,523	sq.ft.
ALLOWABLE COVERED AREA	3500	sq.ft.
RESIDENCE AREA	1239	sq.ft.
LANAI AREA	574	" "
CARPORT AREA	140	" "
STORAGE AREA	62	" "
PORCH AND RELATED	200	" "
TOTAL RESIDENCE STRUCTURE AREA	2215	sq.ft.
WATER TANK AREA	50	sq.ft.
TOTAL PROPOSED COVERED AREA: 2215 sq.ft. + 50 sq.ft. =	2265	sq.ft.

2265 sq.ft. < 3500 sq.ft. OK

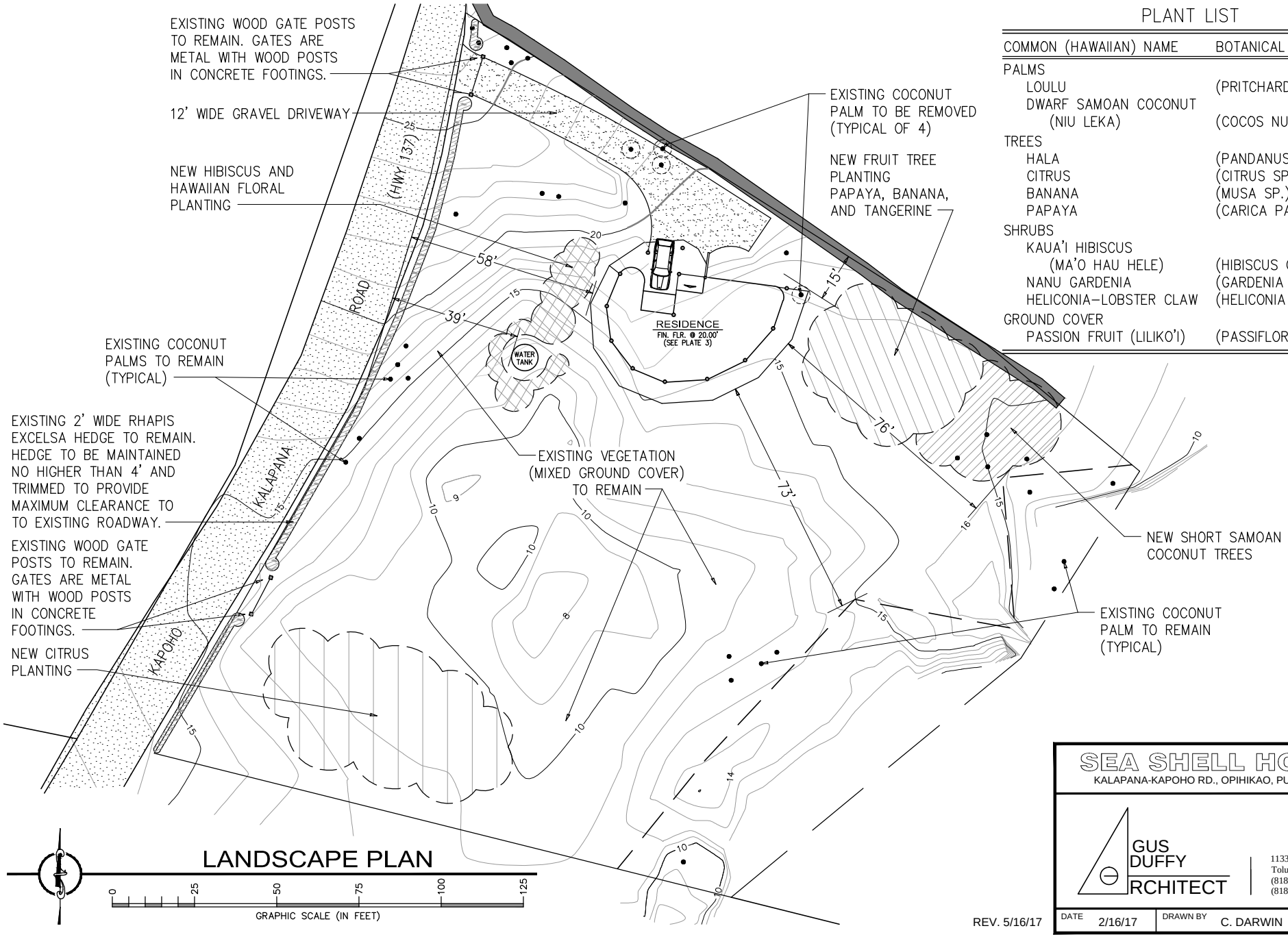
REV. 5/16/17

SEA SHELL HOUSE

KALAPANA-KAPOHO RD., OPIHIKAO, PUNA, HAWAII

GUS DUFFY ARCHITECT
11333 Moorpark St #455
Toluca Lake, CA 91602
(818) 985-0015
(818) 985-0016 FAX

DATE	DRAWN BY	PLATE NO.
2/16/17	C. DARWIN	1



LANDSCAPE PLAN

PLANT LIST

COMMON (HAWAIIAN) NAME	BOTANICAL NAME
PALMS	
LOULU	(PRITCHARDIA SP.)
DWARF SAMOAN COCONUT (NIU LEKA)	(COCOS NUCIFERA)
TREES	
HALA	(PANDANUS TECTORIUS)
CITRUS	(CITRUS SPP.)
BANANA	(MUSA SP.)
PAPAYA	(CARICA PAPAYA)
SHRUBS	
KAUA'I HIBISCUS (MA'O HAU HELE)	(HIBISCUS CALYPHYLLUS)
NANU GARDENIA	(GARDENIA TAITENSIS)
HELICONIA–LOBSTER CLAW	(HELICONIA BIHAI)
GROUND COVER	
PASSION FRUIT (LILIKO'I)	(PASSIFLORA EDULIS)

REV. 5/16/17

SEA SHELL HOUSE

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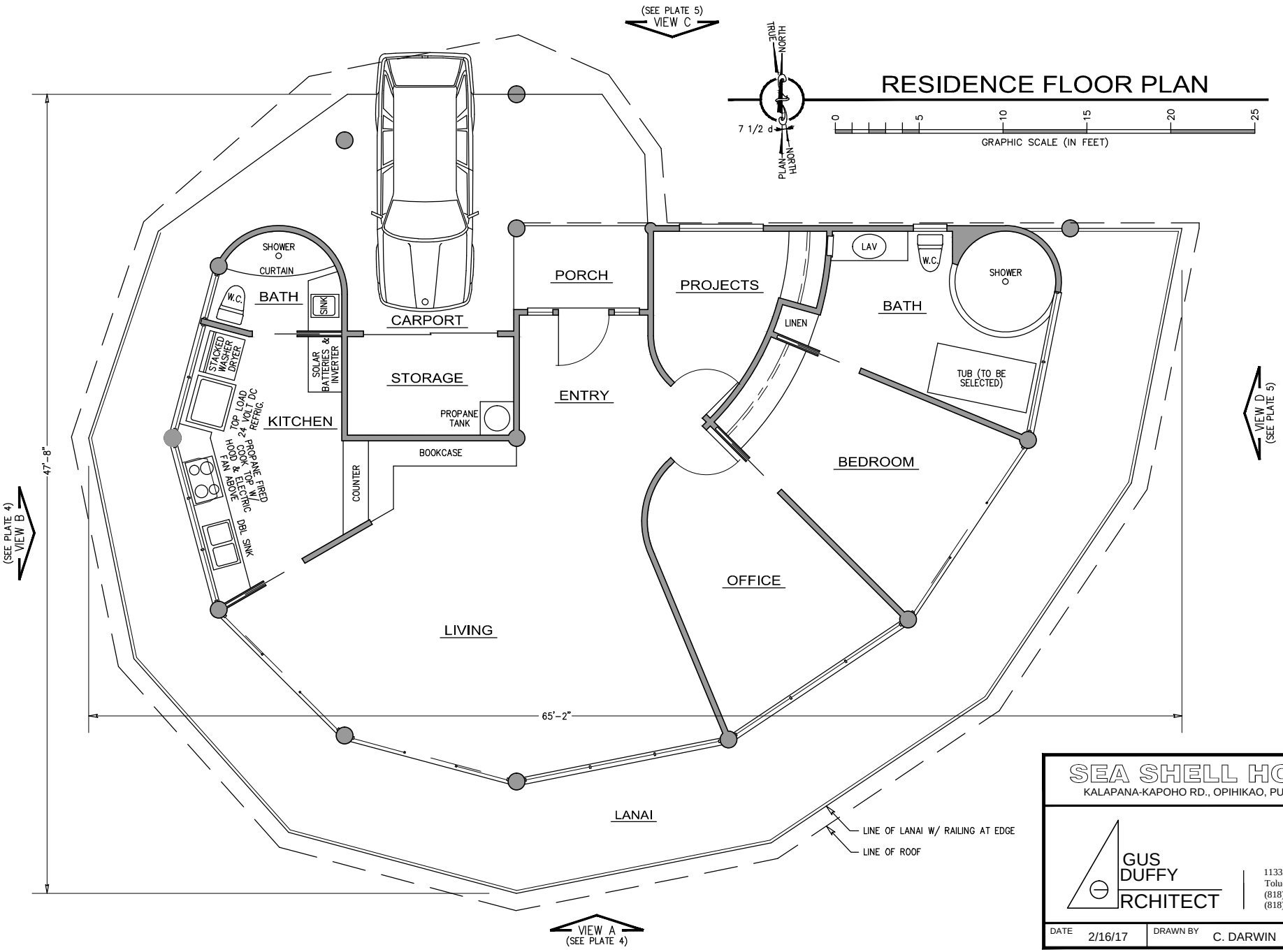
DATE	DRAWN BY	PLATE NO.
2/16/17	C. DARWIN	2

RESIDENCE FLOOR PLAN



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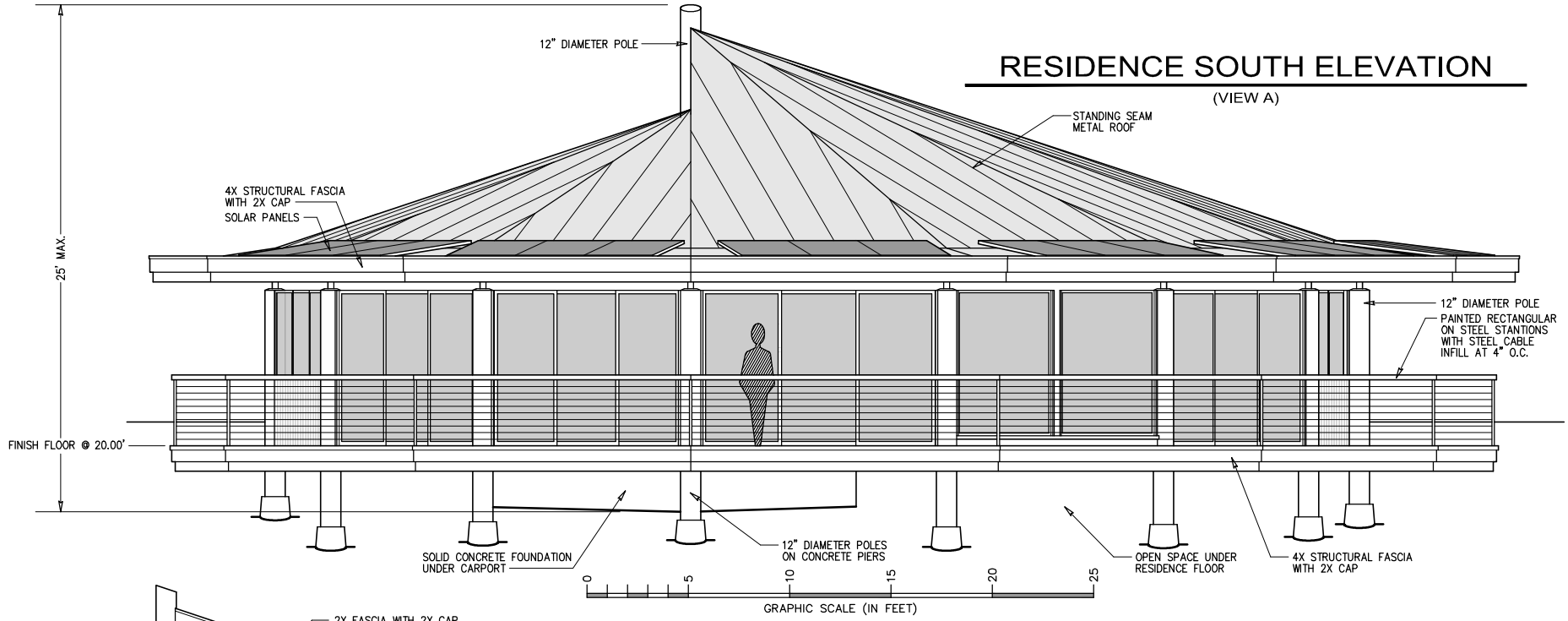
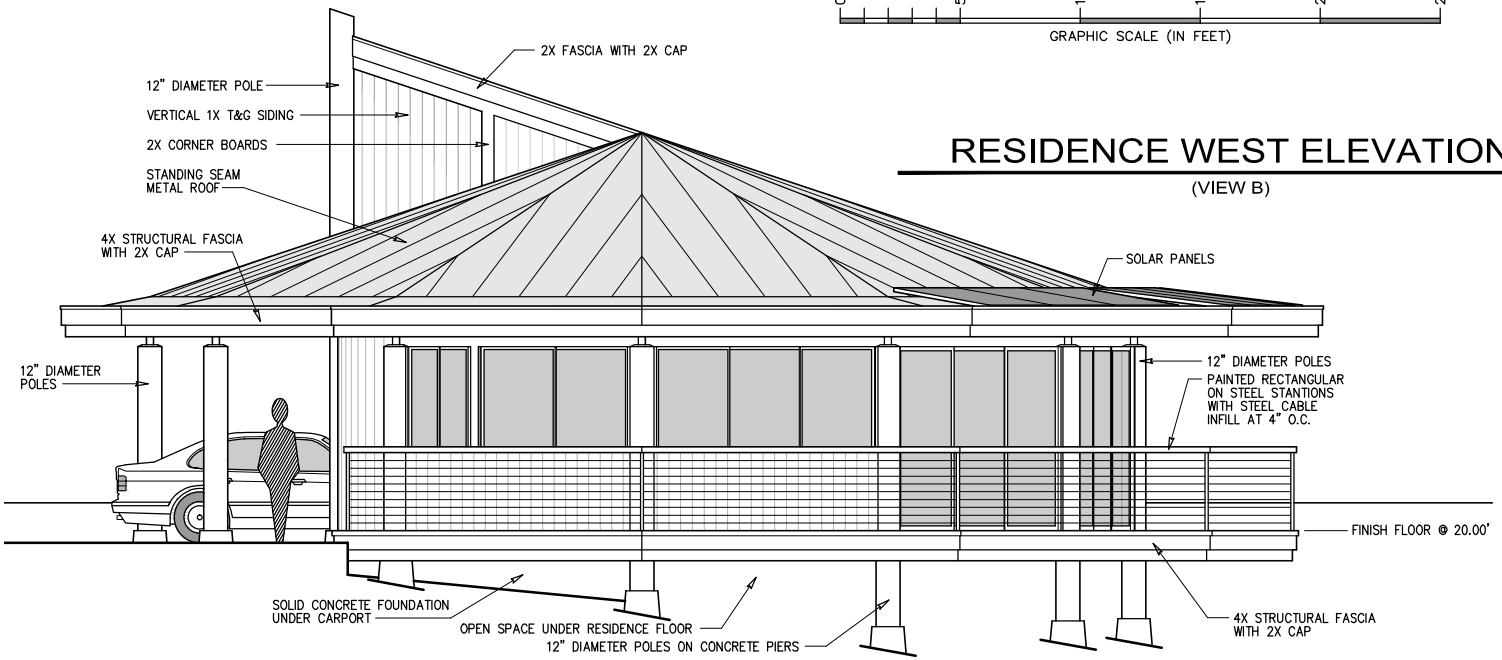
RESIDENCE SOUTH ELEVATION

(VIEW A)



RESIDENCE WEST ELEVATION

(VIEW B)



SEA SHELL HOUSE

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DATE	DRAWN BY	PLATE NO.
2/16/17	C. DARWIN	4

1.2 Environmental Assessment Process

This Environmental Assessment (EA) process is being conducted in accordance with Chapter 343 of the Hawaiʻi Revised Statutes (HRS). This law, along with its implementing regulations, Title 11, Chapter 200, of the Hawaiʻi Administrative Rules (HAR), is the basis for the environmental impact assessment process in the State of Hawaiʻi. 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, based on the preliminary findings for each criterion made by the consultant in consultation with the Hawaiʻi State Department of Land and Natural Resources, the approving agency. If, after considering comments to the Draft EA, DLNR concludes that, as anticipated, no significant impacts would be expected to occur, then the agency will issue a Finding of No Significant Impact (FONSI), and the action will be permitted to proceed with other necessary permits. 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.

1.3 Public Involvement and Agency Coordination

The following agencies, organizations and individuals have been consulted during the Environmental Assessment Process:

County:
- Planning Department
- County Council
- Fire Department
- Department of Public Works
- Police Department

State:
- Department of Health
- Department of Land and Natural Resource (DLNR)
- Office of Hawaiian Affairs

Private:
- Sierra Club
- Malama O Puna
- Five Adjacent/Nearby Property Owners

Copies of communications received during early consultation are contained in Appendix 1a. Notice of the availability of the Draft EA was published in the March 23, 2017 *OEQC Environmental Notice*. Appendix1b contains written comments on the Draft EA and the responses to these comments. Various places in the EA have been modified to reflect input received in the comment letters; additional or modified non-procedural text is denoted by double underlines, as in this paragraph.

PART 2: ALTERNATIVES

2.1 Proposed Project

The proposed project and its location are described in Section 1.1 above and illustrated in Figures 1-3. The location of the structure, a minimum of 73 feet from the shoreline, was chosen in order to preserve most of the sight lines from Red Road, avoid the actual shoreline area, with its hazards and sensitive resources, while still enjoying coastal breezes and views.

2.2 No Action

Under the No Action Alternative, the residence would not be built. The lot would remain unused. This EA considers the No Action Alternative as the baseline by which to compare environmental effects from the project.

2.3 Alternative House Designs and Sites and Alternative Property Uses

As part of initial project development, a design was advanced that separated the built space into a living area and a garage, located 200 feet apart. The advantage of this design was to avoid massing of the structures in one location and, thereby, minimize the visual impact. The disadvantage was that the garage would have been located in an area that was as close as 56 feet from the shoreline and fully within the designated flood zone. The DLNR, Office of Conservation and Coastal Lands also questioned whether the disconnected design met the Conservation District Single-Family Residence standards at HAR, §13-5-41, Exhibit 4, entitled 'Single Family Residential Standards: August 12, 2011." Among other design standards, these rules call for all structures to be connected unless there is no practicable alternative and no adverse impacts on natural resources. Because of this, the applicant chose not to advance the two-structure design through the EA process.

Some other locations on the property could also serve as the site for a residence, but none have the advantages of the proposed site while avoiding impacts to the shoreline area. There is no known environmental or other reason for seriously considering other sites on the property.

No other alternative uses for the property such as farming or commercial tourism uses are currently desired by the applicant, and thus none are addressed in this EA.

PART 3: ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION

The 0.958-acre property is located between the Red Road, County Road 137, and the shoreline, flanked by two other small coastal properties, one of which contains a residence (see Figure 1). The shoreline in this area is consist of a series of inlets or small embayments, largely boulder and cobble beaches, interrupted by ʻaʻā ridges, or promontories. *Mauka* of this the ground is gently sloping and is densely vegetated with grass, shrubs and a few trees (see Figure 2). The property varies from about sea level to 23 feet above sea level.

3.1 Physical Environment

3.1.1 Climate, Geology, Soils and Geologic Hazards

Environmental Setting

The property is located on the flank of Kilauea, an active volcano, in the District of Puna, in the *ahupuaʻa* of ʻOpihikao. This area receives an average of about 98 inches of rain annually, with a mean annual temperature of approximately 75 degrees Fahrenheit (Giambelluca et al 2014; UH Hilo-Geography 1998:57). The lava flows of this area are all derived from eruptive vents on Kilauea Volcano's East Rift Zone, located immediately upslope from the project site. The specific lava flow that underlies the entire Meurer property was erupted from Puʻu Kaliu, an extensively quarried prehistoric cinder cone 3 miles to the north. The age of this flow was estimated at between 400 and 750 years by Moore and Trusdell (1991). Soil in the area is classified with the Malama series, which consists of deep and very deep, well drained soils consisting of organic material over fragmental ʻaʻa lava substrata at a shallow depth. The specific soil is Malama extremely cobbly highly decomposed plant material. It has a soil subclass of VIIs, which means it has limitations that make it unsuitable for cultivation and restrict its use to pasture, range, woodland or wildlife. (U.S. Soil Conservation Service 1973).

The entire Big Island is subject to geologic hazards, especially lava flows and earthquakes. Volcanic hazard as assessed by the U.S. Geological Survey in this area of Puna is Zone 2 on a scale of ascending risk 9 to 1 (Heliker 1990:23). The relatively high hazard risk is because Kilauea is an active volcano. Zone 2 includes areas adjacent to and downslope of active rift zones. About 15 to 25 percent of the area has been covered by lava since 1800, and about 25 to 75 percent has been covered in the last 750 years. As such, there is a not insubstantial risk of lava inundation over a 50-year project span. Several towns and villages in Puna, including Pāhoa, Kalapana and Kapoho, are within Zone 2.

The Island of Hawaiʻi experiences high seismic activity and is at risk from major earthquake damage (USGS 2000), especially to structures that are poorly designed or built, as the 6.7-magnitude quake of October 15, 2006 demonstrated. The portion of the property site proposed for improvement has been graded and is flat to low-sloping. No areas of subsidence or steep slopes are present, and there does not appear to be a risk on the site from landslides or other forms of mass wasting.

Impacts and Mitigation Measures

In general, geologic conditions do not impose undue constraints on the proposed action, as much of the Puna District faces similar volcanic and seismic hazard and yet continues to be the fastest growing region of the State. The applicant understands that there are hazards associated with homes in this geologic setting, and has made the decision that a residence is not imprudent to construct or inhabit.

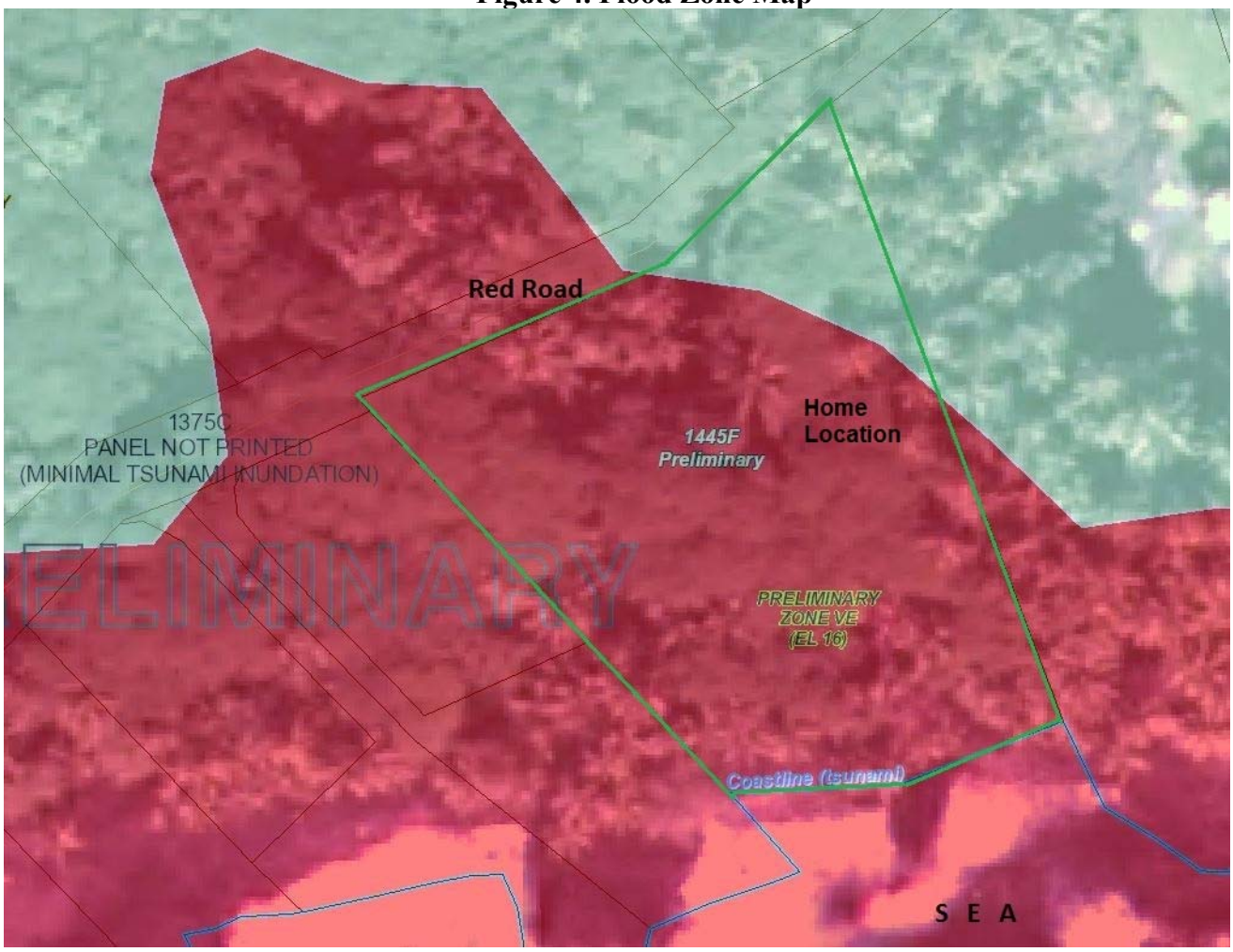
3.1.2 Flood Zones and Shoreline Setting

Floodplain Environmental Setting, Impacts and Mitigation Measures

As the project site is a shoreline property, it is important to consider the potential for the single-family residence to be damaged by coastal flooding associated with storm surges, high waves and tsunami. The proposed site for the residence, which has a ground level 15 to 18 feet above sea level and is a minimum of 73 feet from the shoreline, appears to be out of the area historically affected by high waves. During the tropical storms of 2014 and 2016, which substantially affected and even damaged some low-lying areas of the Puna coastline due to storm surges and high waves, the property was only minimally affected and the area near the proposed home was not affected.

Floodplain status for many areas of the island of Hawaiʻi has been determined by the Federal Emergency Management Agency (FEMA), which produces the National Flood Insurance Program's Flood Insurance Rate Maps (FIRM) (Figure 4). No official FIRMs for the ʻOpihikao area were ever developed, but the County of Hawaiʻi has preliminarily developed maps, which are shown in Figure 4. The Meurer property is primarily located in the proposed VE zone, which is defined by FEMA as "coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones." The base flood elevation of the entire property is proposed at 16 feet above mean sea level. This means that in order to comply with flood zone regulations if the map is accepted as-is, the lowest floor elevation would have to equal or exceed 16 feet in elevation, and any portions of the structure below that elevation (e.g., piers) would be required to comply with flood zone regulations. As shown in the Site Plan, the home has been designed to fully comply with flood zone regulations under the proposed flood zone. The habitable portions of the structure would be raised off the ground surface from zero to 6.5 feet, with a base floor elevation of 20.0 feet above sea level and designed to safely accommodate the residential use, given the flood zone status of the majority of the property. The home and related improvements would also be set back from the shoreline a minimum of 73 feet in order to avoid the effects of waves, sea spray and potential future erosion.

Figure 4. Flood Zone Map



Source: Hawaiʻi DLNR: http://gis.hawaiinfip.org/fhat/

Coastal Erosion Issues: Background

Property near the shoreline is subject to natural coastal processes including erosion and accretion, which can be affected by human actions such as removal of sand or shoreline hardening. Erosion may adversely affect not only a lot owner's improvements but also State land and waters, along with the recreational and ecosystem values they support. Development of shoreline properties also exposes residents and visitors to increased risk of hazardous high waves and tsunami.

Single Family Residential permitting in Conservation Districts in the State of Hawaiʻi is regulated by State of Hawai'i Administrative Rules governing Conservation Districts (Title 13, Subtitle 1 Chapter 5, adopted August 12, 2011). Applications to permit shoreline residential construction in the Conservation Districts must consider rates of coastal erosion. The State DLNR requires an estimate of annual erosion rate for any property for which construction is proposed in the form of a "Coastal Erosion Study". Such a

study integrates on-site quantitative measurements by a credentialed specialist or specialists, inspection of available aerial and satellite imagery taken over a period of time, and a review of relevant geological literature. A Coastal Erosion Study was prepared for the property by Geohazards Consultants International, Inc. The full report is attached as Appendix 2 and summarized below.

There is a scientific consensus that the earth is warming due to manmade increases in greenhouse gases in the atmosphere, according to the United Nations' Intergovernmental Panel on Climate Change (UH Manoa Sea Grant 2014). Global mean air temperatures are projected to increase by at least 2.7°F by the end of the century. This will be accompanied by the warming of ocean waters, expected to be highest in tropical and subtropical seas of the Northern Hemisphere. Wet and dry season contrasts will increase, and wet tropical areas in particular are likely to experience more frequent and extreme precipitation. For Hawaiʻi, where warming air temperatures are already quite apparent, not only is the equable climate at risk but also agriculture, ecosystems, the visitor industry and public health. Sea level rise will flood coasts, degrade coastal ecosystems, erode beaches, and ruin infrastructure in low-lying areas.

Guidance to federal agencies for addressing climate change issues in environmental reviews was released in August 2016 by the Council on Environmental Quality (US CEQ 2016). The guidance urged that when addressing climate change, agencies should consider: 1) the potential effects of a proposed action on climate change as indicated by assessing greenhouse gas emissions in a qualitative, or if reasonable, quantitative way; and, 2) the effects of climate change on a proposed action and its environmental impacts. It recommends that agencies consider the short- and long-term effects and benefits in the alternatives and mitigation analysis in terms of climate change effects and resiliency to the effects of a changing climate. The State of Hawaiʻi encourages a similar analysis, as reflected in Hawaiʻi Revised Statutes §226-109.

Erosion studies must consider not only current processes but those that may occur in the future due to the expected rise of sea level. Although the timing and magnitude of such rises cannot be predicted with certainty, there must be some accounting. In the lower Puna District, long-term sea level rise will occur because of three factors: eustatic (general ocean) sea level rise, isostatic adjustment of the crust as the Hawaiian Islands slowly subside, and rapid, sometimes dramatic, subsidence associated with seismic events.

There is a scientific consensus that eustatic sea level will rise by at least one meter in Hawaiʻi by the end of the century due to effects of global warming, including melting of glacier and ice caps and the effects of a warmer ocean (UH Manoa Sea Grant 2014). A study of isostatic sinking of the island (Caccamise et al. (2005) found the rate of sea level rise at Hilo Harbor to be 3.1+/- 0.6 mm/year since 1946 while estimates of annual subsidence rate in the Kapoho area lie in the range of 0.8-1.7 cm/year (range represents two standard deviations; Hwang and Brooks, 2007). Episodic subsidence of lower Puna is also a significant and ongoing process, as seen in the great earthquakes of 1823, 1868 and November 1975. During the 1975 M=7.6 earthquake, the coast at Kaimu Bay, presently inundated with lava, subsided about three feet, while at Kapoho, six miles to the northeast, the land settled about 9 inches. At the Meurer property the land probably subsided during this event by about one foot. In reality, steady and/or rapid subsidence probably poses a greater long-term threat to inundation of many south Puna coastal properties than the impacts of wave erosion.

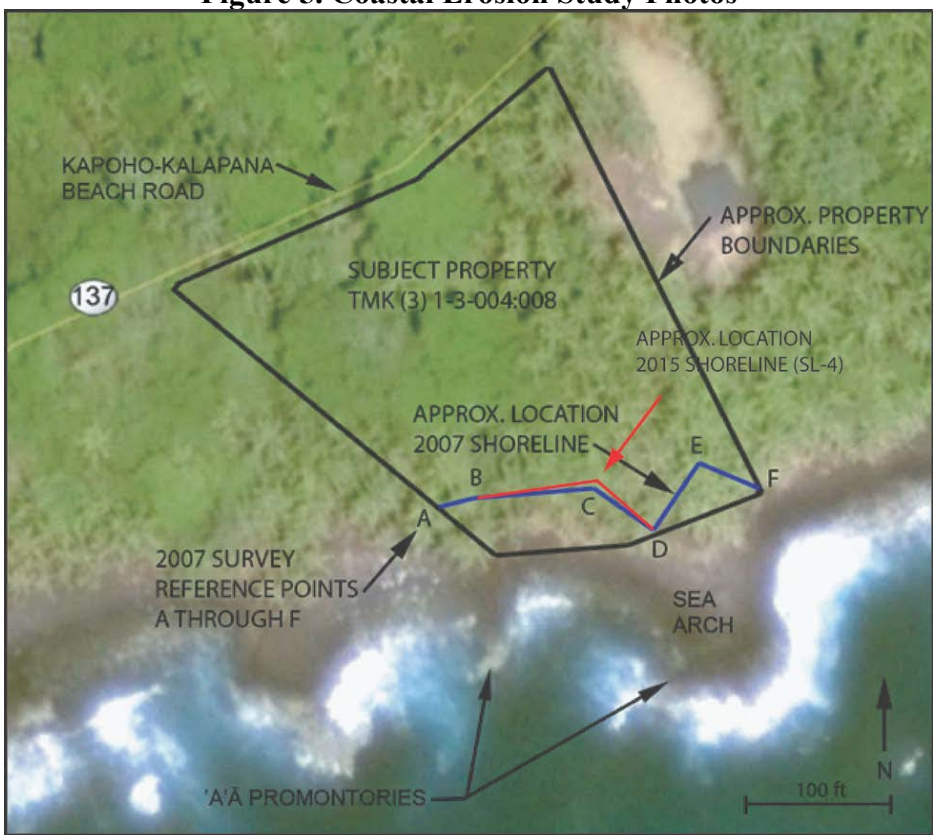
Coastal Erosion: Physical Setting

As discussed in Section 3.1.1, the Meurer property is situated on low-lying, gently sloping coastal terrain consisting of young lava flows from the East Rift Zone of Kilauea volcano that, in places, is overlain with an organic-rich soil cover. The flows are gently sloping in this area, dipping toward the ocean at only about 1-2 degrees. According to Moore & Trusdell (1991), the property is underlain by 400 to 750-year old ʻaʻā and pahoehoe lava flows. Geologic inspection of the property shows the native bedrock consist of ʻaʻā lava flows.

The shoreline frontage of the property is about 185 feet long, along a portion of coastline composed of a series of inlets or small embayments, largely boulder and cobble beaches, interrupted by ʻaʻā ridges, or promontories (Figure 5a). The property is somewhat atypical of the surrounding coastline, as it is apparently underlain by ʻaʻā lava flows, when the surroundings appear to be largely pahoehoe. The western, Kalapana-side of the shoreline area is lower by about two meters than the eastern, Kapoho-side of the property. The property's shoreline consists of portions of two boulder/cobble beaches that stretch beyond the property's boundaries, and two ʻaʻā lava points that bracket a third boulder/cobble beach (Figure 5a). The ʻaʻā ridges, or promontories, extend 50 to 70 feet beyond the shoreline. The largest ʻaʻā promontory, extending from, and obviously supporting, an area with soil and low grass, has been undercut and forms an attractive sea arch. The promontories likely were pressure ridges formed at the edges of the ʻaʻā flow. Besides being useful to fishermen, they serve to both absorb and reflect wave energy, and reduce the shoreline erosion rate. Notable vegetation includes a number of coconut palms, and those near or within the shoreline retain soil within their web-like root systems. They are relevant to an assessment of coastal erosion, because erosion is most apparent where waves have undercut root-bound soil mats within the shoreline area (Figure 5b).

Therefore, although spanning a length of only 185 feet, the shoreline area fronting the Meurer property actually has five distinct sections, from the Kapoho side to the Kalapana side (see Figure 5a): (1) An area behind an ʻaʻā promontory at the western property border; (2) a cobble beach; (3) an ʻaʻā promontory supporting the soil shelf and low grass area; (4) a smaller cobble beach near the eastern property boundary; and (5) an ʻaʻā promontory extending beyond the edge of the eastern property boundary. These distinct geomorphological features in turn reflect various dominant shoreline processes on varying materials.

Figure 5. Coastal Erosion Study Photos



5a. Above: Shoreline features of property. 5b. Below: Undercutting at Point E

Coastal Erosion: Rate of Erosion

In order to evaluate the rate of shoreline erosion at the Meurer Property, GCI utilized information from field studies, aerial photographs, two certified shoreline surveys, and other relevant information. Details are contained in Appendix 2, with only the conclusions presented herein. The field studies revealed pertinent characteristics of the property that provided a baseline over which apparent erosion could be evaluated. Beach profiles were constructed to help elucidate beach processes, and the undercutting of coconut palm root platforms was analyzed. Other evidence of the erosion rate was derived by comparing aerial photographs taken more than 50 years apart and shoreline surveys taken 8 years apart in 2007 and 2015. Finally, geologists examined the age of the underlying formation and the extent of embayment formation. These methods produced varying estimates of erosion with advantages and disadvantages, but cumulatively they helped frame a reasonable rate. Combining the results, GCI concluded that the estimated average shoreline erosion rate is 0.21±0.05 ft/yr. Applying the DLNR formula of 70 times the annual erosion rate plus 40 feet, the appropriate setback distance would be at least 54.7 feet. Considering this information, Mr. Meurer and his architect designed the structure so that there would be a setback of 73 feet to the residence.

Although sea level rise is an important consideration for all coastal homeowners and regulating agencies, the measured rates of projected sea level rise due to both eustatic and gradual tectonic subsidence factors do not appear to pose immediate threats (i.e.—within the coming few decades) to the use of the property for residential purposes, given the 73-foot setback to the residence, which has a ground surface elevation that is a minimum of 15 feet above sea level and a base floor elevation of 20 feet above sea level, four feet above the base flood elevation. Large-scale, episodic subsidence is more difficult to predict. Given the fairly modest subsidence over the last 75 years of about one foot in the last major subsidence episode – more than 40 years ago – the risk of major subsidence for the specified 70-year structure consideration period does not rise to a level that exceeds the potential enjoyment of a coastal residence, in the owner's opinion. In addition to sea level rise, more frequent and more violent storms could result from climate change. It is critical for private and public structures to be set sufficiently far back from the shoreline that damage from such events is minimized. In the case of this property and proposal, the project does not involve any shoreline hardening or use of areas subject to beach processes. Access to the home will be by a driveway from the Red Road at the *mauka* end of the property, away from the shoreline. The applicant understands that there are hazards associated with homes at risk of coastal flooding and sea level rise, and has made the decision that a residence is not imprudent to construct or inhabit. In order to avoid a burden to the public in some way should the sea level at this site rise dramatically, the owner would agree to a CDUP and/or deed condition that would prevent any future request for shoreline hardening to protect the residence, regardless of hardship, and a condition requiring moving or dismantling the home if sea level rise eventually threatens the integrity of the structure.

3.1.3 Water Quality

The property has shoreline frontage but the residence would be set back a minimum of 73 feet from the shoreline. No grading activities would occur *makai* of the structure. No water features such as streams, springs, or anchialine ponds are found on or near the property.

Land clearing and construction activities would occur on an area of less than an acre, including the driveway. A County grading permit will be required. After actual grading plans are developed, the applicant and engineer will determine whether the area of disturbance is sufficiently large to require a National Pollutant Discharge Elimination System permit, although at this time it would not appear to be necessary. Grading for the driveway and house lot will include practices to minimize the potential for sedimentation, erosion and pollution of coastal waters. The applicant will ensure that their contractor shall perform all earthwork and grading in conformance with:

(a) "Storm Drainage Standards," County of Hawaiʻi, October, 1970, and as revised.
(b) Applicable standards and regulations of Chapter 27, "Flood Control," of the Hawaiʻi County Code.
(c) Applicable standards and regulations of the Federal Emergency Management Agency.
(d) Applicable standards and regulations of Chapter 10, "Erosion and Sedimentation Control," of the Hawaiʻi County Code.
(e) Conditions of an NPDES permit, if required, and
(f) Any additional best management practices required by the Board of Land and Natural Resources.

In addition, as part of construction, the applicant will require that the construction contractor implement the following practices:

- The total amount of land disturbance will be minimized. The construction contractor will be limited to the delineated construction work areas within the lot.
- The contractor will not allow any sediment to leave the site, particularly towards the ocean.
- Construction activities with the potential to produce polluted runoff will not be allowed during unusually heavy rains or storm conditions that might generate storm water runoff.
- Cleared areas will be replanted or otherwise stabilized as soon as possible.

The Red Road of ʻOpihikao already supports several homes and is utilized by residents and property owners to park vehicles for fishing and enjoying the tidepools, and there are no reported water quality problems from these uses. Upon its completion, the home will be similar to others on shoreline lots in the area, and it would not be expected to contribute to sedimentation, erosion, and pollution of coastal waters.

3.1.4 Flora and Fauna

Environmental Setting: Flora

Prior to human settlement of Hawaiʻi, the natural vegetation of this part of this part of Puna shoreline was mostly coastal forest and strand vegetation, dominated by naupaka (*Scaevola taccada*), hala (*Pandanus tectorius*), ʻōhiʻ*a* (*Metrosideros polymorpha*), nanea (*Vigna marina*) and various sedges and coastal herbs (Gagne and Cuddihy 1990). The site was systematically inspected for plants by Dr. Ron Terry in August

of 2016. Special attention was paid in these surveys and subsequent field visits to the presence of endangered species, particularly *Ischaemum byrone,* a State and federally listed endangered grass known to grow in the general area.

Archaeological investigations conducted for the area (see Section 3.2.2) indicate that the property was used in association with ranching during the 19th or 20th centuries. There may also have been some use for camping in more recent times. Trees and shrubs have been cut on numerous occasions. The lot supports almost exclusively non-native vegetation, except at the shoreline, where a few common native plants including milo (*Thespesia populnea*), kou (*Cordia subcordata*), akulikuli (*Sesuvium portulacastrum*) and various sedges are present. Unlike many coastal properties in Puna, there are no hala groves (*Pandanus tectorius*) or extensive areas of naupaka (*Scaevola taccada*). No *Ischaemum byrone* or any other rare, threatened or endangered plant species was found on or near the property. A list of all species detected on the property itself is found in Table 1.

Environmental Setting: Fauna

During site visits, we observed Common Myna (*Acridotheres tristis*), Japanese White-eye (*Zosterops japonicus*), and House Finch (*Carpodacus mexicanus*). No native birds were identified, and it is unlikely that many native forest birds would be expected to use the project site due to its low elevation, alien vegetation and lack of adequate forest resources. It is likely that the Hawai'i 'Amakihi (*Hemignathus virens*) are sometimes present, as some populations of this native honeycreeper appear to have adapted to the mosquito borne diseases of the Hawaiian lowlands. Common shorebirds, such as Golden Plover (*Pluvialis fulva*), Ruddy Turnstone (*Arenaria interpres*), and Wandering Tattler (*Heteroscelus incanus*), are often seen on the Puna coastline feeding on shoreline resources. These were not observed during site visits, which occurred during summer, when most of the birds from these species migrate to higher latitudes. They are undoubtedly present during the winter, as the areas *makai* of the shoreline on this property offers reasonably good habitat for shorebirds. They would be unlikely to make much use of the property itself, which is densely vegetated and offers no habitat or resources for them.

As with all of East Hawai'i, several endangered native terrestrial vertebrates may be present in the general area and may overfly, roost, nest, or utilize resources of the property. These include the endangered Hawaiian Hawk (*Buteo solitarius*), the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), the endangered Hawaiian Petrel (*Pterodroma sandwichensis*), the endangered Band-rumped Storm Petrel (*Oceanodroma castro*) and the threatened Newell's Shearwater (*Puffinus newelli*).

All other mammals in the project area are introduced species. These include feral cats (*Felis catus*), feral pigs (*Sus scrofa*), small Indian mongooses (*Herpestes a. auropunctatus*) and various species of rats (*Rattus* spp.). None are of conservation concern and all are deleterious to native flora and fauna.

The coastal and marine fauna and flora are typical of the high-energy coasts of Puna, which are young ecosystems with limited coral growth but a variety of algae, fish and invertebrates. Marine mammals and reptiles, some of them endangered, also visit the Puna coastal waters.

Table 1. Plant Species Observed on Property

Scientific Name	Family	Common Name	Life Form	Status*
Justicia betonica	Acanthaceae	White Shrimp Plant	Shrub	A
Sesuvium portulacastrum	Aizoaceae	Akulikuli	Herb	I
Dieffenbachia sp.	Araceae	Dumb Cane	Herb	A
Cocos nucifera	Arecaceae	Coconut	Tree	PI
Rhapis excelsa	Arecaceae	Rhapis Palm	Tree	A
Asplenium nidus	Aspleniaceae	‘Ekaha	Fern	I
Ageratum conyzoides	Asteraceae	Ageratum	Herb	A
Conyza bonariensis	Asteraceae	Conyza	Herb	A
Emilia fosbergii	Asteraceae	Lilac Pualele	Herb	A
Begonia sp.	Begoniaceae	Begonia	Herb	A
Spathodea campanulata	Bignoniaceae	African Tulip	Tree	A
Cordia subcordata	Boraginaceae	Kou	Tree	I
Canna indica	Cannaceae	Indian Shot	Herb	A
Drymaria cordata	Caryophyllaceae	Drymaria	Herb	A
Casuarina equisetifolia	Casuarinaceae	Ironwood	Tree	A
Cecropia obtusifolia	Cecropiaceae	Cecropia	Tree	A
Calophyllum inophyllum	Clusiaceae	Kamani	Tree	PI
Clusia rosea	Clusiaceae	Autograph Tree	Tree	A
Terminalia catappa	Combretaceae	False Kamani	Tree	A
Commelina diffusa	Commelinaceae	Honohono	Herb	A
Ipomoea alba	Convolvulaceae	Moonflower	Vine	A
Momoridica charantia	Cucurbitaceae	Bitter Melon	Vine	A
Cyperus javanicus	Cyperaceae	‘Ahuawa	Sedge	I
Cyperus polystachyos	Cyperaceae	Pycreus	Herb	I
Fimbristylis cymosa	Cyperaceae	Mau‘u ‘Aki‘aki	Herb	I
Kyllinga brevifolia	Cyperaceae	Kyllinga	Herb	A
Dioscorea sp.	Dioscoreaceae	Bitter Yam	Vine	PI
Desmodium sandwicense	Fabaceae	Desmodium	Herb	A
Samanea saman	Fabaceae	Monkeypod	Tree	A
Thespesia populnea	Malvaceae	Milo	Tree	I
Ficus microcarpa	Moraceae	Banyan	Tree	A
Nephrolepis multiflora	Nephrolepidaceae	Sword Fern	Fern	A
Oxalis debilis var. *corymbosa*	Oxalidaceae	Pink wood Sorrel	Herb	A
Cenchrus purpureus	Poaceae	Napier Grass	Herb	A
Digitaria sp.	Poaceae	Digitaria	Herb	A
Eleusine indica	Poaceae	Goose Grass	Grass	A
Megathyrsus maximus	Poaceae	Guinea Grass	Grass	A
Paspalum sp.	Poaceae	Paspalum	Herb	A
Paspalum conjugatum	Poaceae	Hilo Grass	Herb	A
Phymatosorus grossus	Polypodiaceae	Maile Scented Fern	Fern	A
Morinda citrifolia	Rubiaceae	Noni	Shrub	PI
Paederia scandens	Rubiaceae	Maile Pilau	Vine	A
Solanum americanum	Solanaceae	Popolo	Shrub	I
Solanum linnaeanum	Solanaceae	Sodom Apple	Shrub	A
Melochia umbellata	Sterculiaceae	Melochia	Tree	A
Trema orientalis	Ulmaceae	Gunpowder Tree	Tree	A

A=Alien E=Endemic I=Indigenous PI = Polynesian introduction END=Federal and State Listed Endangered

Impacts and Mitigation Measures

Complete clearing will occur for the driveway, residential structure, and associated facilities depicted in the site plan in Figure 3. In other areas, there will be minor clearing or thinning of non-native plants for view corridors towards the shoreline. A limited number of native, traditional Polynesian introduction and food species will be planted, as indicated in the landscape plan in Figure 3, for decorative, subsistence and house screening purposes. These include loulu (*Pritchardia* sp.), dwarf Samoan coconut or niu leka (*Cocos nucifera*), hala (*Pandanus tectorius*), citrus (*Citrus* spp.), banana (*Musa* sp.), papaya (*Carica papaya*), maʻo hau hele (*Hibiscus brackenridgei*), nanu gardenia (*Gardenia taitensis*), lobster claw (*Heliconia bihai*) and lilikoʻi (*Passiflora edulis*). Otherwise, the vegetation will be left intact and managed through trimming and mowing. No native vegetation or no rare, threatened or endangered plant species will be affected in any way. Because of the minor nature of the project and the lack of sensitive terrestrial ecosystems and threatened or endangered plant species, construction and use of the single-family residence is not likely to cause adverse impacts to terrestrial botanical resources or vegetation.

In order to avoid impacts to the endangered but regionally widespread terrestrial vertebrates listed above, the applicant will commit to conditions that are proposed for the CDUP. Specifically, construction will commit to refrain from activities that disturb or remove the vegetation between June 1 and September 15, when Hawaiian hoary bats may be sensitive to disturbance. If landclearing occurs between March 1 and September 30, a pre-construction hawk nest search by a qualified ornithologist using standard methods will be conducted. If Hawaiian Hawks are present, no land clearing will be allowed until October, when hawk nestlings will have fledged. Finally, the applicant agrees to shield any exterior lighting from shining upward, in conformance with Hawaiʻi County Code § 14 – 50 et seq., to minimize the potential for disorientation of seabirds.

The precautions for preventing effects to water quality during construction listed above in Sections 3.1.1 and 3.1.6 will reduce adverse impact on aquatic biological resources in coastal waters to negligible levels.

3.1.5 Air Quality, Noise, and Scenic Resources

Environmental Setting

Air quality in the area is generally excellent, due to its rural setting and minimal human activity, although vog (sulfur dioxide and particulate matter from Kilauea Volcano) is occasionally blown into this part of Puna. Noise at this rural site is low and is derived from natural sources such as surf and wind.

The area shares the quality of scenic beauty along with most of the Puna coastline. There are currently intermittent views from the Red Road towards the sea through the Meurer property, as shown in Figure 2a. The County of Hawaiʻi General Plan contains Goals, Policies and Standards intended to preserve areas of natural beauty and scenic vistas from encroachment. The General Plan discusses the black sand beaches and tidal ponds as noted features of natural beauty in Puna, and cites among specific examples of

natural beauty the shoreline viewpoint at TMK 1-3-004:071, the small swimming pond feature about 400 feet southwest of the Meurer property.

Impacts and Mitigation Measures

The project would not affect air quality or noise levels in any substantial ways. Brief and minor adverse effects would occur during construction. However, there are virtually no sensitive noise receptors in the vicinity, and given the small scale of the project, noise mitigation will likely not be necessary.

The Site Plan has been formulated to preserve and enhance some sightlines from the Red Road through the property to the sea, while at the same time minimizing views of the residential structure from the road.

3.1.6 Hazardous Substances, Toxic Waste and Hazardous Conditions

Based on onsite inspection and the lack of any known former and current industrial or commercial agricultural uses on the property, it appears that the site contains no hazardous or toxic substances and exhibits no other hazardous conditions. In addition to the measures related to water quality detailed in Section 3.1.3, in order to ensure to minimize the possibility for spills of hazardous materials, the applicant proposes the following conditions of the CDUP:

- Unused materials and excess fill will be removed and disposed of at an authorized waste disposal site.
- During construction, emergency spill treatment, storage, and disposal of all hazardous materials, will be explicitly required to meet all State and County requirements, and the contractor will be asked to adhere to "Good Housekeeping" for all appropriate substances, with the following instructions:
    - Onsite storage of the minimum practical quantity of hazardous materials necessary to complete the job;
    - Fuel storage and use will be conducted to prevent leaks, spills or fires;
    - Products will be kept in their original containers unless unresealable, and original labels and safety data will be retained;
    - Disposal of surplus will follow manufacturer's recommendation and adhere to all regulations;
    - Manufacturers' instructions for proper use and disposal will be strictly followed;
    - Regular inspection by contractor to ensure proper use and disposal;
    - Onsite vehicles and machinery will be monitored for leaks and receive regular maintenance to minimize leakage;
    - Construction materials, petroleum products, wastes, debris, and landscaping substances (herbicides, pesticides, and fertilizers) will be prevented from blowing, falling, flowing, washing or leaching into the ocean;
    - All spills will be cleaned up immediately after discovery, using proper materials that will be properly disposed of;

- Regardless of size, spills or toxic or hazardous materials will be reported to the appropriate government agency;
- Should spills occur, the spill prevention plan will be adjusted to include measures to prevent spills from re-occurring and for modified clean-up procedures.

3.2 Socioeconomic and Cultural

3.2.1 Land Use, Socioeconomic Characteristics and Recreation

Existing Environment

Because of the steady occupation of lots developed during widespread land subdivision about fifty years ago, the Puna District has been the Big Island's fastest-growing district over the last thirty years. Population as measured in the 2010 U.S. Census was 45,326, a 66 percent increase over the 2000 count of 27,232. Despite a lack of basic infrastructure such as paved roads and water in most subdivisions, the relatively inexpensive lots, which typically range in size from one to three acres, have attracted residents from the U.S. mainland and other parts of the State of Hawaiʻi seeking more affordable property. The basis of the economy of Puna has evolved from cattle ranching and sugar to diversified agriculture, various services for the growing populations, commuting to Hilo, and tourism, which has been stimulated by being home to Kilauea, one of the world's most active volcanoes.

Some Puna subdivisions, especially between Pahoa and Hilo, are now essentially bedroom communities for Hilo's workforce, as evidenced by the heavy flow of Hilo-bound traffic during the AM rush hour.

The Meurer property is bordered by the shoreline to the southeast, by the Red Road to the northwest, by a residential lot to the northeast, and a vacant lot to the southwest. Across the Red Road are a number of other lots, many of them with homes.

Like all other areas in Puna, there is a high demand for coastal recreation here. Despite the long coastline, there are few beaches in Puna, and in most location, ocean recreation consists primarily of fishing from the cliffs and enjoying limited bathing in tidepools. There is relatively little use of the rough and irregular shoreline along most of the Red Road coastline. Important exceptions are Ahalanui County Beach park Isaac Hale County Beach Park, McKenzie State Park, and Kehena Beach. Maps of public accesses provided by the County of Hawaiʻi show several of the access points above, but do not indicate any nearby official *mauka-makai* shoreline public accesses from the Red Road in the ʻOpihikao area (http://www.hawaiicounty.gov/pl-shoreline-access-big-island). However, a much smaller but still important shoreline recreation spot is located about 400 feet and two properties southwest of the Meurer property, where a protected tidepool with limited amounts of sand offers a place for soaking, sunbathing, picnicking and fishing. It is particularly popular with local families. Some fisherman and *opihi* pickers follow the shoreline northeast and access fishing spots perched on fingers of lava (see Figure 2).

Impacts and Mitigation Measures

No adverse socioeconomic impacts are expected to result from the project. The project will have a very small positive economic impact for the County of Hawaiʻi. The residence and associated improvements will not adversely affect recreation, as access along the shoreline will not be affected. The proposed residential use will not interfere in any way with this continuing use. Mr. Meurer has been informed of the rights of the public to utilize these areas and the cultural and subsistence importance of these practices, and expects that conditions ensuring continued public access along the front of the property will be codified within the Conservation District Use Permit to make the access situation explicit.

3.2.2 Cultural and Historic Resources

An archaeological inventory survey and a cultural impact assessment were prepared for the property and are attached as Appendices 3 and 4, respectively. Research for this report included primary fieldwork, consultation of archaeological and ethnographical studies and primary documents including maps and Mahele testimony, and consultation of informants. In the interest of readability, the summary below does not include all scholarly references; readers interested in extended discussion and sources may consult Appendix 3. Separately, the Office of Hawaiian Affairs, the Sierra Club, Malama O Puna and neighboring property owners with long-standing connections to the area were consulted to determine whether they had any information on natural or cultural resources that might be present or affected, and additional research on cultural resources and impacts was conducted.

Historical and Cultural Background

The first inhabitants of Hawaiʻi were believed to be settlers who had undertaken difficult voyages across the open ocean. For many years, researchers have proposed that early Polynesian settlement voyages between Kahiki (the ancestral homelands of the Hawaiian gods and people) and Hawaiʻi were underway by A. D. 300, although recent work suggests that Polynesians may not have arrived in Hawaiʻi until at least A. D. 1000 (Kirch 2012).

The initial inhabitants of Hawaiʻi are believed to have come from the southern Marquesas Islands and settled initially on the windward side, eventually expanding to leeward areas. Early Hawaiian farmers developed new strategies and tools for their new environment (Kirch 2012; Pogue 1978). Societal order was maintained by their traditional philosophies and by the conical clan principle of genealogical seniority (Kirch 2012). Universal Polynesian customs brought from their homeland included the observance of major gods *Kane*, *Ku*, and *Lono*; the *kapu* system of law and order; cities of refuge, various superstitions, and the concepts of *mana* and the *ʻaumakua* (Fornander 1969).

The Development Period, believed under Kirch's new concept to have occurred from A. D. 1100 to 1350, brought an evolution of traditional tools, including a variation of the adze (*koʻi*), and some new Hawaiian inventions such as the two-piece fishhook and the octopus-lure breadloaf sinker. That was followed by the Expansion Period (A. D. 1350 to 1650) which saw greater social stratification, intensive land modification, and population growth. This period was also the setting for the second major migration to

Hawaiʻi, this time from Tahiti. Also established during this period was the *ahupuaʻa*, a land-use concept that incorporated all of the eco-zones from the mountains to the shore and beyond. The usually wedge-shaped *ahupuaʻa* provided a diverse subsistence resource base (Hommon 1986) and added another component to what was already becoming a well-stratified society (Kirch 2012).

Ahupuaʻa were ruled by *aliʻi ʻai ahupuaʻa* or lesser chiefs and managed by a *konohiki*. *Aliʻi* and *makaʻainana*, or commoners, were not confined to the boundaries of *ahupuaʻa* as resources were shared when a need was identified. *Ahupuaʻa* were further divided into smaller sections such as *ʻili, moʻoʻaina, paukuʻaina, kihapai, koele, hakuone* and *kuakua*. The chiefs of these land units have their allegiance to a territorial chief or *moʻi* (literally translated as king) (Hommon 1986). The project site is located within ʻOpihikao Ahupuaʻa, a land unit of the District of Puna, one of six major districts on the island of Hawaiʻi.

As population grew during the following centuries so did the reach of inland cultivation in the upland environmental zones and consequent political and social stresses. During the Proto-Historic Period (A. D. 1650-1795), wars reflective of a complex and competitive social environment are evidenced by *heiau* building. During this period, sometime during the reign of Kalaniopuʻu (A. D. 1736-1758), Kamehameha I was born in North Kohala.

As McGregor stated, "Puna is where new land is created and new growth and new life sprout. The new land is sacred, fresh, clean, and untouched. After vegetation begins to grow upon it, it is ready for human use." (2007:145). In Precontact and early Historic times the people lived in a small number of small settlements along the coast where they subsisted on marine resources and agricultural products. Each of the villages, McEldowney noted:

> "…seems to have comprised the same complex of huts, gardens, windbreaking shrubs, and utilized groves, although the form and overall size of each appear to differ. The major differences between this portion of the coast and Hilo occurred in the type of agriculture practiced and structural forms reflecting the uneven nature of the young terrain. Platforms and walls were built to include and abut outcrops, crevices were filled and paved for burials, and the large numbers of loose surface stones were arranged into terraces. To supplement the limited and often spotty deposits of soil, mounds were built of gathered soil, mulch, sorted sizes of stones, and in many circumstances, from burnt brush and surrounding the gardens. Although all major cultigens appear to have been present in these gardens, sweet potatoes, ti (*Cordyline terminalis*), *noni (Morinda citrifolia*), and gourds (*Lagenaria siceraria*) seem to have been more conspicuous. Breadfruit, pandanus, and mountain apple (*Eugenia malaccensis*) were the more significant components of the groves that grew in more disjunct patterns than those in Hilo Bay" [1979:17].

Puna was a region famed in legendary history for its associations with the goddess Pele and god Kāne. Because of the relatively young geological history and persistent volcanic activity, the region has a strong association with Pele. However, the connection to Kāne is perhaps more ancient. Kāne, ancestor to both chiefs and commoners, is the god of sunlight, fresh water, verdant growth, and

forests. It is said that before Pele migrated to Hawaiʻi from Kahiki, Puna was esteemed the most beautiful place in the islands by many. Contributing to that beauty were the groves of fragrant hala and forests of *ʻōhiʻa lehua* for which Puna was famous. The inhabitants of Puna were likewise famous for their expertise and skill in *lauhala* weaving.

Traditional life in Hawaiʻi' took a sharp turn on January 18, 1778 with the arrival of British Capt. James Cook in the islands. On a return trip to Hawaiʻi ten months later, Kamehameha visited Cook aboard his ship the *Resolution* off the east coast of Maui and helped Cook navigate his way to Hawaiʻi Island. Cook exchanged gifts with Kalaniopuʻu at Kealakekua Bay the following January, and Cook left Hawaiʻi in February. However, Cook's ship then sustained damage to a mast in a severe storm off Kohala and returned to Kealakekua, setting the stage for his death on the shores of the bay.

During the Proto-Historic Period there was a continuation of the trend toward intensification of agriculture, *aliʻi*-controlled aquaculture, settling of upland areas and development of traditional oral history. The *Ku* cult, *luakini heiau* and the *kapu* system were at their peaks, but the influence of western civilization was being felt in the introduction of trade for profit and a market-system economy. By 1810, the sandalwood trade established by Europeans and Americans twenty years earlier was flourishing. That contributed to the breakdown of the traditional subsidence system, as farmers and fishermen were required to toil at logging, which resulted in food shortages and a decline in population.

The rampant sandalwood trade resulted in the first Hawaiian national debt, as promissory notes and levies granted by American traders were enforced by American warships. The assimilation of western ways continued with the short-lived whaling industry to the production of sugarcane, which was more lucrative but carried a heavy environmental price.

Following the death of Kamehameha I in 1819, the customary relaxing of *kapu* took place. But with the introduction of Christianity shortly thereafter, his successor, Kamehameha II, renounced the traditional religion and ordered that *heiau* structures either be destroyed or left to deteriorate. The family worship of *ʻaumakua* images was allowed to continue.

In 1823, British missionary William Ellis and members of the American Board of Commissioners for Foreign Missions (ABCFM) toured the island of Hawaiʻi scouting communities in which to establish church centers for the growing Calvinist mission. Ellis recorded observations made during this tour in a journal (Ellis 1963). His writings contain descriptions of residences and practices elsewhere in Puna that are applicable to the general study area:

> "As we approached the sea, the soil became more generally spread over the surface, and vegetation more luxuriant. About two p.m. we sat down to rest. The natives ran to a spot in the neighbourhood, which had formerly been a plantation, and brought a number of pieces of sugar-cane, with which we quenched our thirst, and then walked on through several plantations of sweet potato belonging to the inhabitants of the coast . . . (Ellis 1963:182-183)

> The population in this part of Puna, though somewhat numerous, did not appear to possess the means of subsistence in any great variety or abundance; and we have often been surprised to find desolate coasts more thickly inhabited than some of the fertile tracts in the interior; a circumstance we can only account for, by supposing that the facilities which the former afford for fishing, induce the natives to prefer them as places of abode; for they find that where the coast is low, the adjacent water is usually shallow.
>
> We saw several fowls and a few hogs here, but a tolerable number of dogs, and quantities of dried salt fish, principally albacores and bonitos. This latter article, with their *poë* [*poi*] and sweet potatoes, constitutes nearly the entire support of the inhabitants, not only in this vicinity, but on the sea coasts of the north and south parts of the island.
>
> Besides what is reserved for their own subsistence, they cure large quantities as an article of commerce, which they exchange for the vegetable productions of Hilo and Mamakua [Hāmākua], or the *mamake* and other tapas of Ora [ʻŌlaʻa] and the more fertile districts of Hawaii.
>
> When we passed through Punau [Pānau], Leapuki [Laeapuki], and Kamomoa [Kamoamoa], the country began to wear a more agreeable aspect. Groves of coca-nuts ornamented the projecting points of land, clumps of kou-trees appeared in various directions, and the habitations of the natives were also thickly scattered over the coast . . ." (Ellis 1963:190-191).

A year after Ellis' visit, in 1824, the ABCFM established a base church in Hilo. From that church (Haili), the missionaries traveled to the more remote areas of the Hilo and Puna Districts. David Lyman, who came to Hawaiʻi in 1832, and Titus Coan who arrived in 1835, were two of the most influential Congregational missionaries in Puna and Hilo. As part of their duties they compiled census data for the areas within their missions. In 1835, 4,800 individuals were recorded as residing in the district of Puna; the smallest total district population on the island of Hawaiʻi. In 1841, Titus Coan recorded that most of the 4,371 recorded residents of Puna lived near the shore, the site of the Meurer property, though there were hundreds of individuals who lived inland.

The *Mahele ʻAina* took place in 1848, placing all land in Hawaiʻi into three categories: Crown Lands, Government Lands and Konohiki Lands. Ownership rights were "subject to the rights of the native tenants," or those individuals who lived on the land and worked it for their subsistence and for their chiefs. ʻOpihikao Ahupuaʻa became Government Lands. There were no Land Commission awards (LCA) made in ʻOpihikao Ahupuaʻa. However, the entire *ahupuaʻa* was divided into land grants, many of them sold to Hawaiians.

The Hawaiian government surveyed and began selling homestead lots in Puna in the 1880s. The project area is the coastal portion of Land Grant No. 1279 made to Kalakane in 1853 (see Figure 5 of Appendix 4). Land Grant No. was for 16.95 acres. It can be presumed that the site was used for agriculture, but there does not appear to be any documentation on how long this persisted on the property. Handy and Handy (1972) citing oral historical sources, indicate that even as late as the 1930s there were homesteading areas

in active use in ʻOpihikao, Kaueleau, Kamaili, Keʻekeʻe, Kehena, and Keauohana. Dryland taro was grown throughout the inland portions of these *ahupuaʻa*. A particular taro cultivation method, *pa-hala*, is described for the area from Kalapana to Kamaili. The method involved excavating a hole in ʻaʻa lava in a *hala* grove. The hole was then filled with weeds, which were allowed to rot for six weeks or more. A taro cutting (*huli*) was wrapped in pandanus leaves and planted in the hole. After the cutting produced three or four leaves, the *hala* branches were cut to provide sunlight and the taro plant was covered with pandanus leaves. After the *hala* leaves were sufficiently dry, the leaves were burned reducing them ash that provided nourishment to the taro plant, which grew tall enough to hide a man beneath the leaves.

As a whole, however, land use in the Puna District changed quickly during the late 19th century. In many areas of Puna the native system of agricultural had nearly completely disappeared as a result the drastic population decline, and ranching, sugarcane, coffee, and lumber became the dominant industries. The Keaau Ranch had begun grazing cattle as early as the 1850s and ranching operations continued to expand during this time. A wharf was built north of the project area in Pohoiki in the 1870s. The Olaa-Puna Sugar Company was established in 1900 at Kapoho, and sugarcane fields were planted and tended inland to the west and southwest of the current project area. The Olaa and Puna Sugar Companies operated in Puna from 1900 until the 1980s.

The newly established agricultural businesses and influx of homesteaders and employees necessitated the upgrade of existing transportation routes and the construction of new routes. The construction of new travel routes influenced where people settled and lived. There is an historic trail that leads from the modern-day Liliʻuokalani Gardens area to Hāʻena along the Puna coast. The trail is often called the old Puna Trail and/or Puna Road. There is an historic trail/cart road that is also called the Puna Trail (Ala Hele Puna) and/or the Old Government Road that continues from the south end of the Puna Trail through ʻOpihikao Ahupuaʻa heading to points south. A portion of the Old Government Road later was paved over for the Kapoho-Kalapana Road, which borders the Meurer property.

Beginning in 1900, railroad tracks were laid by the Hawaii Railway Company for hauling sugarcane (and passenger travel) from the fields in lower Puna to the mills in Pahoa and Keaʻau. Surveyor Walter Wall's 1927 Hawaii Government Survey Map of Puna, Keauohana and Malama-iki Forest Reserve showed that the railroad line that extended to Kapoho was expanded to the east as far as Kaueleau Ahupuaʻa (at about the 400-foot elevation; a portion is still shown on current USGS topographic maps). All railroads in Puna ceased operations after the devastating tsunami of 1946 wiped out the central hub of Hilo. As the 20th century advanced, the Puna District underwent further and even more drastic changes. By 1950, most inhabitants of this part of the Puna coast moved away.

A constant through all these eras of history that the well-developed Hawaiian traditions of fishing and collecting food from the ocean continue to be practiced. This orientation to the coast and the traditional practices developed in Hawaiʻi are still passed down generation to generation. Many fishermen catch *pūhi* to fish for *ʻulua* along the cliffs of Puna. Whether they use a hand-line or rod and reel, they use knowledge and techniques of past fishermen to select fishing locations, proper bait, and technique. Fishermen throw net, fish by rod and reel, or spear fish at different locations along the shoreline to catch specific fish such as *āholehole*, *ʻāweoweo*, *kala*, *kole*, *kūmū*, *manini*, *mamo*, *moana* and many other types

of fish. Many people still fish with rod and along the shore on this coastline, including in front of the subject property, or fish by boat out of Pohoiki for *akule*, *kaweleʻā*, *mahimahi*, *ono*, *ʻōpakapaka*, and other species. In addition, the traditional collection of *ʻōpihi*, *ʻaʻama*, and *limu* along the rocky shoreline is still practiced. Traditional Hawaiian fishing practices, shoreline gathering practices, and ocean access are protected by State law.

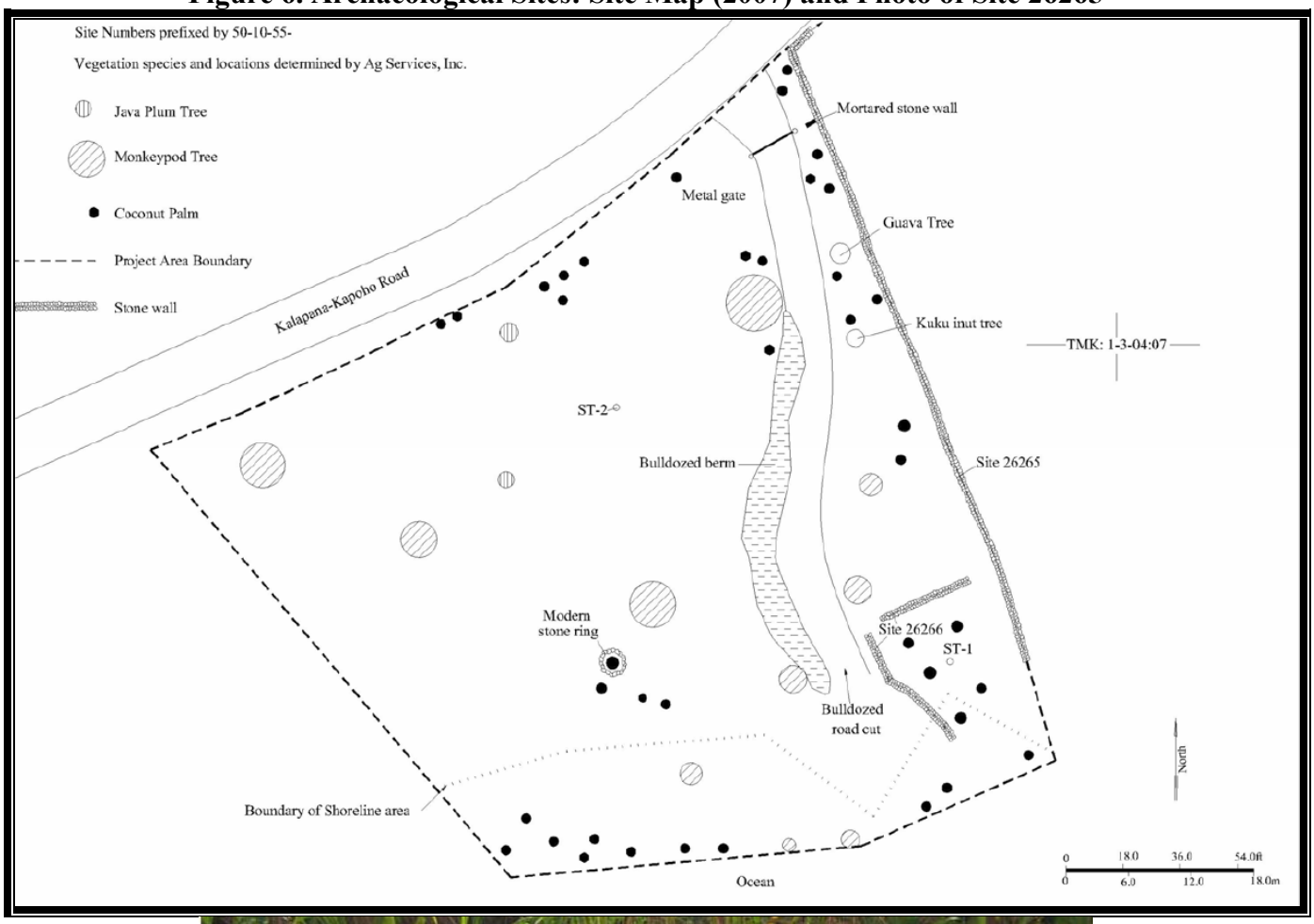
Archaeological Investigations and Resources

Haun & Associates conducted an archaeological inventory survey (AIS) of the project site, which is contained in full in Appendix 3. Archaeologists obtained and reviewed 16 previous archaeological investigations conducted between Kauaea and Kehena associated with single-family home development, road improvements, or other projects. The surveys covered about 640 acres of Puna between sea level and 1,540 ft elevation, and found 113 sites with over 900 features. These included traditional Hawaiian features that associated with habitation, agriculture, burial, rituals, and trails. Traditional sites in this category include petroglyphs, holua slides, water sources, and *ahu* (boundary markers). The majority of the Historic-era features are walls and roads. Based on historic documentary research and previous archaeological work, it appeared that prehistoric use of coastal ʻOpihikao likely included habitation, burial, ritual, and fishing and collecting of marine resources. Historic sites dating to the 1900s would consist of roads, ranching related features, and habitations.

The project area was subjected to a 100-percent surface examination. Ground surface visibility during the survey was good to excellent due to the high canopy of large trees throughout the parcel. Two archaeological sites were determined to be located on the property (Figure 6). They consisted of two stone walls. One was one east-northeastern property boundary (Site 26265). This wall was constructed predominately of subangular basalt cobbles and small boulders, though waterworn basalt stones are incorporated into its length in the seaward portion. Site 26265 is interpreted as an historic livestock control feature likely used to prevent grazing cattle from entering the adjacent parcel. This is based on the height of the intact sections and its location on the boundary of the adjacent TMK: 1-3-04:07. The site is unaltered and in poor to fair condition. The other site was an L-shape wall situated in the southeastern corner of the parcel (Site 26266), with construction and condition similar to the other site. Site 26266 is interpreted as a probable historic livestock control feature that may have served as an animal pen.

In addition to recording these sites in detail, the property was also subject to subsurface testing, specifically the excavation of two 0.3 m diameter shovel tests. The shovel tests were excavated within a single stratigraphic layer and were terminated on bedrock. Standardized excavation records were prepared after the completion of each stratigraphic layer. The fill removed during excavation was screened through ¼” mesh. Following the excavations, a section drawing depicting the stratigraphy was prepared, post-excavation photographs were taken, and the units were backfilled. No cultural remains were recovered from the shovel tests or from the surface of the sites and no laboratory analysis was thus conducted.

Figure 6. Archaeological Sites: Site Map (2007) and Photo of Site 26265



The absence of traditional habitation, ritual, and burial features in the property is likely due to several factors: (a) the presence of coastal bluffs seaward of the parcel that makes landing canoes fairly difficult, (b) prior disturbance associated with the historic utilization of the property for ranching activity and (c) the thin soil present throughout the area.

It should also be noted that maps of various times have depicted *mauka/makai* trails on or near the Meurer property. As shown in Figure 5 of Appendix 4, a trail that began at the Red Road and headed *mauka* was mapped in 1902 along the southwest portion of 'Opihikao (Hawaii Territory Registered Map 2191 by T. Cook). There is no documentary or archaeological evidence that this trail crossed the Meurer property. Another "Trail to the Canoe Landing" is shown on or near the northern boundary of the property on a 1929 map (see letter from Department of Land and Natural Resources, Na Ala Hele Program at end of Appendix 1a). If the trail was present on the Meurer property, it did not leave archaeological traces.

Pursuant to DLNR (2003) Chapter 275-6 (d), the initial significance assessments provided in the archaeological survey were not final until concurrence from the DLNR was obtained. Sites identified during the survey are assessed for significance based on the criteria outlined in the Rules Governing Procedures for Historic Preservation Review (DLNR 2003, Chapter 275). According to these rules, a site must possess integrity of location, design, setting, materials, workmanship, feeling, and association and shall meet one or more of the following criteria:

> Criterion "a". Be associated with events that have made an important contribution to the broad patterns of our history;
> Criterion "b". Be associated with the lives of persons important in our past;
> Criterion "c". Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;
> Criterion "d". Have yielded, or is likely to yield, information important for research on prehistory or history; and
> Criterion "e". Have an important traditional cultural value to the native Hawaiian people or to another ethnic group of the state due to associations with traditional cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts--these associations being important to the group's history and cultural identity.

Based on the above criteria, the two sites within the project area were assessed the archaeologist as solely significant under Criterion "*d".* These sites have yielded information important for understanding historic land use in project area.

Impacts to Archaeological Resources

As a result of the archaeological inventory survey, the archaeologist concluded that the mapping, written descriptions and photography of the two sites adequately documented them and no further work or preservation was recommended, and a report was provided to the State Historic Preservation Division (SHPD). By letter of March 17, 2008 (see end of Appendix 3), SHPD concurred with the findings of the report, concluding that no additional historic preservation work was required.

As discussed above, although not required to be preserved, the landowner has chosen to develop the project site without the need to disturb these walls, which will remain on the property as-is.

As a precaution in the unlikely event that any unanticipated resources are unearthed during development activities, the applicant will ensure that SHPD will be contacted, as outlined in Hawaiʻi Administrative Rules 13§13–280.

Cultural Resources and Practices

When assessing potential cultural impacts to resources, practices, and beliefs, input gathered from community members with genealogical ties and/or long-standing residency relationships to the study area is vital. It is precisely these individuals who ascribe meaning and value to traditional resources and practices. Community members may also retain traditional knowledge and beliefs unavailable elsewhere in the historical or cultural record of a place.

As detailed in Appendix 4, letters of inquiry were sent to organizations whose expertise would include the project area. Inquiries were also made to members of the community who are familiar with the project area lands through cultural, professional, or historical work, or are long-time residents of the area. Consultation was sought from Kamuela Bannister and Kai Markell of the Office of Hawaiian Affairs (OHA; and separately, from Anita Manzano of this agency was well); Herbert Poepoe, SHPD Burial Sites Specialist; Keikialoha Kekipi of the Hawaiʻi Island Burial Council; Rick Gmirkin, Ala Kahakai National Historic Trail, NPS Archaeologist; Nicole Lui and Keone Kawale, cultural practitioners; Samuel Keliihoomalu, a local resident; Deborah Chang, Chairperson of the County of Hawaiʻi Cultural Resources Commission and Member of the Hawaiʻi Island Advisory Council, Nā Ala Hele Statewide Trail and Access System; Theresa Donham, County of Hawaiʻi Cultural Resources Commission Board Member; Clement Chang and Moana Rowland of Na Ala Hele; and longtime ʻOpihikao residents Violet Makuakane and Bernice Kaleikini. Public notices were published in the Office of Hawaiian Affairs *Ka Wai Ola Newspaper*, and were published in the Honolulu Star Advertiser and the Hawaiʻi Tribune Herald.

One individual, Violet Makuakane, responded with information on former cultural practices on or directly adjacent to the property. Violet Makuakane is 83 years old and has lived in ʻOpihikao for most of her life, although she is originally from Pāhala. Her maiden name is Akamu. Her husband was born and raised in ʻOpihikao, where the Makuakane family has lived for generations. Her husband was the pastor of the 175-year old ʻOpihikao Congregational Church for many years. He passed away 10 years ago, and she became pastor. Mrs. Makuakane stated that in the old days, there was a trail along the stone wall that borders the Meurer property on the Pohoiki (northern) side. The trail led to an old canoe landing shown on a 1929 map (see letter from Na Ala Hele at end of Appendix 1a for trail location; the canoe landing was directly *makai* of the Meurer property, as shown in Figure 5 of Appendix 4). She stated that when she married her husband, the road along the ocean (Red Road) was a single lane dirt road, unlike the paved road that exists today. Cars would have to pull off of the road to get by one another. Now the road is paved. The *mauka/makai* trail crossed the road and continued to the beach area marked "canoe landing". In the old days they didn't build structures for canoe landings. It was just a clearing with pebble rocks. The canoe landing was used for many generations; over the last decades, large rocks have washed up and now

prevent canoes from coming in there, and the area is no longer useful for canoe landings, which mainly occur at Pohoiki Harbor. Other individuals who had knowledge of the project area responded that they were not aware of any cultural resources or ongoing cultural practices or beliefs associated with those lands, aside from traditional fishing and gathering on the shoreline in front of the property.

The investigations of the property and its history did not reveal any ongoing cultural resources or practices aside from those conducted on the shoreline *makai* of the property, where fishing and gathering still occur. While some users are newcomers simply engaging in recreation and/or collecting food, others have deeper ties and are undertaking cultural practices as well. Although the area *makai* of the property was used for a canoe landing many decades ago, it is no longer used as such. The small Meurer property does not contain any forest groves, springs, *puʻu*, or caves that might be important cultural sites. No gathering of plant material is noted from the property, and aside from a shoreline strip with a few common native herbs that will not be disturbed in any way, all vegetation on is either non-native weeds or ornamental plantings. There are no cultural values or associations related to this vegetation.

Impacts and Mitigation Measures for Cultural Resources

Shoreline access and the cultural activities this affords will not be affected. It is reasonable to conclude, based upon the limited range of resources and the proposed mitigation to all affected resources, that the exercise of native Hawaiian rights related to gathering, access or other customary activities will not be affected, and there will be no adverse effect upon cultural practices or beliefs. This Draft EA was distributed to agencies, groups and a neighbor who might have knowledge in order to confirm this finding. No party reviewing the Draft EA supplied any cultural information.

3.3 Public Roads, Services and Utilities

3.3.1 Roads and Access

Existing Environment, Impacts and Mitigation Measures

The sole road access to the project site is via an existing driveway from County Road 137, the Kapoho-Kalapana Road (also known as the "Red Road") (see Figure 1, 2a and 3a). Two gates currently lead into the property area. The northern gate will be moved 10 feet further into the property and used as the access to the residence, and the driveway will be improved and paved and lengthened to 35 feet. Mr. Meurer will apply to the County of Hawaiʻi Department of Public Works for a driveway permit to connect to the Red Road.

3.3.2 Public Utilities and Services

Environmental Setting, Impacts and Mitigation Measures

No electric or telephone poles are present on this portion of the Red Road. Mr. Meurer plans to live off-grid utilizing solar photovoltaic and cellular telephones.

Domestic water supply would be a well, using as a backup catchment, the most common method used by thousands of properties both along Government Beach Road and in Puna's largest subdivisions, including 9,000-lot Hawaiian Paradise Park. The catchment water tank would have a capacity of 3,000 gallons.

Wastewater would be treated with a septic system in conformance with requirements of the State Department of Health (see Figure 3 for location). No parks, schools or other public facilities are present nearby. Police, fire and emergency medical service are available about ten road miles away at new facilities on Highway 130 in Pahoa.

There will be no adverse impact to any public or private utilities. The addition of one single-family home will have no measurable adverse impact to or additional demand on public facilities such as schools, police or fire services, or recreational areas. The applicant acknowledges and understands that this lot, along with almost all other residences in the Puna District, is not located within a mile of emergency services.

3.4 Secondary and Cumulative Impacts

Due to its small scale, the proposed project would not produce any major secondary impacts, such as population changes or effects on public facilities.

Cumulative impacts result when implementation of several projects that individually have limited impacts combine to produce more severe impacts or conflicts in mitigation measures. No substantial government or private projects are known to be occurring or in planning for this portion of Puna. There are hundreds of single-family homes located on the Red Road between Pohoiki and Kalapana, and occasionally there are two or more homes under construction simultaneously. The adverse effects of building a single-family residence in this context are very minor and involve temporary disturbances to air quality, noise, traffic and visual quality during construction. It should again be noted that the proposed home is in a somewhat isolated, sparsely populated area, and no accumulation of adverse construction effects would be expected. Other than the precautions for preventing adverse impacts during construction listed above in Sections 3.1.3 and 3.1.6, no special mitigation measures should be required to counteract the small adverse cumulative effect.

3.5 Required Permits and Approvals

County of Hawaiʻi:

Special Management Area Permit or Exemption
Plan Approval and Grubbing, Driveway Grading, and Building Permits

State of Hawaiʻi:

Conservation District Use Permit
Wastewater System Approval

3.6 Consistency With Government Plans and Policies

3.6.1 Hawaiʻi County General Plan

The *General Plan* for the County of Hawaiʻi is the document expressing the broad goals and policies for the long-range development of the Island of Hawaiʻi. The plan was adopted by ordinance in 1989 and revised in 2005. The General Plan's Land Use Allocation Guide Map designates the subject parcel as Open. The *General Plan* 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 Hawaiʻi. Below are pertinent sections followed by a discussion of conformance.

ECONOMIC GOALS

(a) Provide residents with opportunities to improve their quality of life through economic development that enhances the County's natural and social environments.
(b) Economic development and improvement shall be in balance with the physical, social, and cultural environments of the island of Hawaii.
(d) Provide an economic environment that allows new, expanded, or improved economic opportunities that are compatible with the County's cultural, natural, and social environment.

Discussion: The proposed construction and occupation of a single-family home is in balance with the natural, cultural and social environment of the County, would create temporary construction jobs for local residents, and would indirectly boost the economy through construction industry purchases from local suppliers. A multiplier effect takes place when these employees spend their income for food, housing, and other living expenses in the retail sector of the economy. Such activities are in keeping with the overall economic development of the island.

ENVIRONMENTAL QUALITY GOALS

(a) Define the most desirable use of land within the County that achieves an ecological balance providing residents and visitors the quality of life and an environment in which the natural resources of the island are viable and sustainable.
(b) Maintain and, if feasible, improve the existing environmental quality of the island.
(c) Control pollution.

ENVIRONMENTAL QUALITY POLICIES

(a) Take positive action to further maintain the quality of the environment.

ENVIRONMENTAL QUALITY STANDARDS

(a) Pollution shall be prevented, abated, and controlled at levels that will protect and preserve the public health and well being, through the enforcement of appropriate Federal, State and County standards.
(b) Incorporate environmental quality controls either as standards in appropriate ordinances or as conditions of approval.
(c) Federal and State environmental regulations shall be adhered to.

Discussion: The proposed construction and occupation of a single-family home would not have a substantial adverse effect on the environment and would not diminish the valuable natural resources of the region. The home and associated improvements would be compatible with the existing rural single-family homes and recreational uses in the area. Pertinent environmental regulations would be followed, including those for mitigation of water quality impacts.

HISTORIC SITES GOALS

(a) Protect, restore, and enhance the sites, buildings, and objects of significant historical and cultural importance to Hawaii.
(b) Appropriate access to significant historic sites, buildings, and objects of public interest should be made available.

HISTORIC SITES POLICIES

(a) Agencies and organizations, either public or private, pursuing knowledge about historic sites should keep the public apprised of projects.
(b) Amend appropriate ordinances to incorporate the stewardship and protection of historic sites, buildings and objects.
(c) Require both public and private developers of land to provide historical and archaeological surveys and cultural assessments, where appropriate, prior to the clearing or development of land when there are indications that the land under consideration has historical significance.
(d) Public access to significant historic sites and objects shall be acquired, where appropriate.

Discussion: An archaeological inventory survey approved by the State Historic Preservation documented two archaeological sites (livestock wall sections) that were determined not to be significant for preservation but which in any case would not be affected by development. A cultural impact assessment determined that aside from shoreline fishing and gathering *makai* of the lot, which will not be affected, there are no known cultural resources or known or expected cultural practices on the lot, and no effect to such.

FLOOD CONTROL AND DRAINAGE GOALS

(a) Protect human life.
(b) Prevent damage to man-made improvements.
(c) Control pollution.
(d) Prevent damage from inundation.
(e) Reduce surface water and sediment runoff.
(f) Maximize soil and water conservation.

FLOOD CONTROL AND DRAINAGE POLICIES

(a) Enact restrictive land use and building structure regulations in areas vulnerable to severe damage due to the impact of wave action. Only uses that cannot be located elsewhere due to public necessity and character, such as maritime activities and the necessary public facilities and utilities, shall be allowed in these areas.
(g) Development-generated runoff shall be disposed of in a manner acceptable to the Department of Public Works and in compliance with all State and Federal laws.

FLOOD CONTROL AND DRAINAGE STANDARDS

(a) "Storm Drainage Standards," County of Hawaii, October, 1970, and as revised.
(b) Applicable standards and regulations of Chapter 27, "Flood Control," of the Hawaii County Code.
(c) Applicable standards and regulations of the Federal Emergency Management Agency (FEMA).
(d) Applicable standards and regulations of Chapter 10, "Erosion and Sedimentation Control," of the Hawaii County Code.
(e) Applicable standards and regulations of the Natural Resources Conservation Service and the Soil and Water Conservation Districts.

Discussion: The proposed structure is located in a flood zone but will be elevated above the base flood elevation in conformance with regulations. The proposed site for the residence is 15 to 18 feet above sea level and a minimum of 73 feet from the shoreline. The habitable portions of the structure would be raised off the ground surface to an elevation of 20.0 feet above sea level and designed to safely accommodate the residential use, given the flood zone status of the majority of the property. The structure appears to be outside the area historically affected by tsunami. The project will conform to applicable drainage regulations and policies of the County of Hawaiʻi.

NATURAL BEAUTY GOALS

(a) Protect, preserve and enhance the quality of areas endowed with natural beauty, including the quality of coastal scenic resources.
(b) Protect scenic vistas and view planes from becoming obstructed.

(c) Maximize opportunities for present and future generations to appreciate and enjoy natural and scenic beauty.

NATURAL BEAUTY POLICIES

(a) Increase public pedestrian access opportunities to scenic places and vistas.
(b) Develop and establish view plane regulations to preserve and enhance views of scenic or prominent landscapes from specific locations, and coastal aesthetic values.

Discussion: The improvements are minor and consistent with traditional residential uses of the land and will not cause scenic impacts or impede access. The Site Plan has been designed to maintain sightlines through the property and soften views of the residential structures.

NATURAL RESOURCES AND SHORELINES GOALS

(a) Protect and conserve the natural resources from undue exploitation, encroachment and damage.
(b) Provide opportunities for recreational, economic, and educational needs without despoiling or endangering natural resources.
(c) Protect and promote the prudent use of Hawaii's unique, fragile, and significant environmental and natural resources.
(d) Protect rare or endangered species and habitats native to Hawaii.
(e) Protect and effectively manage Hawaii's open space, watersheds, shoreline, and natural areas.
(f) Ensure that alterations to existing land forms, vegetation, and construction of structures cause minimum adverse effect to water resources, and scenic and recreational amenities and minimum danger of floods, landslides, erosion, siltation, or failure in the event of an earthquake.

NATURAL RESOURCES AND SHORELINES POLICIES

(a) Require users of natural resources to conduct their activities in a manner that avoids or minimizes adverse effects on the environment.
(c) Maintain the shoreline for recreational, cultural, educational, and/or scientific uses in a manner that is protective of resources and is of the maximum benefit to the general public.
(d) Protect the shoreline from the encroachment of man-made improvements and structures.
(h) Encourage public and private agencies to manage the natural resources in a manner that avoids or minimizes adverse effects on the environment and depletion of energy and natural resources to the fullest extent.
(p) Encourage the use of native plants for screening and landscaping.
(r) Ensure public access is provided to the shoreline, public trails and hunting areas, including free public parking where appropriate.
(u) Ensure that activities authorized or funded by the County do not damage important natural resources.

Discussion: The proposed site for the residence is 15 to 18 feet above sea level and a minimum of 73 feet from the shoreline. The structure would not affect shoreline resources and it is not likely to be damaged

by waves or tides. The proposed use will not impact the lateral public access or the public's ability to utilize the coastal resources that front this property. Native and Polynesian plants will be used for the limited landscaping proposed for the property.

PUNA COMMUNITY DEVELOPMENT PLAN

The Puna Community Development Plan (CDP) encompasses the judicial district of Puna, and was developed under the framework of the February 2005 County of Hawaiʻi General Plan. Community Development Plans are intended to translate broad General Plan Goals, Policies, and Standards into implementation actions as they apply to specific geographical regions around the County. CDPs are also intended to serve as a forum for community input into land-use, delivery of government services and any other matters relating to the planning area.

The Puna CDP does not specify land use in the project area, but contains the following Goals for Managing Growth that are relevant to the action.

> 3.1.1 Goals (for Managing Growth)
> a. Puna retains a rural character while it protects its native natural and cultural resources.
> b. The quality of life improves and economic opportunity expands for Puna's residents.
> d. Exposure to high risk from natural hazards situations is reduced.
> f. Native vegetation, coastal and historic resources are provided new forms of protection.

Discussion: The proposed single-family home helps the area retain a rural character and through provision of housing and expansion of a market for local goods and services, it improves the quality of life and economy. The lot shares the same volcanic and seismic hazard as all of Puna. Owing to the home's proposed location on the lot, substantial coastal hazard would be avoided. No native vegetation, rare species, coastal resources or historic sites will be adversely affected. The construction of a single-family home is not inconsistent with the Puna CDP.

3.6.2 Hawaiʻi County Zoning and Special Management Area

The State Land Use District for the property proposed for the single-family home is Conservation. The property is zoned by the County of Hawaiʻi as Open, although County zoning does not apply in the Conservation District portion of the property. No aspect of the project appears to be inconsistent with County zoning.

The entire property is within the Special Management Area. Single-family residences may be determined to be an exempt action under the County's Special Management Area (SMA) guidelines. The County of Hawaiʻi Planning Department requires preparation of an SMA Assessment Application, in which SMA issues are expressly dealt with. A summary of consistency is provided below.

The proposed land use complies with provisions and guidelines contained in Chapter 205A, Hawaiʻi Revised Statutes (HRS), entitled *Coastal Zone Management*. Single-family residences may be determined to be an exempt action under the County's Special Management Area (SMA) guidelines. The proposed use would be consistent with Chapter 205A because it would not affect public access to recreational areas, historic resources, scenic and open space resources, coastal ecosystems, economic uses, or coastal hazards.

The proposed improvements are not likely to result in any substantial adverse impact on the surrounding environment. The house site is set back from the shoreline and will not restrict any shoreline uses such as hiking, fishing or water sports. Lateral pedestrian use of the shoreline area will not be impacted and there will be no effect on the public's access to or enjoyment of this shoreline area. Furthermore, viewplanes through the project site will not be adversely impacted in any substantial way, as sightlines are being preserved. It is expected that the project will not result in any impact on the biological or economic aspects of the coastal ecosystem. The project site is not situated over any natural drainage system or water feature that would flow into the nearby coastal system. The property contains mostly non-native and a few common native plants. Use for a single-family home will not adversely affect the floodplain, and the use will be in full conformance with flood zone regulations. In terms of beach protection, construction is set back from the shoreline and would not affect any beaches. No impacts on marine resources are likely to occur. No historic sites that have been determined to be significant for preservation are present, and the two historic walls on the property will remain. There are no known cultural resources or practices on the property, and traditional fishing and gathering will not be affected.

The Planning Director will be requested by the applicant to make the determination that the proposed development of a single-family home is not considered a "development" under Special Management Area Rules and Regulations of the County of Hawaiʻi, Section 9-4 (10) (B) and is otherwise not subject to an SMA Major Permit.

3.6.3 Conservation District

The State Land Use District for the Meurer property is Conservation. Its subzone is Resource, for which, according to Hawaiʻi Administrative Rules (HAR) §13-5-15, a single-family residence is an identified use. The property proposed 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 concurrently prepared a Conservation District Use Application (CDUA), to which this EA is an appendix. The CDUA includes a detailed evaluation of the consistency of the project with the criteria of the Conservation District permit process. Briefly, the following individual consistency criteria should be noted:

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

The development of the single-family residence is in conformance with the purpose of the Conservation District. The proposed use of the subject property for a single-family residence is an identified use within the Conservation District, requiring a Board Permit for such use. A commitment by the applicant to

management of the site will conserve, protect and preserve the natural features on the subject property. The proposed use will not impact the lateral public access or the public’s ability to utilize the coastal resources that front this property. Additionally, due to the careful and limited nature of the proposed development, there would be no significant impacts to the natural or cultural resources of the area.

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

The objective of the Resource subzone “…*is to develop, with proper management, areas to ensure sustained use of the natural resources of those areas.”* Single-family residences are an identified use in the Resource subzone under HAR 13-5-24, R-8. The proposed residence, which would conform to the design standards in 13-5-41, will ensure the sustained use of the natural resources in the project area by mitigating potential impacts as outlined in this document.

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 proposed land use complies with provisions and guidelines contained in Chapter 205A, Hawai‘i Revised Statutes (HRS), entitled *Coastal Zone Management*, as discussed above in Section 3.6.2.

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

Because of the relatively minor nature of the project and the lack of native terrestrial ecosystems and threatened or endangered plant species, the replacement of a single-family residence is not likely to cause adverse biological impacts. Impacts to the island wide-ranging endangered Hawaiian hoary bat and Hawaiian Hawk will be avoided through timing of vegetation removal and/or hawk nest survey. The applicant is planning to install minimal landscaping using primarily native and Polynesian species, mainly leaving the existing landscape in place and except where clearing is necessary for the house pad, accessory structures and shoreline view/breeze corridor. This will minimize the visual impact of the structure as seen from adjacent public areas. No effect on any coastal ecosystem will occur, because of the vegetated area fronting the proposed home site, and the planned precautions for preventing soil runoff during constructions. The proposed action will also have no impact on the public’s current access to or use of the shoreline area.

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;

The proposed use is consistent with single-family residential use in the area. The proposed residence, including decks, lanais and the water tank, will be less than 3,500 square feet in size and will be set back a minimum of 73 feet from the shoreline. Although there is no practical way to avoid having portions of the structure located inside the (proposed) flood zone, it will be elevated above the base flood elevation in

conformance with regulations. Sightlines through the property from the Red Road to the sea will be preserved. This identified use, which conforms to the design standards in HAR 13-5-41, will ensure the sustained use of the natural resources in the project area by mitigating impacts. The use will not adversely affect the surrounding properties or how these properties are utilized.

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 proposed use of the subject property for a single-family residence and commitment to management of the site will help conserve, protect and preserve the natural features of the area.

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 and will not lead to any increase in intensity of use beyond the requested single-family residence.

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

The general area is already in use for ocean recreation by the public and the proposed single-family residence will not be detrimental to the public health, safety, and welfare.

PART 4: DETERMINATION, FINDINGS AND REASONS

4.1 Determination

Based on the findings below, and upon consideration of comments to the Draft EA, the applicant expects that the State of Hawaiʻi, Department of Land and Natural Resources, will determine that the proposed action will not significantly alter the environment, as impacts will be minimal, and that this agency will accordingly issue a Finding of No Significant Impact (FONSI).

4.2 Findings and Supporting Reasons

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 resource would be committed or lost. Common native plants are present but native ecosystems would not be adversely affected. An archaeological inventory survey approved by the State Historic Preservation documented two archaeological sites (livestock wall sections) that were determined not to be significant for preservation but which in any case would not be affected by development. No valuable cultural resources and practices such as coastal access, fishing, gathering, hunting, or access to ceremonial sites would be affected in any way.

2. *The proposed project will not curtail the range of beneficial uses of the environment.* No restriction of beneficial uses would occur by residential use on this lot.

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 minor and basically environmentally benign, and it is thus consistent with all elements of the State's long-term environmental policies.

4. *The proposed project will not substantially affect the economic or social welfare of the community or State.* The project would not have any substantial effect on the economic or social welfare of the Big Island community or the State of Hawaiʻi.

5. *The proposed project does not substantially affect public health in any detrimental way.* The project would not affect public health and safety in any way. Wastewater will be disposed of in conformance with State Department of Health regulations.

6. *The proposed project will not involve substantial secondary impacts, such as population changes or effects on public facilities*. The small scale of the proposed project would not produce any major secondary impacts, such as population changes or effects on public facilities.

7. *The proposed project will not involve a substantial degradation of environmental quality*. The project is minor and environmentally benign, and thus it would 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.* Thorough survey has determined that no endangered plant species are present. Other than bats and hawks, island wide-ranging species that will experience no adverse impacts due to mitigation in the form of timing of vegetation removal and/or hawk nest survey, no rare, threatened or endangered species of fauna are known to exist on or near the project site, and none would be affected by any project activities.

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 adverse effects of building a single-family residence are very minor and temporary disturbance to traffic, air quality, noise, and visual quality during construction. This area is fairly isolated from sensitive receptors other than similar single-family residences. There are no substantial government or private projects in construction or planning, and no accumulation of adverse construction effects would be expected. Other than the precautions for preventing adverse effects during construction listed above, no special mitigation measures should be required to counteract the small adverse cumulative effect.

10. *The proposed project will not detrimentally affect air or water quality or ambient noise levels.* No substantial effects to air, water, or ambient noise would occur. Brief, temporary effects would occur during construction and would be mitigated.

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.* The proposed structure is located in a flood zone but will be elevated above the base flood elevation in conformance with regulations. The proposed site for the residence is 15 to 18 feet above sea level and a minimum of 73 feet from the shoreline. The habitable portions of the structure would be raised off the ground surface with a base floor elevation of 20.0 feet above sea level and designed to safely accommodate the residential use, given the flood zone status of the majority of the property. The structure appears to be outside the area historically affected by tsunami.

12. *The project will not substantially affect scenic vistas and viewplanes identified in county or state plans or studies.* No scenic views are located nearby or would be affected in any way. Sightlines through the property to the sea from the Red Road will be preserved. The attractive design of the home and the landscaping will help ensure that the home will not materially degrade the scenery of the project area.

13. *The project will not require substantial energy consumption*. Negligible amounts of energy input would be required for construction.

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Environmental Assessment

Meurer Single-Family Residence in the Conservation District at ‘Opihikao

APPENDIX 1a
Comments in Response to Early Consultation

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William P. Kenoi
Mayor

Harry S. Kubojiri
Police Chief

Paul K. Ferreira
Deputy Police Chief

County of Hawai`i

POLICE DEPARTMENT
349 Kapi'olani Street • Hilo, Hawai'i 96720-3998
(808) 935-3311 • Fax (808) 961-2389

September 13, 2016

Mr. Ron Terry, Principal
Geometrician Associates
P. O. Box 396
Hilo, HI 96721
rterry@hawaii.rr.com

Dear Mr. Terry:

SUBJECT: EARLY CONSULTATION FOR ENVIRONMENTAL ASSESSMENT FOR PROPOSED SINGLE-FAMILY RESIDENCE IN THE CONSERVATION DISTRICT, PUNA DISTRICT, ISLAND OF HAWAII
TMK (3RD)1-3-004:008

Staff, upon reviewing the provided document, does not anticipate any significant impact to traffic and/or other public safety concerns.

Thank you for allowing us the opportunity to comment.

If you have any questions, please contact Captain Samuel Jelsma, Puna District Commander, at 965-2716.

Sincerely,

HENRY J. TAVARES, JR.
ASSISTANT POLICE CHIEF
AREA OPERATIONS BUREAU

SJ:lli
160599

From: Cory Harden [mailto:333cory@gmail.com]
Sent: Tuesday, September 13, 2016 9:28 PM
To: Ron Terry <rterry@hawaii.rr.com>
Subject: Re: Early consultation letter for proposed home in Conservation District in Opihikao

Hi Ron,
Speaking as an individual, I'd be worried about storms, exacerbated by climate change and sea level rise. Flooding, storm surge, wind, and wind-borne debris, plus fallen trees and utility poles, could affect not only the house, but also utilities and road access.
As you know, some parts of Puna had no electricity for a couple of weeks after Tropical Storm Iselle.
Thanks for sending your letter.
Cory

William P. Kenoi
Mayor

Darren J. Rosario
Fire Chief

Renwick J. Victorino
Deputy Fire Chief

County of Hawai'i
HAWAI'I FIRE DEPARTMENT
25 Aupuni Street • Suite 2501 • Hilo, Hawai'i 96720
(808) 932-2900 • Fax (808) 932-2928

September 15, 2016

Ron Terry, Principal
Geometrician Associates, LLC
P.O. Box 396
Hilo, Hawai'i 96721

Dear Mr. Ron Terry:

SUBJECT: Early Consultation for Environmental Assessment for Proposed Single-Family Residence in the Conservation District, Puna, District, Island of Hawai'i, TMK (3rd) 1-3-004:008

In regards to the above-mentioned Environmental Assessment Early Consultation application, the following shall be in accordance:

NFPA 1, UNIFORM FIRE CODE, 2006 EDITION
Note: Hawai'i State Fire Code, National Fire Protection Association 2006 version, with County of Hawai'i amendments. County amendments are identified with a preceding "C~" of the reference code.

Chapter 18 Fire Department Access and Water Supply

18.1 General. Fire department access and water supplies shall comply with this chapter.

For occupancies of an especially hazardous nature, or where special hazards exist in addition to the normal hazard of the occupancy, or where access for fire apparatus is unduly difficult, or areas where there is an inadequate fire flow, or inadequate fire hydrant spacing, and the AHJ may require additional safeguards including, but not limited to, additional fire appliance units, more than one type of appliance, or special systems suitable for the protection of the hazard involved.

18.1.1 Plans.

18.1.1.1 Fire Apparatus Access. Plans for fire apparatus access roads shall be submitted to the fire department for review and approval prior to construction.

18.1.1.2 Fire Hydrant Systems. Plans and specifications for fire hydrant systems shall be submitted to the fire department for review and approval prior to construction.

C~ 18.1.1.2.1 Fire Hydrant use and Restrictions. No unauthorized person shall use or operate any Fire hydrant unless such person first secures permission or a permit from the owner or representative of the department, or company that owns or governs that water supply or system. Exception: Fire Department personnel conducting firefighting operations, hydrant testing, and/or maintenance, and the flushing and acceptance of hydrants witnessed by Fire Prevention Bureau personnel.

18.2 Fire Department Access.

18.2.1 Fire department access and fire department access roads shall be provided and maintained in accordance with Section 18.2.

18.2.2* Access to Structures or Areas.

18.2.2.1 Access Box(es). The AHJ shall have the authority to require an access box(es) to be installed in an accessible location where access to or within a structure or area is difficult because of security.

18.2.2.2 Access to Gated Subdivisions or Developments. The AHJ shall have the authority to require fire department access be provided to gated subdivisions or developments through the use of an approved device or system.

18.2.2.3 Access Maintenance. The owner or occupant of a structure or area, with required fire department access as specified in 18.2.2.1 or 18.2.2.2, shall notify the AHJ when the access is modified in a manner that could prevent fire department access.

18.2.3 Fire Department Access Roads. (*may be referred as FDAR)

18.2.3.1 Required Access.

18.2.3.1.1 Approved fire department access roads shall be provided for every facility, building, or portion of a building hereafter constructed or relocated.

18.2.3.1.2 Fire Department access roads shall consist of roadways, fire lanes, parking lots lanes, or a combination thereof.

18.2.3.1.3* When not more than two one- and two-family dwellings or private garages, carports, sheds, agricultural buildings, and detached buildings or structures 400ft^2 (37 m^2) or less are present, the requirements of 18.2.3.1 through 18.2.3.2.1 shall be permitted to be modified by the AHJ.

18.2.3.1.4 When fire department access roads cannot be installed due to location on property, topography, waterways, nonnegotiable grades, or other similar conditions, the AHJ shall be authorized to require additional fire protection features.

18.2.3.2 Access to Building.

18.2.3.2.1 A fire department access road shall extend to within in 50 ft (15 m) of at least one exterior door that can be opened from the outside that provides access to the interior of the building. Exception: 1 and 2 single-family dwellings.

18.2.3.2.1.1 When buildings are protected throughout with an approved automatic sprinkler system that is installed in accordance with NFPA 13, NFPA 13D, or NFPA 13R, the distance in 18.2.3.2.1 shall be permitted to be increased to 300 feet.

18.2.3.2.2 Fire department access roads shall be provided such that any portion of the facility or any portion of an exterior wall of the first story of the building is located not more than 150 ft (46 m) from fire department access roads as measured by an approved route around the exterior of the building or facility.

18.2.3.2.2.1 When buildings are protected throughout with an approved automatic sprinkler system that is installed in accordance with NFPA 13, NFPA 13D, or NFPA 13R, the distance in 18.2.3.2.2 shall be permitted to be increased to 450 ft (137 m).

18.2.3.3 Multiple Access Roads. More than one fire department access road shall be provided when it is determined by the AHJ that access by a single road could be impaired by vehicle congestion, condition of terrain, climatic conditions, or other factors that could limit access.

18.2.3.4 Specifications.

18.2.3.4.1 Dimensions.

C~ 18.2.3.4.1.1 FDAR shall have an unobstructed width of not less than 20ft with an approved turn around area if the FDAR exceeds 150 feet. **Exception:** FDAR for one and two family dwellings shall have an unobstructed width of not less than 15 feet, with an area of not less than 20 feet wide within 150 feet of the structure being protected. An approved turn around area shall be provided if the FDAR exceeds 250 feet.

C~ 18.2.3.4.1.2 FDAR shall have an unobstructed vertical clearance of not less then 13ft 6 in.

C~ 18.2.3.4.1.2.1 Vertical clearances may be increased or reduced by the AHJ, provided such increase or reduction does not impair access by the fire apparatus, and approved signs are installed and maintained indicating such approved changes.

18.2.3.4.1.2.2 Vertical clearances shall be increased when vertical clearances or widths are not adequate to accommodate fire apparatus.

C~ 18.2.3.4.2 Surface. Fire department access roads and bridges shall be designed and maintained to support the imposed loads (25 Tons) of the fire apparatus. Such FDAR and shall be comprised of an all-weather driving surface.

18.2.3.4.3 Turning Radius.

C~ 18.2.3.4.3.1 Fire department access roads shall have a minimum inside turning radius of 30 feet, and a minimum outside turning radius of 60 feet.

18.2.3.4.3.2 Turns in fire department access road shall maintain the minimum road width.

18.2.3.4.4 Dead Ends. Dead-end fire department access roads in excess of 150 ft (46 m) in length shall be provided with approved provisions for the fire apparatus to turn around.

18.2.3.4.5 Bridges.

18.2.3.4.5.1 When a bridge is required to be used as part of a fire department access road, it shall be constructed and maintained in accordance with county requirements.

18.2.3.4.5.2 The bridge shall be designed for a live load sufficient to carry the imposed loads of fire apparatus.

18.2.3.4.5.3 Vehicle load limits shall be posted at both entrances to bridges where required by the AHJ.

18.2.3.4.6 Grade.

C~ 18.2.3.4.6.1 The maximum gradient of a Fire department access road shall not exceed 12 percent for unpaved surfaces and 15 percent for paved surfaces. In areas of the FDAR where a Fire apparatus would connect to a Fire hydrant or Fire Department Connection, the maximum gradient of such area(s) shall not exceed 10 percent.

18.2.3.4.6.2* The angle of approach and departure for any means of fire department access road shall not exceed 1 ft drop in 20 ft (0.3 m drop in 6 m) or the design limitations of the fire apparatus of the fire department, and shall be subject to approval by the AHJ.

18.2.3.4.6.3 Fire department access roads connecting to roadways shall be provided with curb cuts extending at least 2 ft (0.61 m) beyond each edge of the fire lane.

18.2.3.4.7 Traffic Calming Devices. The design and use of traffic calming devices shall be approved the AHJ.

18.2.3.5 Marking of Fire Apparatus Access Road.

18.2.3.5.1 Where required by the AHJ, approved signs or other approved notices shall be provided and maintained to identify fire department access roads or to prohibit the obstruction thereof of both.

18.2.3.5.2 A marked fire apparatus access road shall also be known as a fire lane.

18.2.4* Obstruction and Control of Fire Department Access Road.

18.2.4.1 General.

18.2.4.1.1 The required width of a fire department access road shall not be obstructed in any manner, including by the parking of vehicles.

18.2.4.1.2 Minimum required widths and clearances established under 18.2.3.4 shall be maintained at all times.

18.2.4.1.3* Facilities and structures shall be maintained in a manner that does not impair or impede accessibility for fire department operations.

18.2.4.1.4 Entrances to fire departments access roads that have been closed with gates and barriers in accordance with 18.2.4.2.1 shall not be obstructed by parked vehicles.

18.2.4.2 Closure of Accessways.

18.2.4.2.1 The AHJ shall be authorized to require the installation and maintenance of gates or other approved barricades across roads, trails, or other accessways not including public streets, alleys, or highways.

18.2.4.2.2 Where required, gates and barricades shall be secured in an approved manner.

18.2.4.2.3 Roads, trails, and other access ways that have been closed and obstructed in the manner prescribed by 18.2.4.2.1 shall not be trespassed upon or used unless authorized by the owner and the AHJ.

18.2.4.2.4 Public officers acting within their scope of duty shall be permitted to access restricted property identified in 18.2.4.2.1.

18.2.4.2.5 Locks, gates, doors, barricades, chains, enclosures, signs, tags, or seals that have been installed by the fire department or by its order or under its control shall not be removed, unlocked, destroyed, tampered with, or otherwise vandalized in any manner.

18.3 Water Supplies and Fire Hydrants

18.3.1* A water supply approved by the county, capable of supplying the required fire flow for fire protection shall be provided to all premises upon which facilities or buildings, or portions thereof, are hereafter constructed, or moved into or within the county. When any portion of the facility or building is in excess of 150 feet (45 720 mm) from a water supply on a fire apparatus access road, as measured by an approved route around the exterior of the facility or building, on-site fire hydrants and mains capable of supplying the required fire flow shall be provided when required by the AHJ. For on-site fire hydrant requirements see section 18.3.3.

EXCEPTIONS:

1. When facilities or buildings, or portions thereof, are completely protected with an approved automatic fire sprinkler system the provisions of section 18.3.1 may be modified by the AHJ.
2. When water supply requirements cannot be installed due to topography or other conditions, the AHJ may require additional fire protection as specified in section 18.3.2 as amended in the code.
3. When there are not more than two dwellings, or two private garage, carports, sheds and agricultural. Occupancies, the requirements of section 18.3.1 may be modified by AHJ.

18.3.2* Where no adequate or reliable water distribution system exists, approved reservoirs, pressure tanks, elevated tanks, fire department tanker shuttles, or other approved systems capable of providing the required fire flow shall be permitted.

18.3.3* The location, number and type of fire hydrants connected to a water supply capable of delivering the required fire flow shall be provided on a fire apparatus access road on the site of the premises or both, in accordance with the appropriate county water requirements.

18.3.4 Fire Hydrants and connections to other approved water supplies shall be accessible to the fire department.

18.3.5 Private water supply systems shall be tested and maintained in accordance with NFPA 25 or county requirements as determined by the AHJ.

18.3.6 Where required by the AHJ, fire hydrants subject to vehicular damage shall be protected unless located within a public right of way.

18.3.7 The AHJ shall be notified whenever any fire hydrant is placed out of service or returned to service. Owners of private property required to have hydrants shall maintain hydrant records of approval, testing, and maintenance, in accordance with the respective county water requirements. Records shall be made available for review by the AHJ upon request.

C~ 18.3.8 Minimum water supply for buildings that do not meet the minimum County water standards:

Buildings up to 2000 square feet, shall have a minimum of 3,000 gallons of water available for Firefighting.

Buildings 2001- 3000 square feet, shall have a minimum of 6,000 gallons of water available for Firefighting.

Buildings, 3001- 6000 square feet, shall have a minimum of 12,000 gallons of water available for Firefighting.

Buildings, greater than 6000 square feet, shall meet the minimum County water and fire flow requirements.

Multiple story buildings shall multiply the square feet by the amount of stories when determining the minimum water supply.

Commercial buildings requiring a minimum fire flow of 2000gpm per the Department of Water standards shall double the minimum water supply reserved for firefighting.

Fire Department Connections (FDC) to alternative water supplies shall comply with 18.3.8 (1)-(6) of *this code.*

NOTE: In that water catchment systems are being used as a means of water supply for firefighting, such systems shall meet the following requirements:

1) In that a single water tank is used for both domestic and firefighting water, the water for domestic use shall not be capable of being drawn from the water reserved for firefighting;

2) Minimum pipe diameter sizes from the water supply to the Fire Department Connection (FDC) shall be as follows:
   a) 4" for C900 PVC pipe;
   b) 4" for C906 PE pipe;
   c) 3" for ductile Iron;
   d) 3' for galvanized steel.

3) The Fire Department Connection (FDC) shall:
   a) be made of galvanized steel;
   b) have a gated valve with 2-1/2 inch, National Standard Thread male fitting and cap;
   c) be located between 8 ft and 16 ft from the Fire department access. The location shall be approved by the AHJ;
   d) not be located less than 24 inches, and no higher than 36 inches from finish grade, as measured from the center of the FDC orifice;
   e) be secure and capable of withstanding drafting operations. Engineered stamped plans may be required;
   f) not be located more than 150 feet of the most remote part, but not less than 20 feet, of the structure being protected;
   g) also comply with section 13.1.3 and 18.2.3.4.6.1 of *this code.*

4) Commercial buildings requiring a fire flow of 2000gpm shall be provided with a second FDC. Each FDC shall be independent of each other, with each FDC being capable of flowing 500gpm by engineered design standards. The second FDC shall be located in an area approved by the AHJ with the idea of multiple Fire apparatus'conducting drafting operations at once, in mind.

5) Inspection and maintenance shall be in accordance to NFPA 25.

6) The owner or lessee of the property shall be responsible for maintaining the water level, quality, and appurtenances of the system.

EXCEPTIONS TO SECTION 18.3.8:

1) Agricultural buildings, storage sheds, and shade houses with no combustible or equipment storage.

2) Buildings less than 800 square feet in size that meets the minimum Fire Department Access Road requirements.

3) For one and two family dwellings, agricultural buildings, storage sheds, and detached garages 800 to 2000 square feet in size, and meets the minimum Fire Department Access Road requirements, the distance to the Fire Department Connection may be increased to 1000 feet.

4) For one and two family dwellings, agricultural buildings, and storage sheds greater than 2000square feet, but less than 3000 square feet and meets the minimum Fire Department Access Road requirements, the distance to the Fire Department Connection may be increased to 500 feet.

5) For buildings with an approved automatic sprinkler system, the minimum water supply required may be modified.

If there are any questions regarding these requirements, please contact the Fire Prevention Bureau at (808) 932-2911.

DARREN J. ROSARIO
Fire Chief

KV:ds

William P. Kenoi
Mayor

Duane Kanuha
Director

Joaquin Gamiao-Kunkel
Deputy Director

West Hawai'i Office
74-5044 Ane Keohokalole Hwy
Kailua-Kona, Hawai'i 96740
Phone (808) 323-4770
Fax (808) 327-3563

County of Hawai'i
PLANNING DEPARTMENT

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

October 19, 2016

Mr. Ron Terry
Geometrician Associates, LLC
P.O. Box 396
Hilo, HI 96721

Dear Mr. Terry:

SUBJECT: Pre-Consultation for Draft Environmental Assessment
Project: Construction of a Single-Family Residence
TMK: (3) 1-3-004:008; 'Opihikao, Puna, Hawai'i

Thank you for your letter dated September 7, 2016, requesting comments from this office regarding the preparation of a Draft Environmental Assessment (DEA) for the subject project.

The applicant is proposing the construction of a single-family residence, including a detached two-story garage structure and Individual Wastewater System on the subject property. The DEA should include maps that can clearly identify all existing and proposed improvements relating to the subject project.

The subject property consists of 41,730 square feet. The parcel is designated Conservation by the State Land Use Commission. In the Conservation District, there is no county zoning, per se. Therefore, the Department of Land and Natural Resources (DLNR) Office of Conservation and Coastal Lands (OCCL) has jurisdiction on any use or activity on this parcel. In addition, according to the County of Hawai'i General Plan 2005 (as amended), the subject property is designated as Open by the Land Use Pattern Allocation Guide (LUPAG) Map.

The entire parcel is located in the SMA with frontage along the shoreline and subject to review against SMA rules and regulations. On December 6, 2010, the Planning Director issued an SMA Minor Use permit (SMM 10-167) for the removal of four (4) trees on the property. In addition, on September 5, 2013, the Planning Director approved an SMA Minor Use Permit (SMM 13-283) for the removal of six (6) monkey pod trees. The DEA should discuss the objectives and policies of Chapter 205A, Hawai'i Revised Statutes, relating to the SMA, as well as the Planning Commission Rule No. 9 relating to the SMA.

The subject property is also located within the Puna Community Development Plan (CDP) planning area. The Puna CDP, as amended, was adopted on September 10, 2008, and contains goals, objectives, and actions to guide the future development of the Puna planning area. The DEA should include an analysis of the project in relation to the Puna CDP goals and objectives.

We have no further comments to offer at this time. However, please provide our department with a copy of the Draft Environmental Assessment for our review and comment.

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

Sincerely,

for DUANE KANUHA
Planning Director

BJM:ja
\\Coh33\planning\public\wpwin60\Bethany\EA-EIS Review\preconsultdraftea Meurer sfd.doc

DAVID Y. IGE
GOVERNOR OF HAWAII

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH

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

In reply, please refer to:
File:

EPO 16-306

September 28, 2016

Mr. Ron Terry, Principal
Geometrician Associates
P.O. Box 396
Hilo, Hawaii 96721
Email: rterry@hawaii.rr.com

Dear Mr. Terry:

SUBJECT: Early Consultation (EC) for Environmental Assessment for Proposed Single-Family Residence in the Conservation District, Puna District, Hawaii
TMK: 3-1-3-004: 008

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your EC to our office via email.

In the development and implementation of all projects, EPO strongly recommends regular review of State and Federal environmental health land use guidance. State standard comments and available strategies to support sustainable and healthy design are provided at: http://health.hawaii.gov/epo/landuse. Projects are required to adhere to all applicable standard comments. EPO has recently updated the environmental Geographic Information System (GIS) website page. It now compiles various maps and viewers from our environmental health programs. The eGIS website page is continually updated so please visit it regularly at: http://health.hawaii.gov/epo/egis. EPO also encourages you to examine and utilize the Hawaii Environmental Health Portal at: https://eha-cloud.doh.hawaii.gov. This site provides links to our e-Permitting Portal, Environmental Health Warehouse, Groundwater Contamination Viewer, Hawaii Emergency Response Exchange, Hawaii State and Local Emission Inventory System, Water Pollution Control Viewer, Water Quality Data, Warnings, Advisories and Postings.

Please note that all wastewater plans must conform to applicable provisions of the Department of Health's Administrative Rules, Chapter 11-62, "Wastewater Systems". We reserve the right to review the detailed wastewater plans for conformance to applicable rules. Should you have any questions, please review online guidance at: http://health.hawaii.gov/wastewater and contact the Planning and Design Section of the Wastewater Branch at (808) 586-4294.

You may also wish to review the draft Office of Environmental Quality Control (OEQC) viewer at: http://eha-web.doh.hawaii.gov/oeqc-viewer. This viewer geographically shows where some previous Hawaii Environmental Policy Act (HEPA) {Hawaii Revised Statutes, Chapter 343} documents have been prepared.

In order to better protect public health and the environment, the U.S. Environmental Protection Agency (EPA) has developed a new environmental justice (EJ) mapping and screening tool called EJSCREEN. It is based on nationally consistent data and combines environmental and demographic indicators in maps and reports. EPO encourages you to explore, launch and utilize this powerful tool in planning your project. The EPA EJSCREEN tool is available at: http://www.epa.gov/ejscreen.

We request that you utilize all of this information on your proposed project to increase sustainable, innovative, inspirational, transparent and healthy design. Thank you for the opportunity to comment.

Mahalo nui loa,

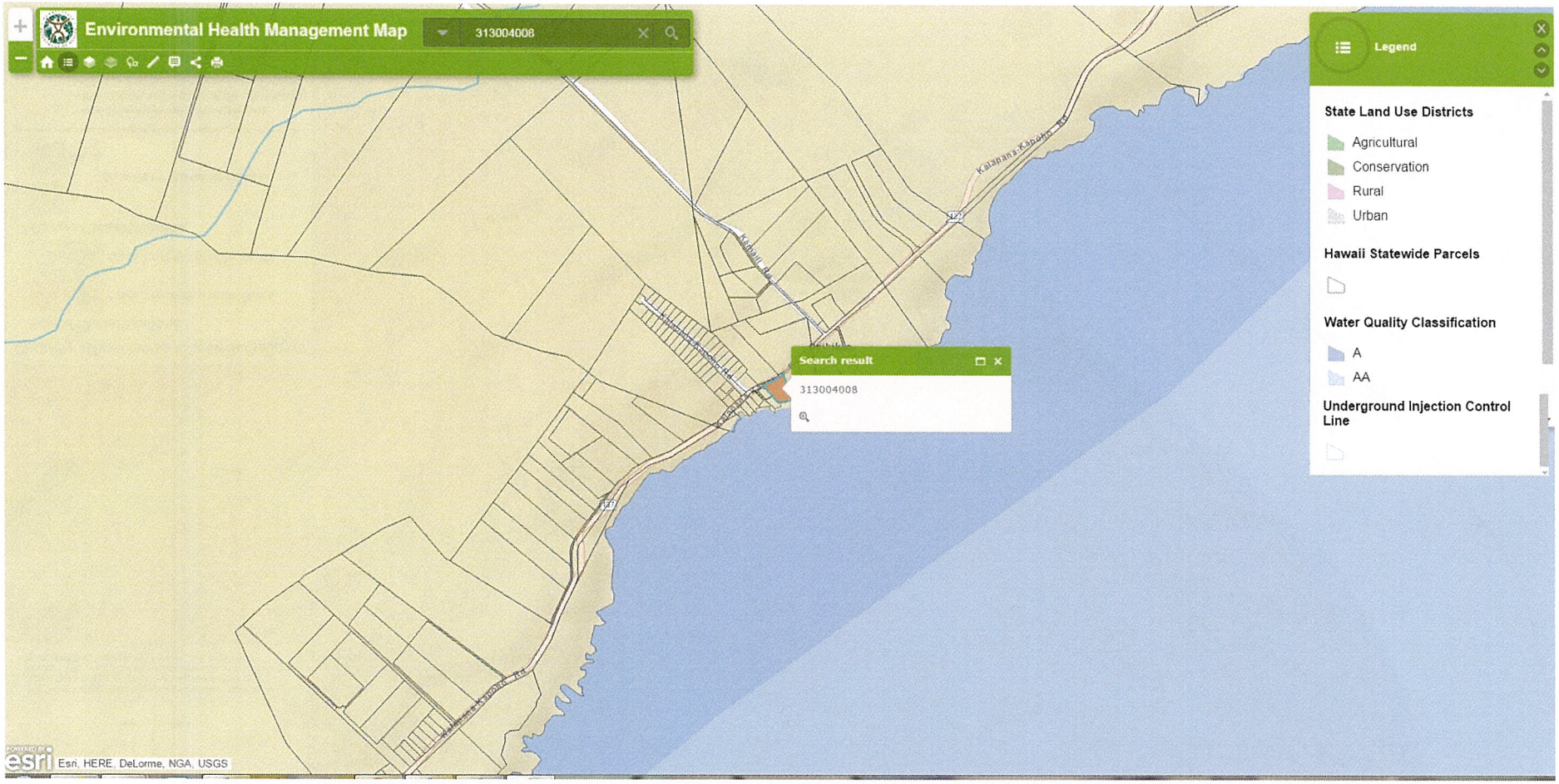
Laura Leialoha Phillips McIntyre, AICP
Program Manager, Environmental Planning Office

LM:nn

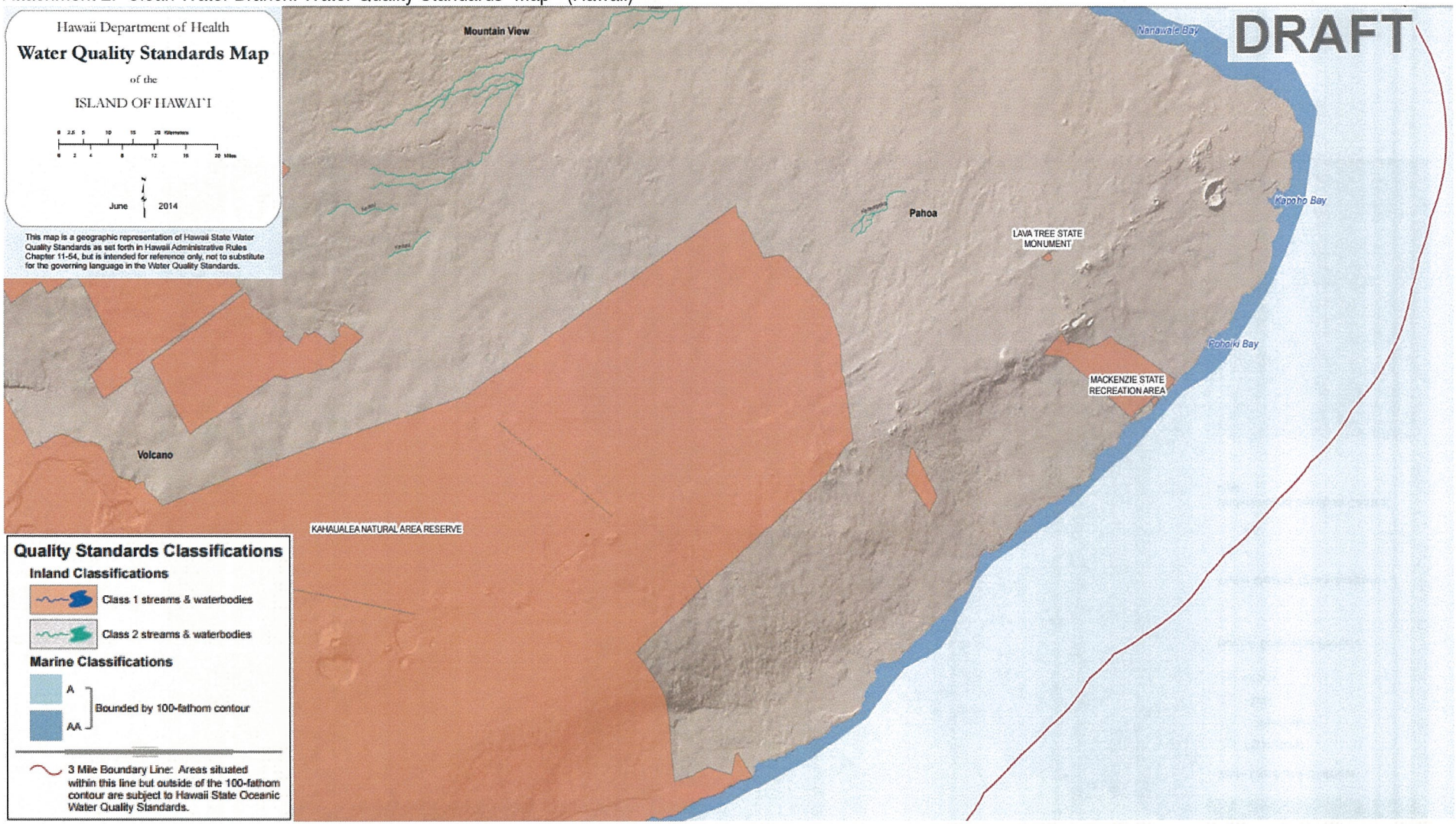
Attachment 1: Environmental Health Management Web App Snipit of Project Area: http://health.hawaii.gov/epo/egis
Attachment 2: Clean Water Branch: Water Quality Standards Map - (Hawaii)
Attachment 3: Wastewater Branch: Act 120 Cesspool Tax Credit Web App Snipit of Project Area
Attachment 4: Wastewater Branch: Recycled Water Use Map of Project Area
Attachment 5: OEQC Viewer Map of Project Area
Attachment 6: U.S. EPA EJSCREEN Report for Project Area

c: DOH: DHO HI, WWB {via email only}

Attachment 1: Environmental Health Management Web App Snipit of Project Area: http://health.hawaii.gov/epo/egis

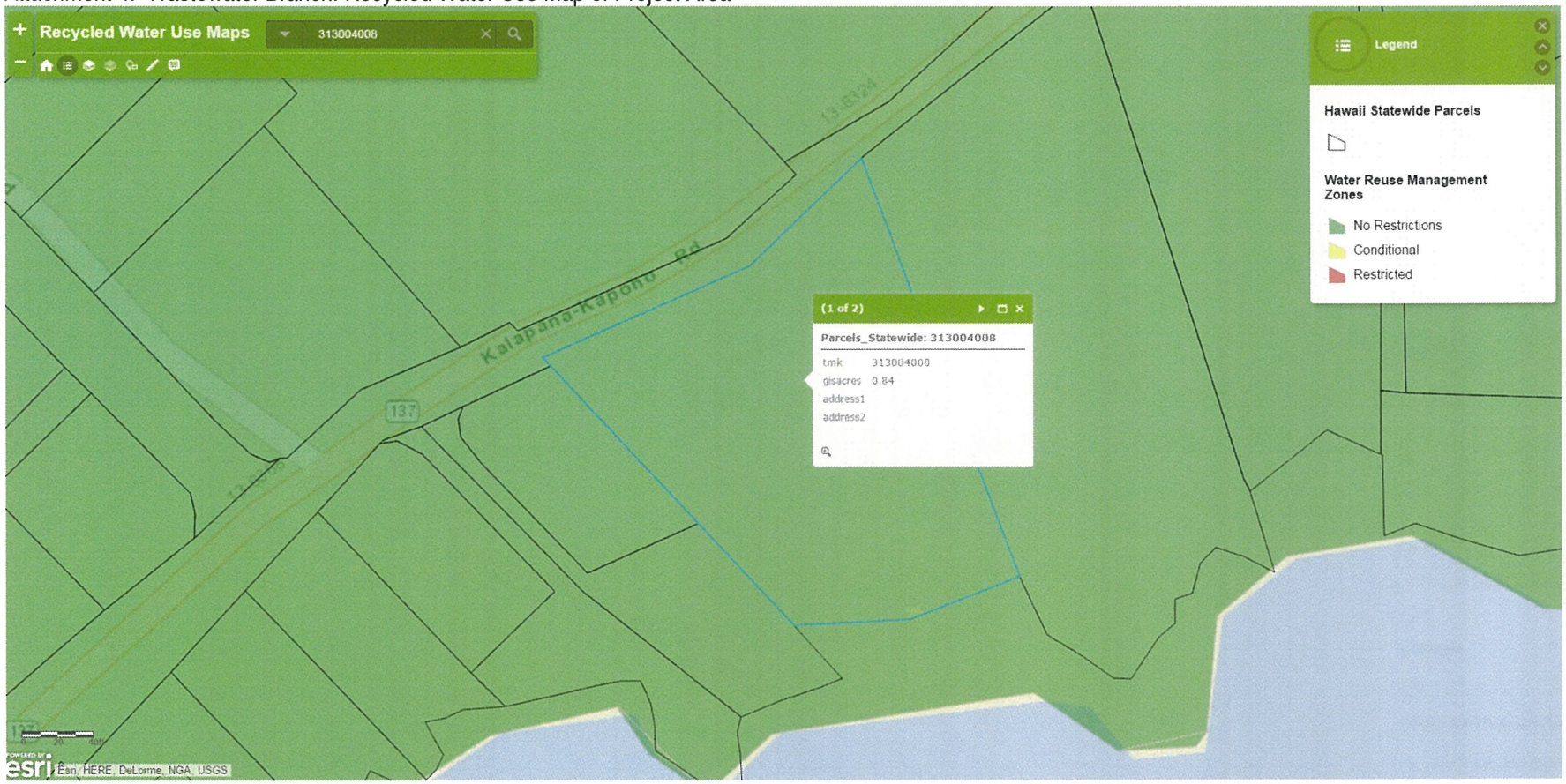


Attachment 2: Clean Water Branch: Water Quality Standards Map - (Hawaii)



Attachment 3: Wastewater Branch: Act 120 Cesspool Tax Credit Web App Snipit of Project Area

Attachment 4: Wastewater Branch: Recycled Water Use Map of Project Area



Attachment 5: OEQC Viewer Map of Project Area

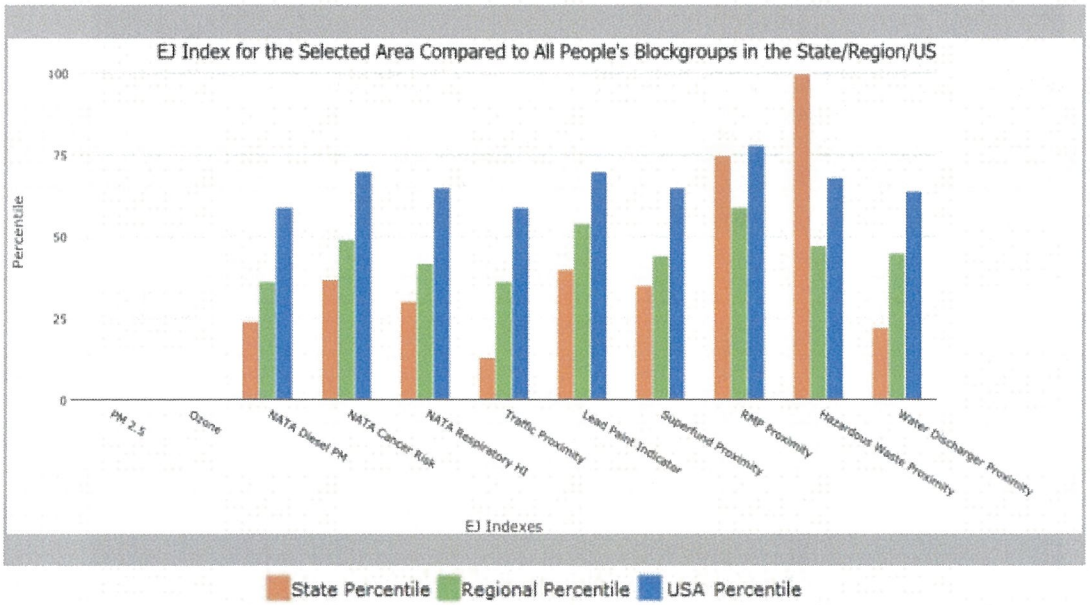
EJSCREEN Report (Version 2016)

1 mile Ring Centered at 19.419153,-154.887919, HAWAII, EPA Region 9

Approximate Population: 1

Input Area (sq. miles): 3.14

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	N/A	N/A	N/A
EJ Index for Ozone	N/A	N/A	N/A
EJ Index for NATA* Diesel PM	24	36	59
EJ Index for NATA* Air Toxics Cancer Risk	37	49	70
EJ Index for NATA* Respiratory Hazard Index	30	42	65
EJ Index for Traffic Proximity and Volume	13	36	59
EJ Index for Lead Paint Indicator	40	54	70
EJ Index for Superfund Proximity	35	44	65
EJ Index for RMP Proximity	75	59	78
EJ Index for Hazardous Waste Proximity	100	47	68
EJ Index for Water Discharger Proximity	22	45	64



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

EJSCREEN Report (Version 2016)

1 mile Ring Centered at 19.419153,-154.887919, HAWAII, EPA Region 9

Approximate Population: 1

Input Area (sq. miles): 3.14

September 28, 2016

Digitized Point

1:9,028

0 0.075 0.15 0.3 mi

0 0.1 0.2 0.4 km

Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0
National Pollutant Discharge Elimination System (NPDES)	0

EJSCREEN Report (Version 2016)

1 mile Ring Centered at 19.419153,-154.887919, HAWAII, EPA Region 9

Approximate Population: 1

Input Area (sq. miles): 3.14

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in µg/m³)	N/A	N/A	N/A	9.37	N/A	9.32	N/A
Ozone (ppb)	N/A	N/A	N/A	51	N/A	47.4	N/A
NATA* Diesel PM (µg/m³)	0.0155	0.149	11	0.978	<50th	0.937	<50th
NATA* Cancer Risk (lifetime risk per million)	25	34	5	43	<50th	40	<50th
NATA* Respiratory Hazard Index	0.49	1	5	2	<50th	1.8	<50th
Traffic Proximity and Volume (daily traffic count/distance to road)	0	990	4	1100	2	590	2
Lead Paint Indicator (% Pre-1960 Housing)	0.048	0.16	35	0.24	35	0.3	25
Superfund Proximity (site count/km distance)	0	0.098	29	0.15	13	0.13	16
RMP Proximity (facility count/km distance)	0.25	0.19	83	0.57	55	0.43	62
Hazardous Waste Proximity (facility count/km distance)	0	0	100	0.11	19	0.072	26
Water Discharger Proximity (facility count/km distance)	0.032	0.34	8	0.2	7	0.31	3
Demographic Indicators							
Demographic Index	47%	52%	35	47%	51	36%	71
Minority Population	44%	77%	7	58%	35	37%	64
Low Income Population	50%	26%	90	36%	72	35%	76
Linguistically Isolated Population	2%	6%	39	9%	28	5%	56
Population With Less Than High School Education	10%	9%	66	17%	42	14%	50
Population Under 5 years of age	4%	6%	27	7%	27	6%	29
Population over 64 years of age	21%	15%	79	13%	87	14%	85

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

For additional information, see: www.epa.gov/environmentaljustice

EJSCREEN is a screening tool for pre-decisional use only. It can help identify areas that may warrant additional consideration, analysis, or outreach. It does not provide a basis for decision-making, but it may help identify potential areas of EJ concern. Users should keep in mind that screening tools are subject to substantial uncertainty in their demographic and environmental data, particularly when looking at small geographic areas. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports. This screening tool does not provide data on every environmental impact and demographic factor that may be relevant to a particular location. EJSCREEN outputs should be supplemented with additional information and local knowledge before taking any action to address potential EJ concerns.

NA ALA HELE
Hawai'i Trail & Access System

RECEIVED
OFFICE OF CONSERVATION
AND COASTAL LANDS

2017 FEB 23 P 3:02

DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

February 23, 2017

Ref: H17:01 Opihikao
CDUA HA-3791

TO: K. Tiger Mills, OCCL Staff Planner

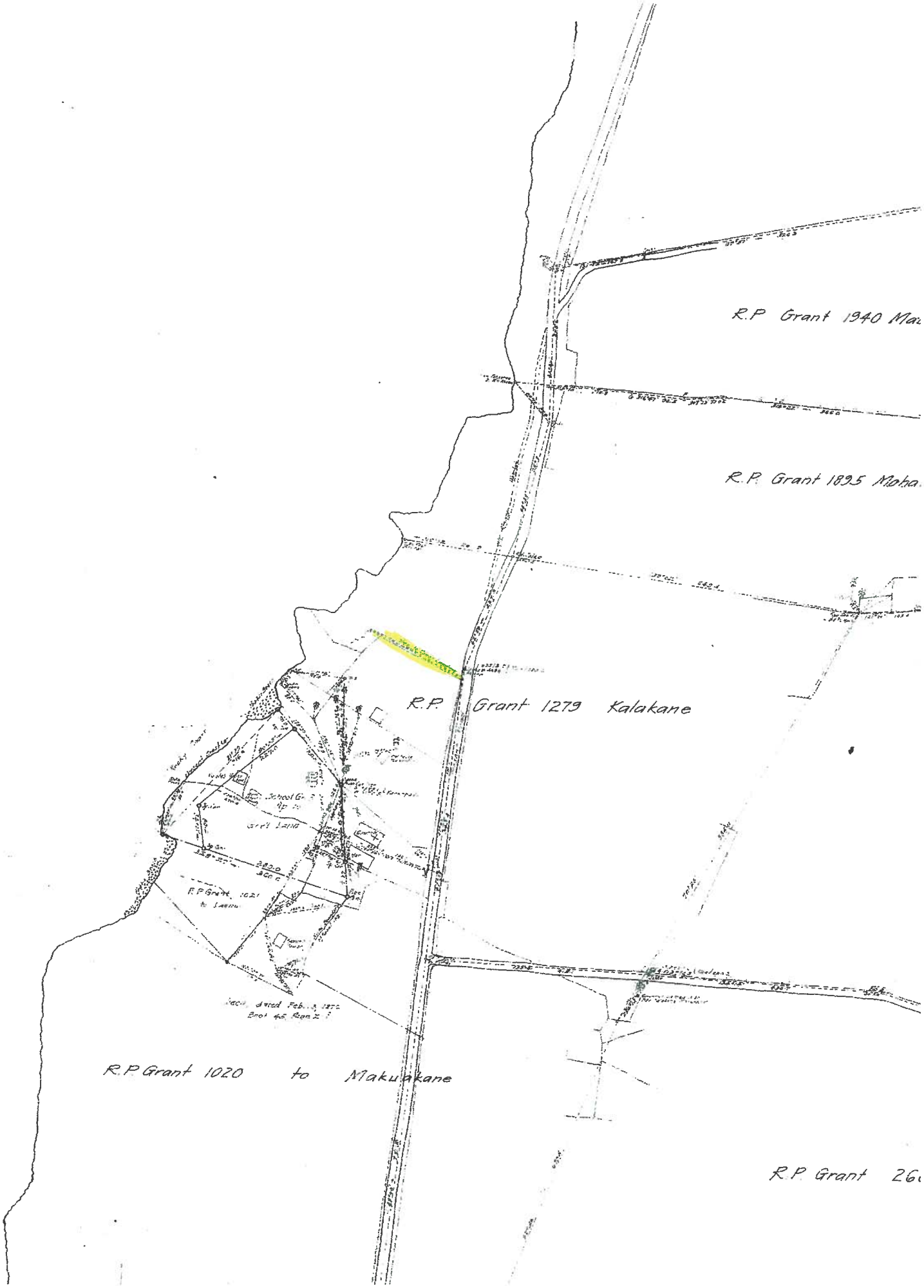
FROM: D. Moana Rowland, NAH Abstractor

SUBJECT: Disposition of Trail in Tax Map Key: 1-3-004:008 located in 'Opihikao

Research has been completed in response to your request for information regarding a trail through this parcel that may be state owned. As you know the state may claim fee simple title to trails that qualify under the Highways Act of 1892. In this case the earliest maps do not identify a trail alignment through the subject parcel. There is, however, a trail that runs mauka from the government road that does not cross the subject parcel.

It is not until 1929 that a map filed as Registered Map No 2827 titled "Opihikao Village Grants" depicts a trail identified as "trail to canoe landing". A portion of this map is attached for your reference. You will note there are no other trails identified on this map.

Based on the lack of map data to confirm a trail alignment through the subject parcel by the year 1892, there does not appear to be a state owned trail in this property.


R.P Grant 1940 Mau
R.P. Grant 1895 Moha
R.P. Grant 1279 Kalakane
R.P Grant 1020 to Makuakane
R.P Grant 26

From: williammeurer@sbcglobal.net
Sent: Tuesday, February 21, 2017 1:55 PM
To: Chief Robert Perriera
Subject: Re: Opihikao home requirements

Dear Chief Perriera;

I haven't heard back from you regarding the requirement for a standby water source for my new single family home in Opihikao.

Please verify that my understanding is correct that we don't need a separate source of water for firefighting. Thanks for letting me know and if you could simply send me an e-mail stating this that would be great.
Best regards, William Meurer

Sent from my BlackBerry 10 smartphone on the Verizon Wireless 4G LTE network.

From: Perreira, Robert <Robert.Perreira@hawaiicounty.gov>
Sent: Monday, February 27, 2017 12:02 PM
To: williammeurer@sbcglobal.net
Subject: RE: Opihikao home requirements

Mr. Meurer,

You are correct at this time you do not need to provide the Fire Department with a fire department connection to your water tank.
Thank you,

Bobby
Robert Perreira
Battalion Chief
Fire Prevention Bureau
(808) 932-2912

From: williammeurer@sbcglobal.net [mailto:williammeurer@sbcglobal.net]
Sent: Tuesday, February 21, 2017 12:30 PM
To: Perreira, Robert <Robert.Perreira@hawaiicounty.gov>
Subject: Fw: Opihikao home requirements

Environmental Assessment

Meurer Single-Family Residence in the Conservation District at ‘Opihikao

APPENDIX 1b
Comments to Draft EA and Responses

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DAVID Y. IGE
GOVERNOR OF HAWAI'I

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEKOA KALUHIWA
FIRST DEPUTY

JEFFREY T. PEARSON, P.E.
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
KAHO'OLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

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

Ref: OCCL:LY

CDUA: HA-3793
Acceptance Date: March 7, 2017
180-Day Exp. Date: September 3, 2017

Mr. James Leonard, AICP
JM Leonard Planning, LLC
P.O. Box 11321
Hilo, HI 96721

MAR - 8 2017

Dear Mr. Leonard:

NOTICE OF ACCEPTANCE AND PRELIMINARY ENVIRONMENTAL DETERMINATION
Conservation District Use Application (CDUA) HA-3793
(Board Permit)

This acknowledges the receipt and acceptance for the processing of your Client's (William H. Meurer) CDUA for a Single Family Residence (SFR) and associated improvements located in Opihikao Beach, Puna on the island of Hawai'i and further identified as Tax Map Key (TMK) (3) 1-3-004:008. The approximately 0.958 acre lot lies within the State Land Use Conservation District, Resource Subzone.

According to the application, the landowner is proposing to construct a 2,265 square foot, single story SFR on an existing, vacant lot. The proposed SFR will be of post on pier construction, raised approximately 20 feet above sea level, and will consist of 1 bedroom, 2 bathrooms, a kitchen, an entryway & living room, an office, workroom areas, covered lanai and porch areas, a carport, and a storage area. The SFR will be set back a minimum of 73 feet from the certified shoreline based upon an average shoreline erosion rate of 0.21± 0.05 feet per year.

Electric power to the SFR will be provided via solar panels situated on the flat portions of the roof, with a battery/inverter sited inside a small equipment room. Potable water will be provided by a well, using a water catchment system as a backup. The water catchment tank would have a capacity of 3,000 gallons. Hot water will be provided by an on-demand propane water heater, housed in an exterior cabinet along with a 10 gallon propane tank. Wastewater will be treated with a septic system designed in conformance with the requirements of the State Department of Health.

Access to the site will be provided by an improved driveway area leading off of Kapoho-Kalapana Road to the area fronting the proposed SFR. The driveway will require some site leveling and grading to create a 12 foot wide gravel driveway with a turnaround area. Landscaping is also proposed which would be comprised of primarily natives, tropical fruit trees and species adapted to the area. Landscaping would be confined to areas near the house and in an open and level area on the southwester portion of the property where some

additional citrus plantings are planned. According to the applicant, a total area of less than one tenth of an acre would be cleared for the SFR and related improvements and will require minimal grading due to the relatively level character of the site.

According to the preliminary Federal Insurance Rate Map (FIRM), the property is located in the VE Zone. The VE zone denotes areas exposed to potential coastal wave action, within which the base-flood elevations have been determined (in this case the base-flood elevation is 16 feet). The property is also situated in a tsunami evacuation zone.

The existing site is densely vegetated throughout, primarily consisting of low shrubs, trees, herbs, vines, and grasses. Coconut palms are found throughout the property, but are concentrated primarily near the shoreline and northeastern boundary of the property. A flora and fauna survey was conducted for the property in August 2016, in which it was documented that most of the property supports non-native vegetation, with the exception of the area near the shoreline where a few common native plants and various sedges were found. These include milo (*Thespesia populnea*), kou (*Cordia subcordata*), and akulikuli (*Sesuvium portulacastrum*). Unlike other properties in the Puna area, no hala tress (*Pandanus tectorius*) or naupaka (*Scaevloa taccada*) were present.

Birds common to the area were observed, including Common Myna (*Acridotheres tristis*), Japanese White-eye (*Zosterops japonicas*), and House Finch (*Carpodacus mexicanu*). No native birds were identified during the survey, however, the Hawai'i 'Amakihi (*Hemignathus virens*) is possible present in the general area, as some population of this native honey creeper appear to have adapted to the mosquito borne diseases of the Hawaiian lowlands. Also, common shorebirds such as the Golden Plover (*Pluvialis fulva*), Ruddy Turnstone (*Arenaria interpres*), and Wandering Tattler (*Heteroscelus incanus*) are often seen on the Puna coastline feeding on shoreline resources. While these shorebirds were not observed during site visits, they are likely to be found in the coastal area during the winter months, as the areas makai of the property's shoreline offers a reasonably good habitat for shorebirds. As with all of East Hawai'i, several endangered, native terrestrial vertebrates may be present in the general area and may overfly, roost, nest, or utilize resources of the property. These include the endangered Hawaiian Hawk (*Lasiurus cinereus semotus*), the endangered Hawaiian Petrel (*Pterodroma sanwichensis*), and the threatened Newell's Shearwater (*Puffinus newelli*).

Other mammals in the project area are all introduced species, including feral cats (*Felis catus*), feral pigs (*Sus scrofa*), small Indian mongoose (*Herpestes a. auropuncatus*) and various species of rats (*Rattus spp.*)

An archaeological survey of the property was conducted in December 2007. As a result of the survey, two archaeological sites, consisting of two stone walls, were located on the property. One wall (Site 26265), located along the northeastern property boundary, was found to be constructed predominately of sub-angular basalt cobbles and small boulders, though waterworn basalt stones are incorporated into its length in the seaward portion. This site was interpreted as a historic livestock control feature and likely used to prevent grazing cattely from entering the adjacent parcel. The site is unaltered and in poor to fair condition. The other site (Site 26266) is an L-shaped wall situated in the southeastern corner of the parcel also in poor to fair condition. This wall was also interpreted to as a historic livestock control feature that may have served as an animal pen. A Cultural Impact Assessment (CIA) was also conducted for the property in December 2016. The CIA did not reveal any cultural resources or practices occurring on or near the site.

After reviewing the application, Department finds that:

1. The proposed project is an identified land use within the Conservation District, pursuant to Hawai`i Administrative Rules (HAR) §13-5-24, *Identified land uses in the resource subzone,* R-7 SINGLE

FAMILY RESIDENCE (D-1) *A single family residence that conforms to the design standards as outlined in this chapter.* The proposed use requires a Board Permit.

2. Pursuant to HAR §13-5-40 HEARINGS, a Public Hearing will not be required.

3. In conformance with Chapter 343, Hawai'i Revised Statutes (HRS), as amended, and HAR, Title 11, Department of Health, Chapter 200, Environmental Impact Statement Rules, an Environmental Assessment (EA) for the project has been prepared and a Finding of No Significant Impacts (FONSI) is anticipated for the proposed project;

4. The subject area is within the Special Management Area (SMA). The applicant's responsibility includes complying with the provisions of Hawai'i's Coastal Zone Management law (Chapter 205A, HRS) that pertain to the Special Management Area (SMA) requirements administered by the various counties. Negative action on this application can be expected should you fail to obtain and provide us, at least forty-five (45) days prior to the 180-day expiration date, one of the following:
    - An official determination that the proposal is exempt from the provisions of the county rules relating to the SMA;
    - An official determination that the proposed development is outside the SMA; or
    - An SMA Use Permit for the proposed development.

Further, the OCCL offers the following comments on the Draft EA and CUDA:

- Please include a description of any staging areas needed during the construction of the project.

- Please include a discussion regarding the installation of any utility lines (septic, domestic water, and catchment water). Please include the lengths of the lines (linear feet) and the diameter of the lines. Please also note if they will be above or below ground. If they will be installed underground, please include dimensions of the area that will need to be trenched for installation.

- Please include a discussion if any irrigation lines are proposed to be installed. If irrigation lines are proposed please include the length of the line (linear feet) and the diameter of the lines. Please also note if they will be above or below ground. If they will be installed underground, please include dimensions of the area that will need to be trenched for installation.

- Please provide the quantity and individual dimensions of the solar panels that are proposed.

- Please provide the sizing of the septic system (capacity of septic tank and size of leech field). Please indicate if the septic system will be above ground or below ground. If below ground, please include dimensions of the area that will need to be trenched for installation.

- For all land disturbing activities (grading, trenching, etc.), please include a discussion of how the spoils will be disposed of.

- Please also note that page 15 of the CDUA document states that a Cultural Impact Assessment was prepared in November **2017**. According to Appendix B of your CDUA, the report appears to have been prepared in December 2016.

Upon completion of the application review process, the subject CDUA will be reviewed by the Board of Land and Natural Resources for consideration. Should you have any questions, please contact Lauren Yasaka at the Office of Conservation and Coastal Lands at (808) 587-0386.

Sincerely,

SUZANNE D. CASE, Chairperson
Board of Land and Natural Resources

c: Hawaii Board Member
DOCARE/DOFAW/HDLO/SHPD
DOH/OHA/OEQC
CoH, Department of Planning
CoH, Fire Department
Malama O Puna
Pahoa State Library

DAVID Y. IGE
GOVERNOR OF
HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEKOA KALUHIWA
FIRST DEPUTY

JEFFREY T. PEARSON, P.E.
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

2017 APR -5 A 10:08

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

April 5, 2017

TO: Samuel L. Lemmo, Administrator
Office of Conservation and Coastal Lands

ATTN: Lauren Yasaka

FROM: James Cogswell
Wildlife Program Manager

SUBJECT: Division of Forestry and Wildlife Comments on Conservation District Use Application HA-3793 and Draft Environmental Assessment for the Meurer Single Family Residence

The Department of Land and Natural Resources Division of Forestry and Wildlife has received your inquiry regarding Conservation District Use Application HA-3793 and Draft Environmental Assessment for the Meurer Single Family Residence, located in the Puna District of Hawaii County TMK (3) 1-3-004:008.

The proposed action involves construction of a single-family residence consisting of 1,239 square feet, with a 1,026 square foot lanai, carport, and porch, and a 3,000 gallon water tank. The proposed action includes clearing and grading an area less than one tenth of an acre. Given the location of the proposed project and minimal site clearing, there are no expected impacts to threatened or endangered species as a result of this project.

The State and Federally listed Hawaiian hoary bat (*Lasiurus cinereus semotus*) has the potential to occur in the vicinity of the project area. Therefore, DOFAW recommends avoiding using barbed wire, as bat mortalities have been documented as a result of becoming ensnared by barbed wire during flight. If any trees are planned for removal during the bat breeding season there is a risk of injury or mortality to juvenile bats. To minimize the potential for impacts to this species, woody plants greater than 15 feet (4.6 meters) tall should not be disturbed, removed, or trimmed during the bat birthing and pup rearing season (June 1 through September 15). Site clearing should be timed to avoid disturbance to breeding Hawaiian hoary bats. The endangered Hawaiian hawk or 'io (*Buteo solitaries*) may occur in the project vicinity. DOFAW recommends surveying the area to ensure no Hawaiian hawk nests are present if trees are to be cut. Finally, we note that artificial lighting can adversely impact seabirds that may pass through the area at night causing disorientation which could result in collision with manmade artifacts or grounding

of birds. If nighttime lighting is required at the facility, DOFAW recommends that any lights used be fully shielded to minimize impacts.

Should the proposed location of the project change, or should it become evident in the future that listed species are being impacted, DOFAW requests that the project proponent reinitiate consultation. If you have any questions, please contact Kate Cullison, Conservation Initiative Coordinator at 808-587-4148 or Katherine.cullison@hawaii.gov.

DAVID Y. IGE
GOVERNOR OF HAWAI'I

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEKOA KALUHIWA
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KAHO'OLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

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

ref:OCCL:LY

CDUA HA-3793
Acceptance Date: March 47, 2017
180 Day Expiration Date: September 3, 2017
SUSPENSE DATE: 21 Days from stamped date

MAR 15 2017

MEMORANDUM:

TO:

___ DLNR, Division of Conservation and Resource Enforcement
___ DLNR, Division of Forestry and Wildlife
___ DLNR, Historic Preservation Division
✓ DLNR, Hawaii District Land Office
___ Office of Hawaiian Affairs
___ Department of Health
___ CoH, Department of Planning
___ CoH, Fire Department

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

SUBJECT: REQUEST FOR COMMENTS
Draft Environmental Assessment and Conservation District Use Application (CDUA) HA-3793 for the Meurer Single Family Residence (SFR) and Associated Improvements

APPLICANT: William Meurer

LOCATION: Opihikao Beach, Puna, Hawai'i
Tax Map Keys: (3) 1-3-004:008

Please find enclosed, a CD with an electronic copy of the subject DEA, CDUA HA-3793, and our notice to the applicant. We would appreciate your agency's review and comment on this application. If no response is received by the suspense date, we will assume there are no comments. The suspense date starts from the date stamp. Please contact Lauren Yasaka at (808) 587-0386, should you have any questions on this matter.

BEFORE APRIL 5

( ) Comments Attached

(✓) No Comments

Signature

Gordon C. Heit DLA
Print Name/Title

Attachment
Enclosure

geometrician
ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 969-7090 PO Box 396 Hilo Hawaii 96721 rterry@hawaii.rr.com

May 29, 2017

Sam Lemmo, Administrator
Office of Conservation and Coastal Lands
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Lemmo:

Subject: Comments on Draft Environmental Assessment (DEA)/Conservation District Use Application (CDUA) for Meurer Single-Family Residence in the Conservation District at ‘Opihikao, Puna District, Island of Hawai‘i, TMK (3rd.) 1-3-004:008

I am in receipt of the comment letters on the Draft EA for the subject project provided by Lauren Yasaka via email to project planner James Leonard.

I also note that your letter of March 8, 2017, accepting the CDUA and EA, also contained comments on the Draft EA (and CDUA). Although issued prior to the comment period’s inception, we assume we should treat these as comments that require a response in the context of Chapter 343. Accordingly, we list the comments below, along with the response provided by Mr. Leonard, as well as additional response information where appropriate.

1. *Include a description of any staging areas needed during the construction of the project*. The staging area for construction of the home would encompass approximately 1,500 square feet and would be located near the second gate in the southwest portion of the property, near the mauka edge of the area shown on the Landscape Plan as being designated for new citrus plantings. This is in a relatively level and open area of the property, near an existing property access, and thus will require no grading for use as a staging area for equipment and materials.

2. *Include a discussion regarding the installation of any utility lines (septic, domestic water, and catchment water). Include the lengths of the lines (linear feet) and the diameter of the lines. Please also note if they will be above or below ground. If they will be installed underground, please include dimensions of the area that will need to be trenched for installation*. The ¾-inch domestic water line would be placed underground and would extend from the well site to the storage tank and then the house, requiring a one-foot wide by 75-foot long trench that would encompass a total area of about 75 square feet.

3. *Include a discussion if any irrigation lines are proposed to be installed. If irrigation lines are proposed please include the length of the line (linear feet) and the diameter of the lines. Please also note if they will be above or below ground. If they will be installed underground, please include dimensions of the area that will need to be trenched for installation*. The irrigation lines will be temporary (above ground) drip-irrigation lines, using ½-inch polyethylene piping, located primarily in the area directly makai of the proposed residence and designated on the Landscape Plan for new fruit trees and new short Samoan coconut palms. In that the property is in an area of typically abundant rainfall, a permanent underground irrigation system is not required nor being proposed for the residence.

4. *Provide the quantity and individual dimensions of the solar panels that are propose*d. There will be a total of five solar panels, each measuring 40" x 76" and each attached to the roof over the lanai, as shown in the South Elevation drawing in Figure 5 (on page 9) of the CDUA. These photovoltaic (PY) panels will serve as the sole source of electrical power for the house.

5. *Provide the sizing of the septic system (capacity of septic tank and size of leech field). Please indicate if the septic system will be above ground or below ground. If below ground, please include dimensions of the area that will need to be trenched for installation*. A DOH approved septic system, designed by Big Island Engineering, would include a 1,000-gallon septic tank and a 12' x 18' absorption bed. The undergrounding of the wastewater piping to connect the house to the septic system will require a 2-foot wide trench that would extend approximately 65 feet and would encompass and area of approximately 130 square feet.

6. *For all land disturbing activities (grading, trenching, etc.), please include a discussion of how the spoils will be disposed of.* All soils extracted for the utility related trenching will be used to refill the trenches following the pipe installation and to blend the trenched area with the surrounding topography. Any excess material, especially from the area of the septic tank installation, will be deposited in a natural depression near the roadway and outside of the floodplain, which will reduce the drop-off behind the hedge into the property. At most this would comprise up to six cubic yards of material and affect an additional area of less than 400 square feet.

In the interest of a complete record on comment letters to the EA/CDUA, I would also like to acknowledge receipt of comments from DLNR agencies contained within form memos circulated by your office. We acknowledge here the *no-comment* remarks of the Hawai‘i Island Land Division. Concerning the comments from DOFAW regarding protection measures for Hawaiian hoary bats, the need for a Hawaiian hawk survey, and requirement for shielded lighting: each of these measures is cited in the Draft EA, and all are expected to be imposed as conditions on the permit. Please note that per current State and federal recommendations, as well as practices for federal and State construction activities, the hawk survey will be conducted only for tree removal or landclearing activities within the March 1 through September 30 period.

We have also attached to this letter copies of our responses to the Hawai‘i Fire Department, the Department of Health’s Environmental Planning Office and Clean Water Branch, Michael and Nora O’Friel, Cory Harden, Ralph Johnston. It is our understanding that no other comment letters were received.

Thank you for circulating the EA and CDUA for review by DLNR agencies. If you have any questions about the EA, please contact me at (808) 969-7090; for questions about the project or CDUA, please contact James Leonard, Project Planner, at (808) 896-3459.

Sincerely,

Ron Terry

Ron Terry, Principal
Geometrician Associates

Cc: James Leonard, William Meurer

TO: Ron Terry rterry@hawaii.rr.com
Sam Lemmo dlnr.occl@hawaii.gov
Michael Yee planning@co.hawaii.hi.us

April 19, 2017

Dear Mr. Terry, Mr. Lemmo, and Mr. Yee,

Please consider the comments below on:

Draft Environmental Assessment (DEA) for Conservation District Use Application (CDUA) HA-3793
for the Meurer Single Family Residence (SFR) and Associated Improvements
located at Opihikao Beach, Puna, Hawai'I Tax Map Key (TMK): (3) 1-3-004:008

Viewplanes
The DEA says "most sight lines from the Kapoho -Kalapana Road through the property to the sea are preserved" and "most sight lines from the Red Road through the property to the sea would be preserved." *(DEA p. ii)*

But Nora O'Friel, a neighbor, has sent you documentation that the view will be blocked as vegetation grows. She said the hedge is trimmed short in photo 2a on page 3 of the DEA, but will grow much taller. S/he also said the hedge extends 90 feet further than shown in the Landscape Plan on page 6 of the DEA.

Shoreline access
The DEA says "Mr. Meurer has been informed of the rights of the public to utilize these [shoreline] areas and the cultural and subsistence importance of these practices, and expects that conditions ensuring continued public access along the front of the property will be codified within the Conservation District Use Permit to make the access situation explicit." *(DEA p. 23)*

Flooding
The DEA describes the property as having "a 26% chance of [ocean] flooding over the life of a 30-year mortgage" and "an additional hazard associated with storm waves." *DEA p. 12*

I hope that possible flooding of access roads has also been considered, in light of the extensive damage in Puna from Tropical Storm Iselle.

Archaeological site
"An archaeological survey determined that two sites were present, both of them low-stacked walls built to control livestock. Although not required to be preserved, the landowner has chosen to develop the project site without the need to disturb these walls, which will remain on the property as-is." *(DEA p. 1)*

To address all these concerns, please include these conditions in the Conservation District Use Permit:

- Viewplanes--existing views of the shoreline and ocean from the road will be preserved
- Shoreline access—will be preserved
- Flooding—no "future request for shoreline hardening to protect the residence, regardless of hardship" and no "moving or dismantling the home if sea level rise eventually threatens the integrity of the structure." *(DEA p. 17)*
- Archaeological site—the two walls will be preserved

Thank you for considering these comments.

Sincerely, Cory Harden, Hilo

geometrician
ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 969-7090 PO Box 396 Hilo Hawaii 96721 rterry@hawaii.rr.com

May 29, 2017

Cory Harden
333cory@gmail.com

Dear Ms. Harden:

Subject: Comment on Draft Environmental Assessment (DEA)/Conservation District Use Application (CDUA) for Meurer Single-Family Residence in the Conservation District at ‘Opihikao, Puna District, Island of Hawai‘i, TMK (3rd.) 1-3-004:008

Thank you for the comment email dated April 19, 2017, for the proposed single-family home. In answer to your specific comments:

1. *Blocking of viewplane*s. The planned home and landscaping preserves 85% of the property untouched and minimize the change to viewplanes. In regard to the condition you propose, it would not be possible to preserve ALL sight lines to the sea and have a home.

2. *Landscape plan should show hedge running whole length of property*. The Site Plan and Landscape plan have been amended to show this.

3. *Shoreline access*. Thank you for citing Mr. Meurer’s understanding and commitment to not blocking or restricting in any way access in front of his property. As you may not be aware, the No Trespassing Signs depicted in the O’Friel’s letter, which you cite, are on an adjacent property. Mr. Meurer does not intend to put up signs that would discourage use of the area makai of the shoreline. Mr. Meurer supports any conditions that affirm this.

4. *Flooding of not only properties but roads that access them*. This point is well taken. There may be certain large scale flooding events that block access to and from this property, as well as other properties with low-lying roads in the Puna and Hilo districts. Fortunately, however, unlike some of the neighbors to the south, Mr. Meurer’s driveway and the Highway 137 route to Kamaili (Opihikao) Road and high ground is outside the proposed new, expanded flood zone. Mr. Meurer offered the condition related to shoreline hardening that you quote and understands that it is reasonable and in the public interest.

5. *Archaeological site*. As you point out, Mr. Meurer's plans have been designed explicitly to avoid these sites, and they will be preserved.

We very much appreciate your review of the document. If you have any questions about the EA, please contact me at (808) 969-7090.

Sincerely,

Ron Terry, Principal
Geometrician Associates

Cc: James Leonard, William Meurer

April 17, 2017

RECEIVED
OFFICE OF CONSERVATION
AND COASTAL LANDS

2017 APR 20 P 1:09

DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

Sam Lemmo, OCCL Administrator
1151 Punchbowl Street, Room 131
Honolulu, HI 96813

Regarding March 23, 2017 Environmental Notice – Opihikao, the planned Meurer home (SRF)
Subject: EA for CDUA HA-3793

For all concerned,

My name is Ralph Johnston. I live on Puakenikeni Lane across the street from the planned Meurer home. These are my comments……

I have lived here for (only) thirteen years. In all but the last couple years there has not been much 'lawn' work on this property. No tree cutting…no planting….

Then, a couple years ago, a man named Ed Schroder (sp) bought the property. He applied for a permit to cut down two (2) of the Monkey Pod trees and he received the permit to do so. I had thought this was conservation land so I didn't think this was possible. I learned that the Monkey Pod tree is not an indigenes tree. Even though I have seen so many pictures of this truly magnificent tree highlighting many government buildings. It is 'Hawaii.' (Where do I get a permit to cut down these trees around these many, many government , official, and historic buildings? I know a lot of these places are not 'conservation' places….maybe that's the rub…)

Coincidentally, about two (2) weeks after the cutting down of the two trees, the other four (4) Monkey Pod trees contracted a mysterious 'disease' and needed to be cut down immediately. And they were cut down too.
And then the removal of the Monkey Pod wood. I had thought that wood was supposed to be bucked up into 2 foot sections and hauled to the landfill. I still wonder where those flatbed trucks and the trucks with big trailers that picked up all of those 'far from 2 foot logs' took them. I'm sure they just hauled them away as multi foot logs and then cut them up into 2 foot sections and hauled to the dump. Wink Wink Nudge Nudge…

So now there are maybe 20 coco palms left. There were probably at least 100 before the Monkey Pods were taken down. And now there is little foliage left on the lot…well, with the exception of the row of Rhapis Palms that runs across the road side of the lot – about a foot and a half from the road itself. (You may or may not be interested to know that those Rhapis Palms grew from 3 feet tall to over 6 feet tall and they will grow to between 12 feet and 14 feet tall when left a few more years. They were cut back down to 2 to 3 feet at the same time the lot was cleared of the trees. Also, the kindergarden class (an extention of Kua O Kala) at the old Opihikao church would often take field trips to the tide pools one lot further down the Red Road. Not so much any more. The road at the Meurer property is so close to the Rhapis Palms

that there is no place to walk...and this type of palm will grow in width... until it easily touches the road. So locals and tourists who ride bikes...well.....)

So we'll loose the view of the trees and the ocean. And yes, we will loose most of the remaining trees as this house will be solar and the trees will simply be in the way of the solar panels. But we'll have a 2500 sq ft house on 20 foot stilts to look at. Seems like I read that one of the things that these conservation 'things' was to keep the ocean views...I don't know...

Here's the deal for me...I just want to know where all the 'conservation' ideas work – what are these things for? If it's not here – then where? It doesn't take a seer of the future to see where this is going to go. I don't want to put energy into this if the deck is stacked – and it seems to me that it is. Will anything that we who live here say have any effect at all on any outcome? A permit was given to cut down a beautiful view of Hawaii. So building a house will give the government more money. The money or the Hawaii.

Just tell me, "Hey Ralph, the house is going to be built..it's none of your business." OK...I'll accept that and move on. Or tell me, "It's progress." And I'll tell you "...it's irresponsible progress." And I'll move on.

Thanks,

Ralph Johnston
Opihikao

geometrician
A S S O C I A T E S , L L C
integrating geographic science and planning

phone: (808) 969-7090 PO Box 396 Hilo Hawaii 96721 rterry@hawaii.rr.com

May 29, 2017

Ralph Johnston
RR2 Box 4210
Pahoa, HI 96778

Dear Mr. Johnston:

Subject: Comment on Draft Environmental Assessment (DEA)/Conservation District Use Application (CDUA) for Meurer Single-Family Residence in the Conservation District at ‘Opihikao, Puna District, Island of Hawai‘i, TMK (3rd.) 1-3-004:008

Thank you for the comment letter dated April 17, 2017, discussing the actions of the previous owner under previous Conservation District Use Permits. These actions were not performed by Mr. Meurer and were permitted by the DLNR. They are not relevant to the current application. Mr. Meurer intends to be a good steward to the property and to enjoy use of a single-family home while maintaining much of the viewplane through the property. Please note that house is being designed so that the base floor is at the 20-foot elevation, which is between 2 to 5 feet above the existing ground elevation at the house site, so it would not appear to be on “stilts”, as your letter suggests. In fact, the house has been carefully designed as single story structure with a compact, sea-shell inspired design and a low-pitched roof so as to minimize its visual impact when viewed from the surrounding areas.

We very much appreciate your review of the document. If you have any questions about the EA, please contact me at (808) 969-7090.

Sincerely,

Ron Terry

Ron Terry, Principal
Geometrician Associates

Cc: James Leonard, William Meurer

Harry Kim
Mayor

Darren J. Rosario
Fire Chief

Renwick J. Victorino
Deputy Fire Chief

County of Hawai'i
HAWAI'I FIRE DEPARTMENT
25 Aupuni Street • Suite 2501 • Hilo, Hawai'i 96720
(808) 932-2900 • Fax (808) 932-2928

March 28, 2017

Mr. Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands
P.O. Box 621
Honolulu, Hawai'i 96809

Dear Mr. Lemmo,

SUBJECT: Draft Environmental Assessment and Conservation District Use Application (CDUA) HA-3793 for the Meurer Single Family Residence (SFR) and Associated Improvements

In regards to the above-referenced Draft Environmental Assessment and Conservation District Use Application, the following shall be in accordance:

NFPA 1, UNIFORM FIRE CODE, 2006 EDITION
Note: Hawai'i State Fire Code, National Fire Protection Association 2006 version, with County of Hawaii amendments. County amendments are identified with a preceding "C~" of the reference code.

Chapter 18 Fire Department Access and Water Supply

18.1 General. Fire department access and water supplies shall comply with this chapter.

For occupancies of an especially hazardous nature, or where special hazards exist in addition to the normal hazard of the occupancy, or where access for fire apparatus is unduly difficult, or areas where there is an inadequate fire flow, or inadequate fire hydrant spacing, and the AHJ may require additional safeguards including, but not limited to, additional fire appliance units, more than one type of appliance, or special systems suitable for the protection of the hazard involved.

18.1.1 Plans.

18.1.1.1 Fire Apparatus Access. Plans for fire apparatus access roads shall be submitted to the fire department for review and approval prior to construction.

18.2.3.1.3* When not more than two one- and two-family dwellings or private garages, carports, sheds, agricultural buildings, and detached buildings or structures 400ft^2 (37 m^2) or less are present, the requirements of 18.2.3.1 through 18.2.3.2.1 shall be permitted to be modified by the AHJ.

18.2.3.1.4 When fire department access roads cannot be installed due to location on property, topography, waterways, nonnegotiable grades, or other similar conditions, the AHJ shall be authorized to require additional fire protection features.

18.2.3.2 Access to Building.

18.2.3.2.1 A fire department access road shall extend to within in 50 ft (15 m) of at least one exterior door that can be opened from the outside that provides access to the interior of the building. Exception: 1 and 2 single-family dwellings.

18.2.3.2.1.1 When buildings are protected throughout with an approved automatic sprinkler system that is installed in accordance with NFPA 13, NFPA 13D, or NFPA 13R, the distance in 18.2.3.2.1 shall be permitted to be increased to 300 feet.

18.2.3.2.2 Fire department access roads shall be provided such that any portion of the facility or any portion of an exterior wall of the first story of the building is located not more than 150 ft (46 m) from fire department access roads as measured by an approved route around the exterior of the building or facility.

18.2.3.2.2.1 When buildings are protected throughout with an approved automatic sprinkler system that is installed in accordance with NFPA 13, NFPA 13D, or NFPA 13R, the distance in 18.2.3.2.2 shall be permitted to be increased to 450 ft (137 m).

18.2.3.3 Multiple Access Roads. More than one fire department access road shall be provided when it is determined by the AHJ that access by a single road could be impaired by vehicle congestion, condition of terrain, climatic conditions, or other factors that could limit access.

18.2.3.4 Specifications.

18.2.3.4.1 Dimensions.

C~ 18.2.3.4.1.1 FDAR shall have an unobstructed width of not less than 20ft with an approved turn around area if the FDAR exceeds 150 feet. **Exception:** FDAR for one and two family dwellings shall have an unobstructed width of not less than 15 feet, with an area of not less than 20 feet wide within 150 feet of the structure being protected. An approved turn around area shall be provided if the FDAR exceeds 250 feet.

18.2.3.4.6.2* The angle of approach and departure for any means of fire department access road shall not exceed 1 ft drop in 20 ft (0.3 m drop in 6 m) or the design limitations of the fire apparatus of the fire department, and shall be subject to approval by the AHJ.

18.2.3.4.6.3 Fire department access roads connecting to roadways shall be provided with curb cuts extending at least 2 ft (0.61 m) beyond each edge of the fire lane.

18.2.3.4.7 Traffic Calming Devices. The design and use of traffic calming devices shall be approved the AHJ.

18.2.3.5 Marking of Fire Apparatus Access Road.

18.2.3.5.1 Where required by the AHJ, approved signs or other approved notices shall be provided and maintained to identify fire department access roads or to prohibit the obstruction thereof of both.

18.2.3.5.2 A marked fire apparatus access road shall also be known as a fire lane.

18.2.4* Obstruction and Control of Fire Department Access Road.

18.2.4.1 General.

18.2.4.1.1 The required width of a fire department access road shall not be obstructed in any manner, including by the parking of vehicles.

18.2.4.1.2 Minimum required widths and clearances established under 18.2.3.4 shall be maintained at all times.

18.2.4.1.3* Facilities and structures shall be maintained in a manner that does not impair or impede accessibility for fire department operations.

18.2.4.1.4 Entrances to fire departments access roads that have been closed with gates and barriers in accordance with 18.2.4.2.1 shall not be obstructed by parked vehicles.

18.2.4.2 Closure of Accessways.

18.2.4.2.1 The AHJ shall be authorized to require the installation and maintenance of gates or other approved barricades across roads, trails, or other accessways not including public streets, alleys, or highways.

18.2.4.2.2 Where required, gates and barricades shall be secured in an approved manner.

18.3.4 Fire Hydrants and connections to other approved water supplies shall be accessible to the fire department.

18.3.5 Private water supply systems shall be tested and maintained in accordance with NFPA 25 or county requirements as determined by the AHJ.

18.3.6 Where required by the AHJ, fire hydrants subject to vehicular damage shall be protected unless located within a public right of way.

18.3.7 The AHJ shall be notified whenever any fire hydrant is placed out of service or returned to service. Owners of private property required to have hydrants shall maintain hydrant records of approval, testing, and maintenance, in accordance with the respective county water requirements. Records shall be made available for review by the AHJ upon request.

C~ 18.3.8 Minimum water supply for buildings that do not meet the minimum County water standards:

Buildings up to 2000 square feet, shall have a minimum of 3,000 gallons of water available for Firefighting.

Buildings 2001- 3000 square feet, shall have a minimum of 6,000 gallons of water available for Firefighting.

Buildings, 3001- 6000 square feet, shall have a minimum of 12,000 gallons of water available for Firefighting.

Buildings, greater than 6000 square feet, shall meet the minimum County water and fire flow requirements.

Multiple story buildings shall multiply the square feet by the amount of stories when determining the minimum water supply.

Commercial buildings requiring a minimum fire flow of 2000gpm per the Department of Water standards shall double the minimum water supply reserved for firefighting.

Fire Department Connections (FDC) to alternative water supplies shall comply with 18.3.8 (1)-(6) of *this code.*

NOTE: In that water catchment systems are being used as a means of water supply for firefighting, such systems shall meet the following requirements:

3) For one and two family dwellings, agricultural buildings, storage sheds, and detached garages 800 to 2000 square feet in size, and meets the minimum Fire Department Access Road requirements, the distance to the Fire Department Connection may be increased to 1000 feet.

4) For one and two family dwellings, agricultural buildings, and storage sheds greater than 2000square feet, but less than 3000 square feet and meets the minimum Fire Department Access Road requirements, the distance to the Fire Department Connection may be increased to 500 feet.

5) For buildings with an approved automatic sprinkler system, the minimum water supply required may be modified.

If there are any questions regarding these requirements, please contact the Fire Prevention Bureau at (808) 932-2911.

DARREN J. ROSARIO
Fire Chief

KV:ds

geometrician
ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 969-7090 PO Box 396 Hilo Hawaii 96721 rterry@hawaii.rr.com

May 29, 2017

Darren Rosario, Chief
Hawai‘i Fire Department
25 Aupuni St., Suite 2501
Hilo HI 96720

Dear Chief Rosario

Subject: Comment on Draft Environmental Assessment (DEA)/Conservation District Use Application (CDUA) for Meurer Single-Family Residence in the Conservation District at ‘Opihikao, Puna District, Island of Hawai‘i, TMK (3rd.) 1-3-004:008

Thank you for the comment letter dated March 28, 2017, citing applicable portions of the Fire Code. Please note that the owner has met with the appropriate Fire Department personnel to review his plans and confirm the Fire Department requirements for the proposed residence, in order to ensure that the proposed house and its related improvements are being planned and designed in compliance with the Department’s requirements for a single-family residence. We cite a portion of an email exchange below to provide further information concerning this:

> From: williammeurer@sbcglobal.net
> Sent: Tuesday, February 21, 2017 1:55 PM
> To: Chief Robert Perreira
> Subject: Re: Opihikao home requirements
>
> Dear Chief Perreira;
>
> I haven't heard back from you regarding the requirement for a standby water source for my new single family home in Opihikao.
>
> Please verify that my understanding is correct that we don't need a separate source of water for firefighting. Thanks for letting me know and if you could simply send me an e-mail stating this that would be great.
> Best regards, William Meurer

From: Perreira, Robert <Robert.Perreira@hawaiicounty.gov>
Sent: Monday, February 27, 2017 12:02 PM
To: williammeurer@sbcglobal.net
Subject: RE: Opihikao home requirements

Mr. Meurer,

You are correct at this time you do not need to provide the Fire Department with a fire department connection to your water tank.
Thank you,

Robert Perreira
Battalion Chief
Fire Prevention Bureau
(808) 932-2912

We very much appreciate your review of the document. If you have any questions about the EA, please contact me at (808) 969-7090.

Sincerely,

Ron Terry

Ron Terry, Principal
Geometrician Associates

Cc: James Leonard, William Meurer

DAVID Y. IGE
GOVERNOR OF HAWAII

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH

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

In reply, please refer to:
EMD/CWB

03050PMHK.17

March 29, 2017

Mr. Ron Terry
Geometrician Associates LLC
P.O. Box 396
Hilo, Hawaii 96721

Dear Mr. Terry:

SUBJECT: Comments on the Draft Environmental Assessment and Conservation District Use Permit Application for the Meurer Single-Family Residence and Associated Improvements
TMK: (3) 1-3-004:008
Opihikao Beach, Puna, Island of Hawaii, Hawaii

The Department of Health (DOH), Clean Water Branch (CWB), acknowledges receipt of your letter, dated March 4, 2017, requesting comments on the subject project. The DOH-CWB has reviewed the document and offers these comments. Please note that our review is based solely on the information provided in the subject document and its compliance with the Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. Mr. William Meurer (Applicant) may be responsible for fulfilling additional requirements related to our program. We recommend that they also read our standard comments on our website at:
http://health.hawaii.gov/epo/files/2013/05/Clean-Water-Branch-Std-Comments.pdf.

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

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

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

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

2. The Applicant may be required to obtain National Pollutant Discharge Elimination System (NPDES) permit coverage for discharges of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55).

For NPDES general permit coverage, a Notice of Intent (NOI) form must be submitted at least 30 calendar days before the commencement of the discharge. An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. To request NPDES permit coverage, your Applicant must submit the applicable form ("CWB Individual NPDES Form" or "CWB NOI Form") through the e-Permitting Portal and the hard copy certification statement with the respective filing fee ($1,000 for an individual NPDES permit or $500 for a Notice of General Permit Coverage). Please open the e-Permitting Portal website located at: https://eha-cloud.doh.hawaii.gov/epermit/. They will be asked to do a one-time registration to obtain their login and password. After they register, click on the Application Finder tool and locate the appropriate form. They can then follow the instructions to complete and submit the form.

3. If your Applicant's project involves work in, over, or under waters of the United States, it is highly recommended that they contact the Army Corp of Engineers, Regulatory Branch (Tel: 835-4303) regarding their permitting requirements.

   Pursuant to Federal Water Pollution Control Act [commonly known as the "Clean Water Act" (CWA)], Paragraph 401(a)(1), a Section 401 Water Quality Certification (WQC) is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may **result** in any discharge into the navigable waters..." (emphasis added). The term "discharge" is defined in CWA, Subsections 502(16), 502(12), and 502(6); Title 40 of the Code of Federal Regulations, Section 122.2; and HAR, Chapter 11-54.

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

5. It is the State's position that all projects must reduce, reuse, and recycle to protect, restore, and sustain water quality and beneficial uses of State waters. Project planning should:

   a. Treat storm water as a resource to be protected by integrating it into project planning and permitting. Storm water has long been recognized as a source of irrigation that will not deplete potable water resources. What is often overlooked is that storm water recharges ground water supplies and feeds streams and estuaries; to ensure that these water cycles are not disrupted, storm water cannot be relegated as a waste product of impervious surfaces. Any project

planning must recognize storm water as an asset that sustains and protects natural ecosystems and traditional beneficial uses of State waters, like community beautification, beach going, swimming, and fishing. The approaches necessary to do so, including low impact development methods or ecological bio-engineering of drainage ways must be identified in the planning stages to allow designers opportunity to include those approaches up front, prior to seeking zoning, construction, or building permits.

b. Clearly articulate the State's position on water quality and the beneficial uses of State waters. The plan should include statements regarding the implementation of methods to conserve natural resources (e.g., minimizing potable water for irrigation, gray water re-use options, energy conservation through smart design) and improve water quality.

c. Consider storm water Best Management Practice (BMP) approaches that minimize the use of potable water for irrigation through storm water storage and reuse, percolate storm water to recharge groundwater to revitalize natural hydrology, and treat storm water which is to be discharged.

d. Consider the use of green building practices, such as pervious pavement and landscaping with native vegetation, to improve water quality by reducing excessive runoff and the need for excessive fertilization, respectively.

e. Identify opportunities for retrofitting or bio-engineering existing storm water infrastructure to restore ecological function while maintaining, or even enhancing, hydraulic capacity. Particular consideration should be given to areas prone to flooding, or where the infrastructure is aged and will need to be rehabilitated.

If you have any questions, please visit our website at:
http://health.hawaii.gov/cwb, or contact the Engineering Section, CWB, at (808) 586-4309.

Sincerely,

Alec Wong

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

MHK:ctt

c: Mr. William Meurer, (c/o James Leonard) [via e-mail jmleonard@mac.com only]
Mr. Sam Lemmo, DLNR-OCCL [via e-mail dlnr.occl@hawaii.gov only]
DOH-EPO [via e-mail Noella.Narimatsu@doh.hawaii.gov only]

geometrician

A S S O C I A T E S , L L C
integrating geographic science and planning

phone: (808) 969-7090 PO Box 396 Hilo Hawaii 96721 rterry@hawaii.rr.com

May 29, 2017

Alec Wong, P.E., Chief
Clean Water Branch
Hawai‘i Department of Health
P.O. Box 3378
Honolulu HI 96814

Dear Mr. Wong:

Subject: **Comment on Draft Environmental Assessment (DEA)/Conservation District Use Application (CDUA) for Meurer Single-Family Residence in the Conservation District at ‘Opihikao, Puna District, Island of Hawai‘i, TMK (3rd.) 1-3-004:008**

Thank you for the comment letters dated March 29, 2017. Your letter noted requirements in Chapters 11-54 and 11-55, HAR, related to water quality criteria and the National Pollutant Discharge Elimination System (NPDES). You also cited CWB standard comments and Clean Water Act requirements administered by the U.S. Army Corps of Engineers (USACE) for projects affecting waters of the U.S. Finally, your letter provided information on green building practices, such as reducing the need for irrigation, pervious pavement, percolating stormwater, bioengineering of storm channels, and potential re-use of storm water for irrigation,

The applicant and its contractors will fully commit to complying with water quality regulations during construction of the single-family residence. The action would not involve the discharge of dredged or fill materials into waters of the U.S. No Section 401 Water Quality Certification is required. The construction will disturb only a fraction of an acre and there are no other apparent aspects of the project that would trigger the need for an NPDES permit. Temporary irrigation lines will be installed and removed within a few months, and no permanent irrigation will be required.

We very much appreciate your review of the document. If you have any questions about the EA, please contact me at (808) 969-7090.

Sincerely,

Ron Terry

Ron Terry, Principal
Geometrician Associates

DAVID Y. IGE
GOVERNOR OF HAWAII

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH

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

In reply, please refer to:
File:

EPO 17-068

March 28, 2017

Mr. Ron Terry
Geometrician Associates, LLC
P.O. Box 396
Hilo, Hawaii 96721
Email: rterry@hawaii.rr.com

Dear Mr. Terry:

SUBJECT: Draft Environmental Assessment (DEA) for Meurer Single-Family Residence in the Conservation District at Opihikao, Hawaii
TMK: -3--1-3-00-4-008

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your DEA to our office via the OEQC link:
http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Hawaii/2010s/2017-03-23-HA-5E-DEA-Meurer-Residence.pdf

We understand from the OEQC publication form project summary that *"William Meurer plans a single-family residence on his 0.958-acre Conservation District property in the Puna District, Island of Hawai'i. The proposed home would have a total of 2,265 square feet (sf) of living area, lanai, carport, porch and a 3,000-gallon water tank. Other features include a driveway, a water well, and an individual wastewater system. The structure has been sited and designed with the intent of minimizing the impact to existing sight lines through the property from Red Road to the sea. The habitable floor of the residence would be raised to the 20-foot elevation and has been designed to safely accommodate a home within the proposed flood zone designation for the majority of the property. The home is set back from the shoreline a minimum of 73 feet in order to avoid the effects of waves, sea spray and potential future erosion. Landclearing over less than a quarter-acre would produce short-term impacts to noise, air and water quality, and scenery, mitigated by Best Management Practices. The vegetation has been repeatedly disturbed in the past and is now primarily non-native, with no rare, threatened or endangered plants. Impacts to the islandwide-ranging endangered Hawaiian hoary bat and Hawaiian hawk will be avoided through vegetation removal timing. An archaeological survey determined that two sites were present, both of them low-stacked livestock walls. Although not required to be preserved, they will remain on the property as-is. There will be no interference with shoreline access or traditional fishing and gathering and there will be no adverse impacts to cultural practices or beliefs"*

In the development and implementation of all projects, EPO strongly recommends regular review of State and Federal environmental health land use guidance. State standard comments and available strategies to support sustainable and healthy design are provided at: http://health.hawaii.gov/epo/landuse. Projects are required to adhere to all applicable standard comments.

EPO has recently updated the environmental Geographic Information System (GIS) website page. It now compiles various maps and viewers from our environmental health programs. The eGIS website page is continually updated so please visit it regularly at: http://health.hawaii.gov/epo/egis.

EPO also encourages you to examine and utilize the Hawaii Environmental Health Portal at: https://eha-cloud.doh.hawaii.gov. This site provides links to our e-Permitting Portal, Environmental Health

Warehouse, Groundwater Contamination Viewer, Hawaii Emergency Response Exchange, Hawaii State and Local Emission Inventory System, Water Pollution Control Viewer, Water Quality Data, Warnings, Advisories and Postings.

Please note that all wastewater plans must conform to applicable provisions (HAR, Chapter 11-62, "Wastewater Systems"). We reserve the right to review the detailed wastewater plans for conformance to applicable rules. Should you have any questions, please review online guidance at: http://health.hawaii.gov/wastewater and contact the Planning and Design Section of the Wastewater Branch (WWB) at (808) 586-4294.

Injection wells used for the subsurface disposal of wastewater, sewage effluent, or surface runoff are subject to environmental regulation and permitting (HAR, Chapter 11-23, "Underground Injection Control {UIC}"). DOH approval must be obtained before any injection well construction commences. A UIC permit must be issued before any injection well operation occurs. For specific questions please email sdwb@doh.hawaii.gov or call (808) 586-4258.

Any construction waste generated by the project needs to be disposed of at a solid waste disposal facility that complies with the applicable provisions (HAR, Chapter 11-58.1 "Solid Waste Management Control"). The open burning of any of these wastes, on or off site, is strictly prohibited. Additional information is accessible at: http://health.hawaii.gov/shwb. For specific questions call (808) 586-4226.

To better protect public health and the environment, the U.S. Environmental Protection Agency (EPA) has developed a new environmental justice (EJ) mapping and screening tool called EJSCREEN. It is based on nationally consistent data and combines environmental and demographic indicators in maps and reports. EPO encourages you to explore, launch and utilize this powerful tool in planning your project. The EPA EJSCREEN tool is available at: http://www.epa.gov/ejscreen.

Hawaii's climate is changing. Sea level rise and the associated coastal impacts have the potential to harm an array of natural and built environments in Hawaii. For additional information on projected sea level rise in Hawaii, EPO recommends that you visit the following informative links:

- State of Hawaii Climate Adaptation Portal: http://climateadaptation.hawaii.gov
- University of Hawaii, Manoa, School of Ocean and Earth Sciences and Technology, Coastal Geology Group: http://www.soest.hawaii.edu/coasts/index.html
- US Environmental Protection Agency – Climate Impacts on Coastal Areas: https://www.epa.gov/climate-impacts/climate-impacts-coastal-areas

We request that you utilize all this information on your proposed project to increase sustainable, innovative, inspirational, transparent and healthy design. Thank you for the opportunity to comment.

Mahalo nui loa,

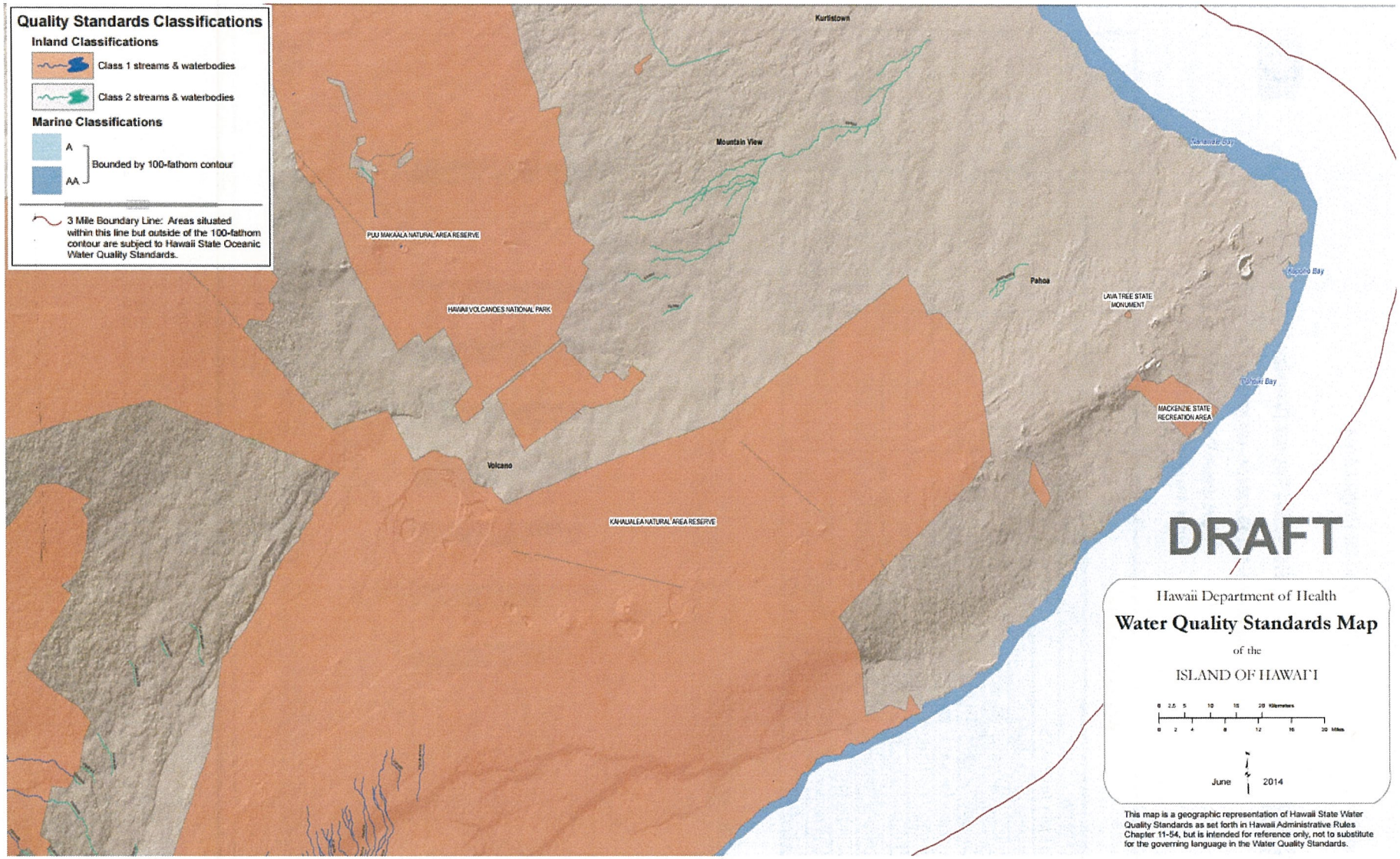
Laura Leialoha Phillips McIntyre, AICP
Program Manager, Environmental Planning Office

LM:nn

Attachment 1: Clean Water Branch: Water Quality Standards Map - Hawaii
Attachment 2: U.S. EPA EJSCREEN Report for Project Area

c: William Meurer, c/o James Leonard (via email: jmleonard@mac.com)
Sam Lemmo, Administrator, DLNR-OCCL (via email: dlnr.occl@hawaii.gov)
DOH: DHO HI, WWB, SDWB {via email only}

Attachment 1: Clean Water Branch: Water Quality Standards Map - Hawaii



Attachment 2: U.S. EPA EJSCREEN Report for Project Area

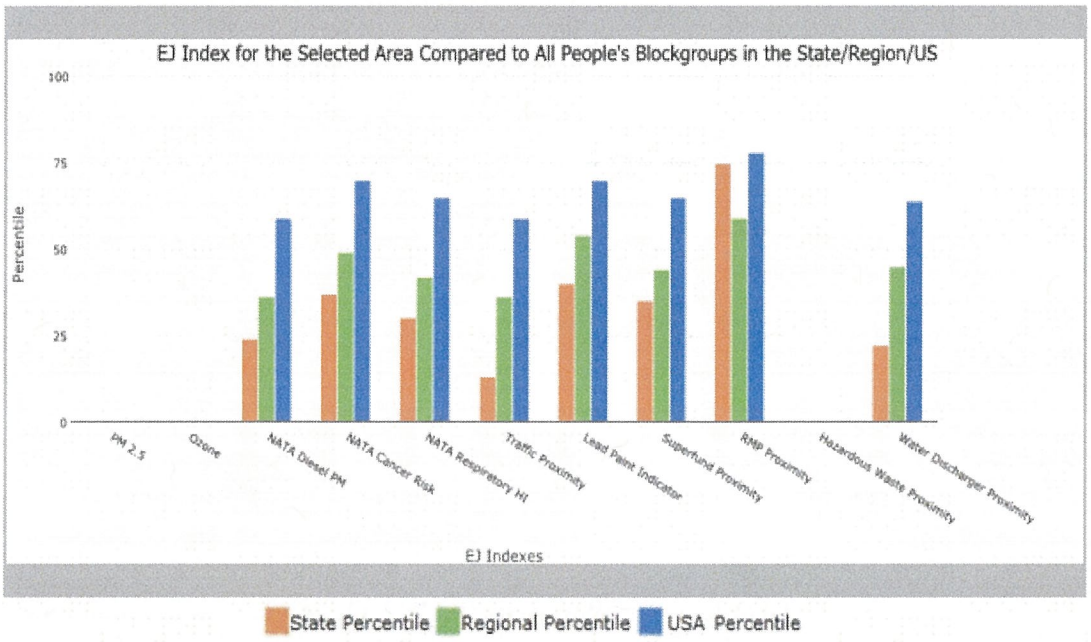
EJSCREEN Report (Version 2016)

1 mile Ring Centered at 19.425434,-154.881895, HAWAII, EPA Region 9

Approximate Population: 1

Input Area (sq. miles): 3.14

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	N/A	N/A	N/A
EJ Index for Ozone	N/A	N/A	N/A
EJ Index for NATA* Diesel PM	24	36	59
EJ Index for NATA* Air Toxics Cancer Risk	37	49	70
EJ Index for NATA* Respiratory Hazard Index	30	42	65
EJ Index for Traffic Proximity and Volume	13	36	59
EJ Index for Lead Paint Indicator	40	54	70
EJ Index for Superfund Proximity	35	44	65
EJ Index for RMP Proximity	75	59	78
EJ Index for Hazardous Waste Proximity+	N/A	N/A	N/A
EJ Index for Water Discharger Proximity	22	45	64



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

EJSCREEN Report (Version 2016)

1 mile Ring Centered at 19.425434,-154.881895, HAWAII, EPA Region 9

Approximate Population: 1

Input Area (sq. miles): 3.14

March 24, 2017

Digitized Point

1:1,128

Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0
National Pollutant Discharge Elimination System (NPDES)	0

EJSCREEN Report (Version 2016)

1 mile Ring Centered at 19.425434,-154.881895, HAWAII, EPA Region 9

Approximate Population: 1

Input Area (sq. miles): 3.14

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in µg/m³)	N/A	N/A	N/A	9.37	N/A	9.32	N/A
Ozone (ppb)	N/A	N/A	N/A	51	N/A	47.4	N/A
NATA* Diesel PM (µg/m³)	0.0155	0.149	11	0.978	<50th	0.937	<50th
NATA* Cancer Risk (lifetime risk per million)	25	34	5	43	<50th	40	<50th
NATA* Respiratory Hazard Index	0.49	1	5	2	<50th	1.8	<50th
Traffic Proximity and Volume (daily traffic count/distance to road)	0	990	4	1100	2	590	2
Lead Paint Indicator (% Pre-1960 Housing)	0.048	0.16	35	0.24	35	0.3	25
Superfund Proximity (site count/km distance)	0	0.098	29	0.15	13	0.13	16
RMP Proximity (facility count/km distance)	0.25	0.19	83	0.57	55	0.43	62
Hazardous Waste Proximity+ (facility count/km distance)	N/A	0.14	N/A	0.14	N/A	0.11	N/A
Water Discharger Proximity (facility count/km distance)	0.032	0.34	8	0.2	7	0.31	3
Demographic Indicators							
Demographic Index	47%	52%	35	47%	51	36%	71
Minority Population	44%	77%	7	58%	35	37%	64
Low Income Population	50%	26%	90	36%	72	35%	76
Linguistically Isolated Population	2%	6%	39	9%	28	5%	56
Population With Less Than High School Education	10%	9%	66	17%	42	14%	50
Population Under 5 years of age	4%	6%	27	7%	27	6%	29
Population over 64 years of age	21%	15%	79	13%	87	14%	85

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

+ The hazardous waste environmental indicator and the corresponding EJ index will appear as N/A if there are no hazardous waste facilities within 50 km of a selected location.

For additional information, see: www.epa.gov/environmentaljustice

EJSCREEN is a screening tool for pre-decisional use only. It can help identify areas that may warrant additional consideration, analysis, or outreach. It does not provide a basis for decision-making, but it may help identify potential areas of EJ concern. Users should keep in mind that screening tools are subject to substantial uncertainty in their demographic and environmental data, particularly when looking at small geographic areas. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports. This screening tool does not provide data on every environmental impact and demographic factor that may be relevant to a particular location. EJSCREEN outputs should be supplemented with additional information and local knowledge before taking any action to address potential EJ concerns.

geometrician

A S S O C I A T E S , L L C
integrating geographic science and planning

phone: (808) 969-7090 PO Box 396 Hilo Hawaii 96721 rterry@hawaii.rr.com

May 29, 2017

Laura Leialoha Phillips McIntyre, AICP
Environment Planning Office Manager
Hawai‘i DOH Environmental Health Administration
919 Ala Moana Blvd, Suite 312
P.O. Box 3378
Honolulu HI 96814

Dear Ms. McIntyre:

Subject: **Comment on Draft Environmental Assessment (DEA)/Conservation District Use Application (CDUA) for Meurer Single-Family Residence in the Conservation District at ‘Opihikao, Puna District, Island of Hawai‘i, TMK (3rd.) 1-3-004:008**

Thank you for the comment letter dated March 28, 2017, referring us to websites providing DOH standard comments and strategies to support sustainable and healthy design; the eGIS website; the Hawai‘i Environmental Portal; the EPA EJSCREEN; administrative rules related to wastewater systems, runoff and injection wells, and construction debris; and miscellaneous publications dealing with climate change and sea level rise.

During EA development, many of these sources were consulted, and the website from the HEER office provided information on the potential for hazardous materials. It should be noted that during construction, the contractor will be required to comply with all applicable administrative rules. The house has been designed to be sustainable in many ways, including a small footprint; natural light and ventilation; solar power; and minimal landscaping with local species requiring no permanent irrigation.

We very much appreciate your review of the document. If you have any questions about the EA, please contact me at (808) 969-7090.

Sincerely,

Ron Terry

Ron Terry, Principal
Geometrician Associates

Michael and Nora OFriel March 30, 2017

Sam Lemmo, OCCL Administrator, (808)
587-0377, dlnr.occl@hawaii.gov 1151 Punchbowl Street, Room 131, Honolulu, HI 96813
Michael Yee, planning@co.hawaii.hi.us 101 Pauahi St. #3 Hilo, Hawaii 96720

March 23, 2017 Environmental Notice — Opihikao, the planned Meurer home (SFR)
1
Subject: EA for CDUA HA-3793

My husband and I have lived on HWY 137 less than two miles from the Meurer project site for 45 years.
We have, over the years, watched the area grow and we welcome new neighbors.
HWY 137 has very few openings along the road that offer such spectacular views of the coastline and the raw, untouched beauty that the Meurer property offers.

Here are our concerns followed by comments:

1. **PRESERVATION OF SIGHT LINE FOR OCEAN VIEW FROM HWY 137**
2. **HEDGE**
3. **GATES AND GATE POSTS**
4. **PUBLIC ACCESS FOR SHORELINE**
5. **PUBLIC NOTICE**

1. **PRESERVATION OF SIGHT LINE FOR OCEAN VIEWS FROM HWY 137**

The following places in the application Mr. Meurer states his intent to preserve and enhance sight lines from HWY 137 through the property to the ocean.

1. APPLICANT PUBLICATION FORM - Feb 2016

   A. Page 2 - 2

      States the intent of minimizing the impact to existing sight lines through the property from Red Road to the sea.

2. SUMMARY OF PROJECT, ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES.

   A. Paragraph III, page ii

      The design features a low-profile roof, very limited landscaping, and a location on the property such that most sight lines from the Kapoho - Kalapana Road through the property to the sea are preserved.

3. PART 1: PROJECT DESCRIPTION AND E.A. PROCESS

   A. Paragraph 3 Page 1

      The design features very limited landscaping utilizing primarily native and Polynesian plants and a location on the property such that most sight lines from the Red Road through the property to the sea would be preserved.

4. PART 3: 3.1.5 AIR QUALITY, NOISE AND SCENIC RESOURCES

   A. Impacts and Mitigation Measures page 22

      The Site Plan has been formulated to preserve and enhance some sight lines from the Red Road through the property to the sea, while at the same time minimizing views of the residential structure from the road.

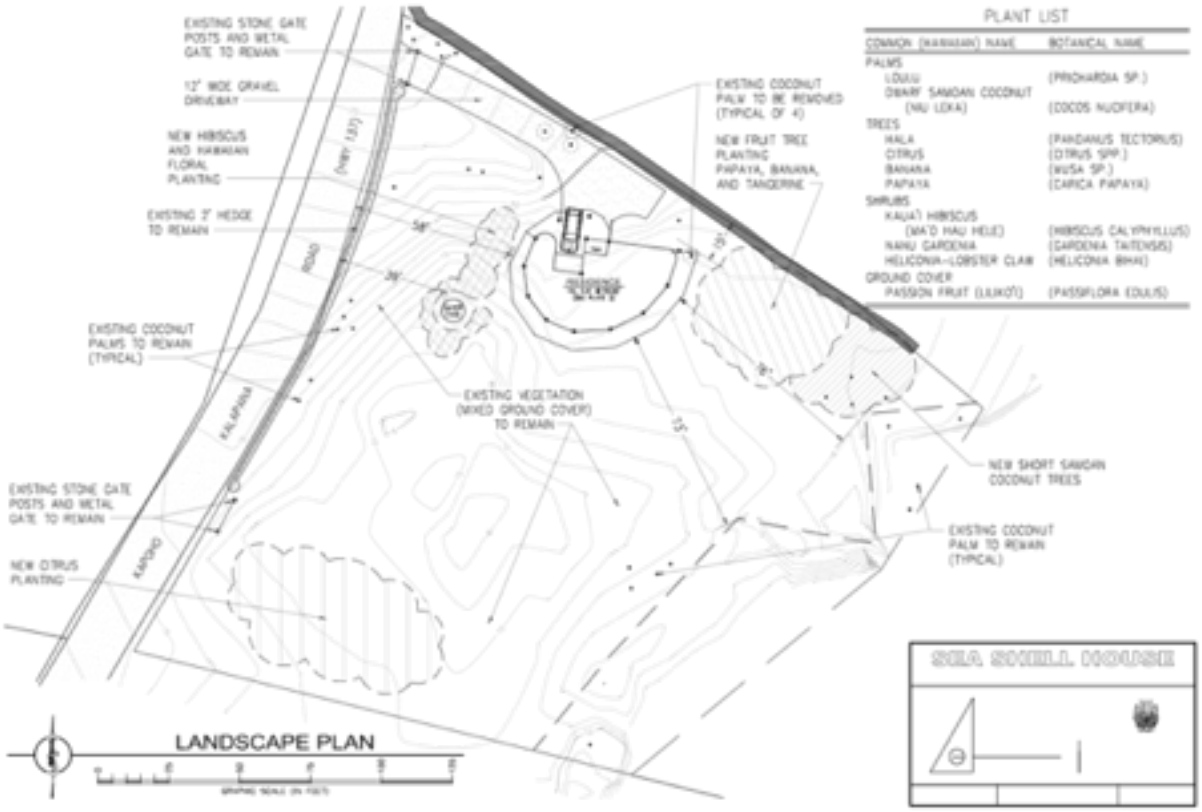
Existing sight lines through the property from Red Road to the sea to be enhanced, preserved and protected.

Spectacular ocean views to preserve and enhance, from the Red Road through the property to the sea.

Application Publication Form States: Sight lines from the Red Road through the property to the sea would be preserved.

2. HEDGE

The ARCHITECTURAL PLAN and LANDSCAPE PLAN both indicate an existing 2' hedge that runs from the northern gate and ending at the second gate near the southern boundary. The plan shows that this hedge already encroaches beyond the roadside property boundary in several places.



The LANDSCAPE PLAN is incomplete as it fails to show that the hedge runs the entire length of the property, 250' along HWY 137 and 40' on the southern border for a grand total of 290'. The plan also does not name the type of plant which is Rhapis excelsa as identified in:

TABLE 1. Plant Species Observed on Property
A. page 20. The 4th entry from top
Rhapis excelsa

Description of Rhapis Excelsa

Generally speaking, the plant can grow to more than 14' feet in height. Its clumps can sometimes reach enormous width, so the plant's width can match its height. Lady Palm has big, thick leaves with blunt tips and wide segments. This is why it's sometimes known as "broadleaf Lady Palm". The plant has sturdy canes covered with coarse, dark brown fiber. Lady Palms can grow about 8 to 12 inches in height per year.

6' man standing by mature Rhapis excelsa hedge in the Puna district.

Rhapis excelsa hedge runs 250’ along HWY 137 and 40’ on the southern border of the Maurer parcel.
Last month, this Rhapis excelsa palm hedge was over 7’ tall and blocking all view of the ocean from HWY 137.
In preparation for this environmental notice, the hedge was cropped to 4’ and the leafy, bushy growth cut away to minimize the interference of coastal views.

Southern gate with 4'hedge. 50' hedge to the south on HWY 137 and 40' hedge on southern side border, not shown on LANDSCAPE PLAN. Stump of old growth Mauna Loa tree removed in 2014, a permit was issued. This hedge was planted after removing 4 Mauna Loa trees. Was a permit issued by SMA or CZM department for this hedge planting?

HWY 137 is narrow, 16’ wide, barely wide enough to pass another vehicle. This hedge is only 2’ from the edge of the pavement. When this hedge widens and encroaches on this narrow shoulder it becomes a danger for traffic. This privacy screen will encroach on what little pedestrian or bike access exists, 2 feet.

The visual and privacy screen is 2' from the pavement of HWY 137.

What are the set backs from the highway for hedges, entrance gates and future road widening? Have these setbacks been violated?

If this Rhapis excelsa privacy screen is acceptable to the DLNR, Office of Conservation and Coastal Lands and the Office of Environmental Quality Control, would the acceptable height be 2' as proposed on their LANDSCAPE PLAN? What would the acceptable height be as to ensure ocean views? Who would monitor the hedge growth and notify the Meurer's that it its time to crop the hedge back to the acceptable height and width.
Will the cutting back fall on the county road maintenance crew to maintain and remove the rubbish on the roadside?

Other options for preserving the ocean views would be to remove all Rhapis palms and plant low shrubs which they mention in

PART 1 : PROJECT DESCRIPTION.

Perhaps a 2' rock wall could be permitted by the SMA guidelines and setbacks. Rock walls are very Hawaiian, low maintenance, visually appealing and would increase property values and preserve ocean views.

Please ensure that this hedge proximity is reviewed by the Department of Public Works, Engineering Division, concerning future road widening. Also gate and planting setbacks.

3. GATES

Figure 2, Site photos page 3

Their submitted photo shows the existing gate with wood posts and the 6' bushy Rhapis excelsa hedge on BOTH sides of gate.

LANDSCAPE PLAN incorrectly indicates both gates having "existing stone gate posts" and metal gates.

The photo below shows the same existing gate with existing wood posts as in Figure 2, site photo. The gate is 3' from the pavement of HWY 137.
We feel that for public safety the gate setback should allow a large vehicle to pull entirely off the road while opening or closing the gate.

Southern metal gate with wood posts set back from the pavement 3'. No stone gate pillars. Ocean view to be preserved.

5’ wooden post, 4’ Rhapis palm hedge, recently cropped and trimmed. Ocean views to be preserved.

5’ tall gate post and cropped & trimmed Rhapis excelsa hedge 4’ tall to minimize obstruction of ocean view in preparation for this environmental notice.

The northern gate has new wood posts and is 6’ from the edge of HWY 137, 16’ closer to the road than the old post holes measuring 22’ from the edge of HWY 137 as shown in this photo.
Due to existing rock walls, HWY 137 narrows to a one lane road to the north of this gate. If vehicles do not pull completely off the HWY to open/close this gate it will further impact the safety and flow of traffic and public safety.

4. PUBLIC ACCESS

Project Summary Page 2 - 2

There will be no interference with shoreline access or traditional fishing and gathering and there will be no adverse impacts to cultural practices or beliefs.

Summary of Project, Environmental Impacts and Mitigation Measures
Page ii

Mr Meurer understands and supports the right to traverse and utilize the shoreline area, and the proposed residential use will not interfere in any way with ongoing fishing access.

To ensure future coastal views we are appealing to the CZM and SMA agencies and guidelines for help in protecting and preserving scenic amenities and ocean access for not only fishing but for public use/ shoreline access within special management areas and the mean high tide line where there is no beach. Also to restrict any development or plantings which would substantially interfere with or detract from the line of sight toward the sea from the state highway nearest the coast, HWY 137.

Where is the established shoreline access for public use? Can an access be designated or is the public allowed to cross the Maurer property to access the shoreline?
We would like to request a survey map be accessible to the public that indicates and establishes the mean high tide line for public access and enjoyment. Where can we find such a map?

Ocean view to the north.
Ocean access 171for not only fishing but for public use & shoreline access within special management areas and the mean high tide line where there is no beach.

BEWARE
of DOG
NO
TRESPASSING

5. PUBLIC NOTICE

1.3 Public Involvement & Agency Coordination Page 9

Private:

Five Adjacent/nearby Property Owners

If it is public information to know who was notified, when and how they were notified where could we find this information? Could you email the five notices that went out? Your response with these notifications is appreciated.
We have spoken with 4 adjacent home owners and one other property owner, nearest to the Maurer property, not one of them have been notified by Mr. Muerer as of March 31.

Please acknowledge receipt of this comment. Your help and timely response to our concerns, before April 23, 2017, will be greatly appreciated.
Please notify us of any scheduled hearings.

Respectfully,
Michael OFriel
Nora OFriel
13-125 Nalu Place
Pahoa HI, 96778
noraofriel@gmail.com

Photos of the beautiful Maurer property taken on March 27, 2017

View of house site and driveway on northern boundary, looking toward HWY 137

Interior of the Maurer property taken March 27, 2017

Arch rock on coastline in front of the Muerer property.

Ocean view looking toward Kalapana, south

Ocean view and 250’ Rhapis privacy and visual screen hedge. 40’ hedge on southern boundary. Potential height of 12’ to 15’ and 8’ wide.

Paul Charbonneau owner HokuMele Gardens Landscape Nursery
14-4828 Kumuloulu St, Vacationland Farmlots, Kapoho
(808) 965-0772

My name is Paul Charbonneau and I'd like to make a comment regarding the Meurer single family residence permit application TMK 1-3-004-008 in Opihikao, Puna

My home for the last 40 years has been Kapoho...a few miles north along the coast from the Meurer property. I moved here after getting my degree in Tropical Crop Production in 1977 from what was then known as the Ag College in Hilo (now CTAHR). For the last 40 years I've been commercially raising landscape palms in Kapoho. I am a founding member of the Hawaii Island Palm Society and have been active in this organization to the present day.

The Meurer property currently has a long roadside hedge of Rhapis excelsa...the common Rhapis palm. I am very familiar with this palm, having grown it on my land as stock plantings and potted for sale since 1977. While there are dwarf cultivars of R. excelsa, what is planted only 2-3 feet from the pavement of HWY 137 is the standard regular height form. This is a vigorous clumping palm that will fairly quickly reach a height of 12-14ft+ and has a dense foliage that will completely block the ocean view from the roadway. Not only that, the palm produces numerous suckers (keikis) which spread via underground rhizomes. In time this will produce a rather wide thick clump which will encroach onto the road shoulder. I have clumps of R. excelsa on my lot that are over 10 ft wide and 14ft tall. While it is possible to keep topping this planting to the current size (3-4ft tall x 2ft wide), it would require never ending vigilence to prevent keikis from obstructing the road shoulder and tall shoots from blocking the ocean view.

My experience has shown these palms to be fairly easy to dig and transplant and I would highly urge the owner to do so and place a more suitable, lower growing, less invasive boundary planting in its place. I also would suggest planting further from the pavement to allow pedestrian and bicycle traffic to pass safely.

Thank you very much,

Paul Charbonneau

Paul Charbonneau

geometrician
ASSOCIATES, LLC
integrating geographic science and planning

phone: (808) 969-7090 PO Box 396 Hilo Hawaii 96721 rterry@hawaii.rr.com

May 29, 2017

Michael and Nora O'Friel
noraofriel@gmail.com

Dear Mr. and Mrs. O'Friel:

Subject: Comment on Draft Environmental Assessment (DEA)/Conservation District Use Application (CDUA) for Meurer Single-Family Residence in the Conservation District at 'Opihikao, Puna District, Island of Hawai'i, TMK (3rd.) 1-3-004:008

Thank you for the comment letter dated March 30, 2017 on the proposed single-family home. In answer to your specific comments:

1. *Sight lines for ocean views from Hwy 137 will be compromised*. It would not be possible to construct a home on the property without some effects to the view, but the project has been planned to minimize the effects to the extent reasonable by locating the house in the northwest corner of the lot. For drivers or walkers headed north, the home would be set against the backdrop of the neighbor's vegetation for much of the way. The improvements occupy less than 15 percent of the lot. Much of the underbrush has been removed and the hedge trimmed to less than 4 feet, and Mr. Meurer intends to keep it that way per expected conditions of CDUP approval.
2. *Landscape plan should show hedge running whole length and identify Rhapis excelsa*. The Site Plan and Landscape Plan have been amended per your suggestions.
3. *Was permit issued for hedge planting?* Mr. Meurer did not plant the hedge, and he is unaware of when it was planted, although it was clearly some years before he acquired the property. It does serve the function of delineating the roadway from the lot, where there are several drop-offs that would be hazardous for the public.
4. *Hedge will encroach on narrow shoulder (2-foot) and endanger pedestrian and bike traffic*. According to surveys, and as shown on the Site Plan, the paved portion of the roadway actually encroaches into Mr. Meurer's lot, at least on the northern end, rather than the other way around. Mr. Meurer will keep the hedge trimmed at 4 feet in height or less and will also maintain the roughly two-foot space between the hedge and the paved roadway. Again, the hedge serves a valuable function in places of having a "soft" boundary that will keep pedestrians and bicyclists from falling into the lot.
5. *If the hedge is allowed to remain, who will monitor to ensure that is does not encroach on road or views? Who will be responsible for trimming it?* Mr. Meurer will be responsible for trimming

and maintaining the hedge, and expects to have this responsibility as a condition of approval for the CDUP.
6. *A 2-foot Hawaiian rock wall would be preferable*. A rock wall would be more hazardous for vehicles and bicycles.
7. *Gate is described incorrectly as rock with wooden posts*. The description of the gate construction has been amended on the Site Plan to reflect a concrete base with wooden posts.
8. *Gate should be set back to allow entering/exiting vehicles to not impact roadway*. In deference to concerns expressed by yourself and others, and despite the fact that the roadway here actually encroaches onto his property, Mr. Meurer has decided to move the gate approximately 10 feet further back into the property. This will ensure that a vehicle parked to open or close the gate will not intrude into the roadway or shoulder. The *Rhapis* palm hedge will be extended within the property to meet the relocated gate.
9. *Where is the established shoreline access for public use? Can an access be designated or is the public allowed to cross the Meurer property to access the shoreline?* There is ready access to the area makai of the shoreline in front of the Meurer property by parking in the tidepool area and walking 400 feet along the shoreline to the north. Please note that the "No Trespassing" signs shown in your letter are NOT on the Meurer property. Mr. Meurer does not intend to put up signs that would discourage use of the area makai of the shoreline.
10. *Request a survey map be accessible to the public that indicates and establishes the mean high tide line for public access and enjoyment*. The relevant boundary for public access is already depicted in several places in the EA. The certified shoreline is clearly shown on Figure 3, Plate 1, on Page 5 of the EA. The mean high tide line – which is located well makai of the official shoreline and would not provide a good line for the public, as it would require them to walk in the water – is not legally relevant to public access.
11. *Public notification*. The neighbors listed below, who border the property to north, south and across the street, were notified by mail on September 7, 2016, of the owner's intention to build a home and invited to submit comments or questions. Note that although this is not required of an Environmental Assessment, it was done to solicit information from nearby property owners who might have knowledge of environmental conditions and interest in the proposed action. The same owners were notified by mail on March 20, 2017, of the availability of the EA and instructed how to obtain it and when and where to send comments. The one neighbor who responded to the early consultation was provided a hardcopy of the Draft EA, per her request.

Konanui, Bernard M
Konanui, Uriel D
PO BOX 8
KEAAU, HI 96749-0008

Permaculture Foundation of Hawaii
PO BOX 2411
KAILUA KONA, HI 96745-2411

Elia, Daniel/Ruth Ohana Trst
C/O Kaleikini, Bernice A, Ttee
PO BOX 226
PAHOA, HI 96778-0226

Olsgard, Dale Melvin
PO BOX 999
HOMER, AK 99603-0999

Kerver, James L/Melany L Trst
PO BOX 510
CAPTAIN COOK, HI 96704-0510

You also provided a written statement concerning *Rhapis excelsa* from a Mr. Paul Charbonneau. Based on his experience with the plant, he recommended using a different hedge plant that would not 1) require endless and burdensome maintenance to keep at 4 feet or 2) end up growing so tall that it will block all views. While this point is well taken, the property came with the hedge, which can serve its purpose well if it is maintained. Mr. Meurer believes that he can easily continue to maintain the hedge at less than four feet and also keep about a 2-foot space between the hedge and the paved roadway.

We very much appreciate your review of the document. If you have any questions about the EA, please contact me at (808) 969-7090.

Sincerely,

Ron Terry, Principal
Geometrician Associates
Cc: James Leonard, William Meurer

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Environmental Assessment

Meurer Single-Family Residence in the Conservation District at ‘Opihikao

APPENDIX 2
Coastal Erosion Study

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GEOHAZARDS CONSULTANTS INTERNATIONAL, INC.

Appraisal of hazards – reduction of risk

P.O. Box 479 Volcano, HI 96785

COASTAL EROSION STUDY
MEURER PROPERTY
OPIHIKAO, PUNA DISTRICT, ISLAND OF HAWAII

13-6343 Kalapana Kapoho Beach Road

TMK (3) 1-3-004:008

0.958 acres

Graham Paul Knopp, Ph.D.

Timothy E. Scheffler, Ph.D.

November 2016

TABLE OF CONTENTS

1.0 Introduction 1
2.0 Physical Site Setting 1
2.1 Geological/Geomorphological General Physical Site Setting 1
2.2 Marine Conditions 3
2.3 Specific Site Setting 4
2.4 General Coastal Zone Hazards at this Property 7
3.0 Shoreline Erosion Rate Evaluation 7
3.1 Methodology 7
3.2 GCI Field Studies 7
3.3 Coconut Palm Dating 9
3.4 Comparison of Existing Conditions with 2007 and 2015 Shoreline Surveys 10
3.5 Shoreline "Encroachment" Method 11
3.6 Stereographic Imagery Inspection 11
3.7 Shoreline Retreat 11
4.0 Findings and Conclusion 11
REFERENCES 13

TABLE OF FIGURES

Figure 1. Portion of Geologic Map from Moore and Trusdell (1991) 2
Figure 2. Wave Environment of Meurer property (indicated by black star) 3
Figure 3. Meurer Property Layout 5
Figure 4. Beach Profiles Measured Orthogonally From Points "B", "C", and "E" 8
Figure 5. Undercutting of Coconut Palm Root Platforms 10

TABLE OF TABLES

Table 1. Description of Primary Shoreline Features 6
Table 2. General Coastal Zone Hazards 7
Table 3. Summary of Shoreline Erosion Estimation Methods 12

APPENDIX: 2007 and 2015 Certified Shoreline Surveys

1.0 Introduction

Single-family residential construction on the Island of Hawai'i is regulated by State of Hawai'i Administrative Rules governing Conservation Districts (Title 13, Subtitle 1, Chapter 5, adopted August 12, 2011). Any residential construction in coastal State Land Use Conservation Districts must consider rates of coastal erosion for construction permitting purposes. The State Department of Land and Natural Resources requires an estimate of annual erosion rate for any property for which construction is proposed in the format of a "Coastal Erosion Study" (CES). A CES integrates on-site quantitative measurements by a credentialed specialist or specialists, inspection of available aerial and satellite imagery taken over a period of time, and a review of relevant geological literature. The current report is submitted as a CES in support of a construction proposal for the subject property in the southern Puna district. Section 2 of this Report is a description of the physical setting of the Meurer property, Section 3 presents a summary of the methods GCI used to quantify the rate of shoreline erosion, and Section 4 is the findings and conclusions.

Shoreline erosion on a specific site may be the product of a number of ongoing processes, both local, global, short-term and long-term (NRC 1990). Shoreline erosion and the maturation of a shoreline can be seen as the process of the growth of the shoreline margin inland and development of a coastal shelf. This process may also be visible as the retreat of a shoreline headland and development of embayments between headlands, which tend to absorb relatively more wave energy as waves are refracted towards them. The beach-producing action of wave-driven weathering of rocks may be enhanced in some locales by storm water runoff and groundwater movement. In addition to these competing local dynamics, sea level change may reduce the degree to which beaches may develop.

Sea level rise is composed of both global, eustatic sea level rise and isostatic sea level rise cause by subsidence or rebound of the Island. Therefore global sea level rise places a limit on the extent to which beaches, and the development of the shoreline margin, can mature. Beaches tend to effectively dissipate wave energy through sand/gravel/cobble weathering, with the "milling" of larger particles into smaller particles in a turbulent process that uses up wave energy. Beach particles originate from material transported from inland areas by storm water runoff, from the shoreline material itself, and from near-shore material (i.e., coral reefs). So, while in the long-term sea level rise may dominate shoreline erosion, short-term erosion may be limited by beach development and other site-specific characteristics that serve to absorb, reflect, and diffuse wave energy.

2.0 Physical Site Setting

2.1 Geological/Geomorphological General Physical Site Setting

The Meurer property, hereafter referred to as "the Property", is situated on low-lying, undulating and somewhat hummocky sloping coastal terrain consisting of young lava flows from the East Rift Zone of Kilauea volcano in places overlain with an organic-rich soil cover, The lava flows

are gently sloping in this area, dipping toward the ocean at only about 3-4 degrees. According to Moore & Trusdell (1991), the lava flows underlying the Meurer property are from 400-750-year-old ʻaʻā and pahoehoe lava flows (Figure 1) and are of unit "f7e2". It is not apparent how far the coastal shelf extends offshore in this area.

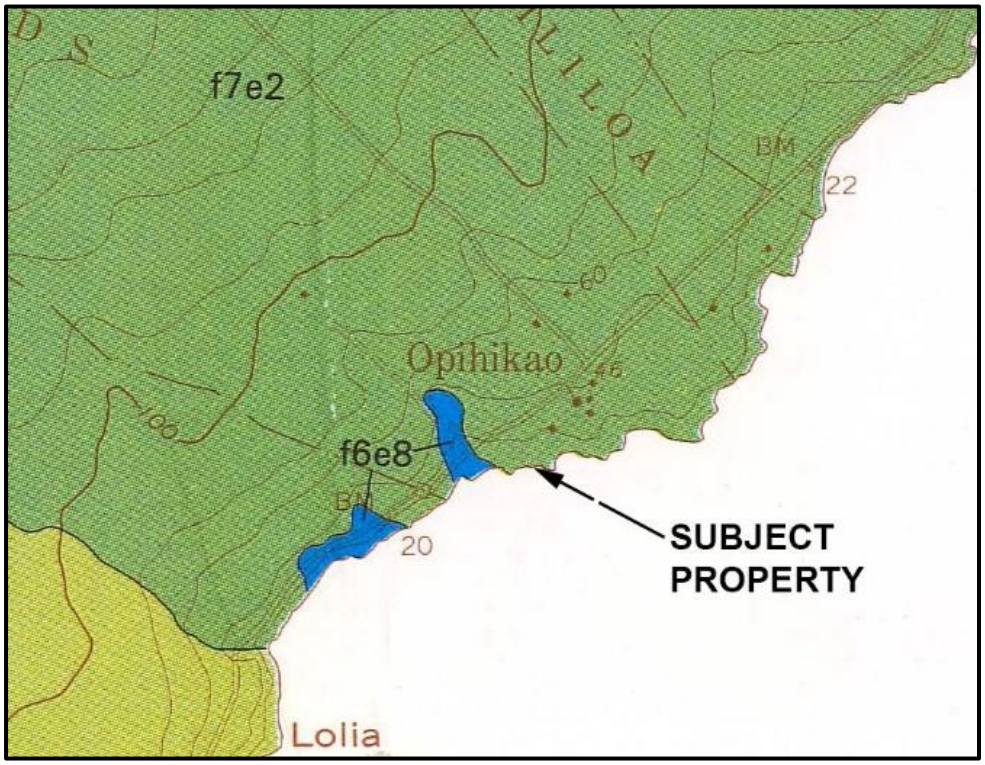

Figure 1. Portion of Geologic Map from Moore and Trusdell (1991)

Subsidence of lower Puna is a significant and ongoing process, in large part historically related to the great earthquakes of 1823, 1868 and November 1975. During the 1975 M=7.6 earthquake, the coast at Kaimu Bay, presently inundated with lava, subsided about 11.5 feet (3.5 meters) while at Kapoho, six miles to the northeast, the land settled 0.8 feet (0.24 meters). At the subject property the land probably subsided about 0.8 ft. Subsidence is not only related episodically to normal faulting along the south Puna coast, but to isostatic sinking of the island. Caccamise et al. (2005) found the rate of sea level rise at Hilo Harbor to be 1.3 ± 0.2 in/yr (3.1± 0.6 mm/yr) since 1946 while estimates of annual subsidence rate in the Kapoho area lie in the range of 0.3-0.7 in/yr (0.8-1.7 cm/year, range represents two standard deviations) and a local value of sea level rise of 0.5±0.3 in/yr (13 ± 8 mm/yr, also two standard deviations) by Hwang and Brooks (2007). The County of Hawaii is certainly aware of this situation, which arguably poses a greater long-term threat to inundation of many south Puna coastal properties than the impacts of wave erosion.

2.2 Marine Conditions

In this area the shoreline faces the southeast (approx. 142°), but, more specifically, faces a more southerly direction (approx. 168°) in the vicinity of the Meurer property, as it is located on the western side of a broad headland about 2 miles wide. The shoreline in this area faces open ocean with no barrier or offshore reefs or bars. The submarine slope is approximately 1300 ft/mile (25%) for a distance of roughly 6 miles, descending into the deep water Puna Canyon.

The wave climate is the combination of conditions including wave energy, frequency, and topography of a specific site. Generally speaking, Lower Puna is completely sheltered from the north and northwest swells that batter the northern shores of the islands. Hurricane generated swells can have impacts on the Lower Puna coast as can tsunami generated waves. Storm waves associated with regional swells that impact the Lower Puna area can be classified into three types: (1) Northeast trade wind swells; (2) Kona storm waves; and (3) southerly swells. Figure 2 presents a diagram showing the prevalent swell directions impacting the Hawaiian Islands (Vitousek, S., et al. , 2009). During GCI's site visits it was apparent that trade wind swells were obliquely impacting the Meurer property shoreline while somewhat larger southerly swells were arriving more intermittently from the south-southwest.

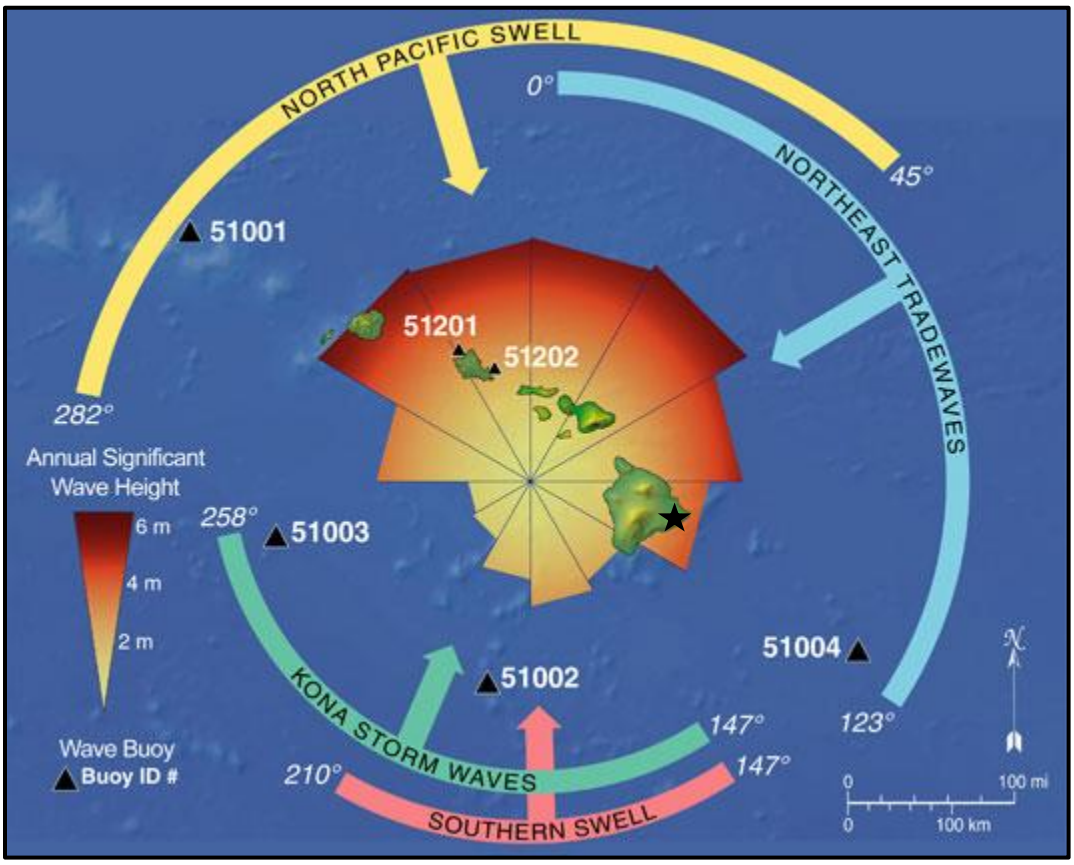

Figure 2. Wave Environment of Meurer property (indicated by black star).

2.3 Specific Site Setting

Geologic inspection of the property shows the native bedrock consist of ʻaʻā lava flows whose margins extend beyond the property boundary.

The shoreline frontage of the subject property is about 184 feet (56.1 meters) long, along a portion of coastline composed of a series of inlets or small embayments, largely boulder and cobble beaches, interrupted by ʻaʻā headlands, or promontories. The property is somewhat atypical of the surrounding coastline as it is apparently underlain by ʻaʻā lava flows, while the surroundings appear to be largely pahoehoe. The property is densely vegetated throughout with a small, graded lawn area covering roughly the eastern one-third of the property, and allowing access to the shoreline area. The western portion of the property is somewhat lower, about 6 feet (2 meters) than this lawn area.

The property's shoreline consists of portions of two boulder/cobble beaches that stretch beyond the property's boundaries, and two ʻaʻā lava points that bracket a third boulder/cobble beach (Figure 3). The ʻaʻā promontories extend beyond the shoreline by roughly 50-70 feet (15-21 meters). This configuration is most apparent in aerial photographs. The largest ʻaʻā promontory, extending from, and obviously supporting, the soil lawn area, has been undercut and forms an attractive sea arch. The promontories likely were pressure ridges formed at the edges of the ʻaʻā flow. Now, besides being useful to fishermen, they serve to both absorb and reflect wave energy, and reduce the shoreline erosion rate.

Notable vegetation includes a large number of coconut palms, similar to stands marking the sites of prehistoric Hawaiian settlements elsewhere in the Puna and Kaʻu districts. These trees span a range of ages, and those near or within the shoreline retain soil within their web-like root systems. Coastal erosion is most apparent where waves have undercut root-bound soil mats within the shoreline area.

The shoreline area fronting the Meurer property can be viewed as consisting of the following five distinct areas, from west to east, respectively (Table 1): (1) An area behind an ʻaʻā promontory at the western property border; (2) a cobble beach; (3) an ʻaʻā promontory supporting the soil shelf and lawn area; (4) a smaller cobble beach near the eastern property boundary; and (5) an ʻaʻā promontory extending beyond the edge of the eastern property boundary.

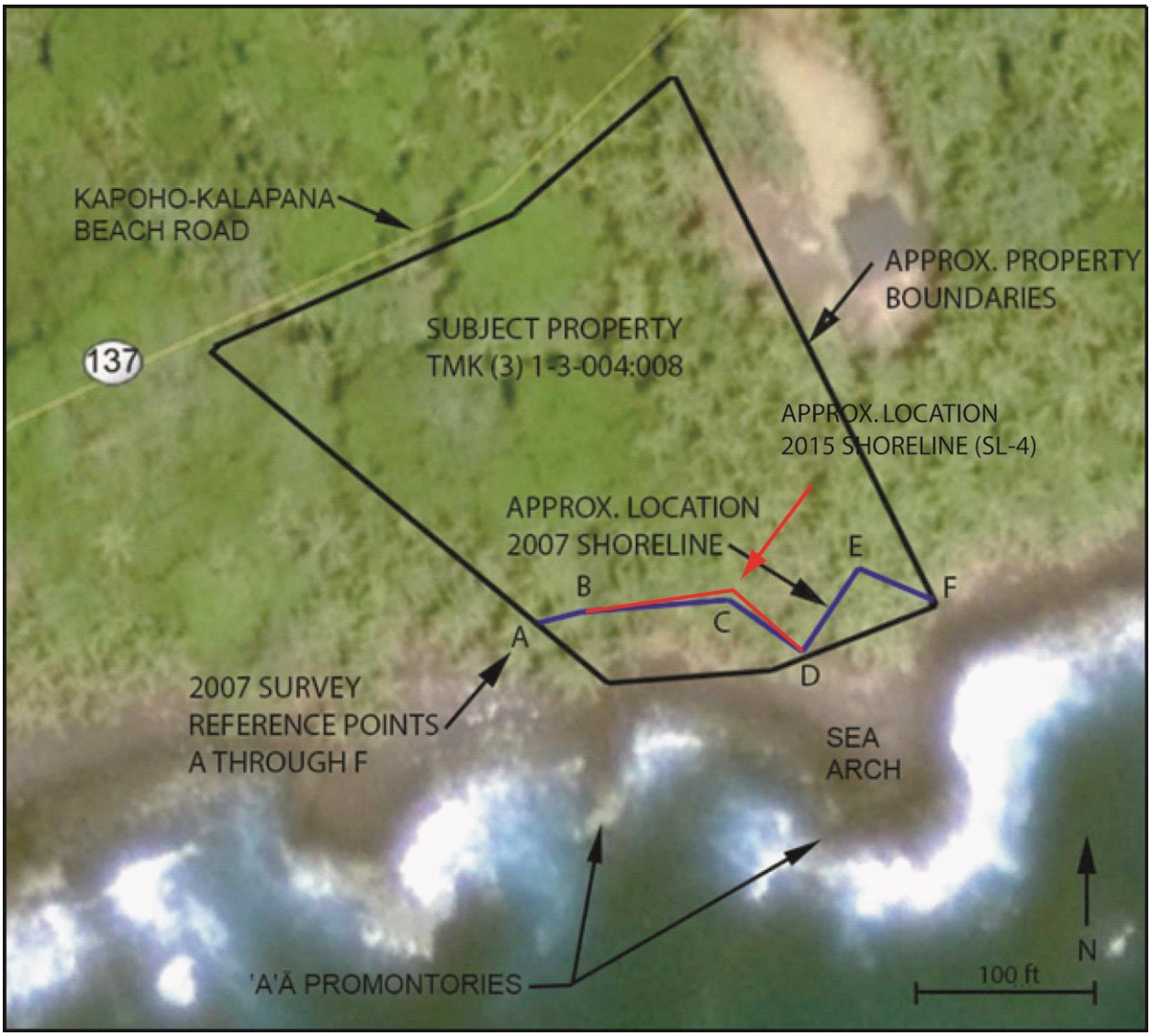

Figure 3. Meurer Property Layout

The shoreline fronting the property reflects several geologic features and shoreline processes. Small-scale topographic changes include the ʻaʻā promontories and a low area on the western portion of the subject property. Undercutting of the soil platform in the vicinity of point D, and the ʻaʻā promontory here was noted, as well as undercutting of a number of the coconut palm root mats in this area.

Table 1. Description of Primary Shoreline Features

Reference Points*	**Lateral Distance From PT "A" (approx.)**	**Feature Type**	**Geomorphological Description**
A (SL-6)	0	ʻaʻā promontory	Low ʻaʻā promontory cut behind by shoreline erosion at edge of boulder beach extending into adjacent property
B (SL-5)	40 ft	Cobble/Boulder beach	Composed of sub-round to sub-angular cobbles and boulders of approx. size range 4 – 24 in. Many round to sub-round cobbles have been transported to areas inland from the shoreline here as the subject property inland is at relatively low elevation compared to surroundings. The debris line here is very diffuse, approx. 16 ft, and almost entirely below the shoreline. A smaller, low-lying ʻaʻā promontory of maximum diameter of several feet extends into the ocean here, representing a more advanced state of weathering and shelf collapse.
C (SL-4)	100 ft	Cobble/boulder beach	As B above, but some sorting is seen within 1.5 meters of the edge of this beach, with smaller and more sub-round cobbles in this area of size range approx. 2.5 – 15 in. A number of coconut palms in this area have had their root balls undercut by wave action. The debris line here is very diffuse approx. 16 ft wide, and almost entirely below the shoreline.
D (SL-3)	115 ft	ʻaʻā promontory	This feature is the highest point of the shoreline area and supports a soil lawn area. The ʻaʻā promontory here extends more than 50 ft from the shoreline at approx. the same elevation. The adjoining soil platform on the west side has been undercut by wave action, forming a 5 ft deep cavity. This point has also been undercut, forming an attractive sea arch.
E (SL-2)	130 ft	Cobble/boulder beach	This smaller beach shows a distinct change in slope to the soil platform behind of about 3 ft.
F (SL-1)	165 ft	Edge of beach/ʻaʻā promontory	Eastern property corner. Also composed of a soil platform as described for E above, with an abrupt slope change to the cobble/boulder beach below.

* The designations "A-F" are points established in the 2007 shoreline survey. The 2015 shoreline points correspond to them with a single exception at point "C" and "SL-4". All field measurements were taken from the relocated 2015 pins (SL-1 through SL-6).

2.4 General Coastal Zone Hazards at this Property

Fletcher et al. (2002) rate the coastal zone hazards this area of the Puna coastline to be high for tsunami and volcanic/seismic hazards.

Table 2. General Coastal Zone Hazards

Hazard Type	**Relative Hazard**	**Scale (1-4)**
Tsunami	High	4
Stream Flooding	Low	1
High waves	Low-medium	2
Storms	Medium-high	3
Erosion	Low-medium	2
Sea Level Change	Low-medium	2
Volcanic/seismic	High	4

The high tsunami hazard for the subject property's shoreline is due to the relatively shallow coastal gradient, and the absence of any buffering structures offshore (i.e., barrier or broad fringing reefs, breakwaters, etc.), as well as the possibility of locally-generated tsunami. The high volcanic/seismic hazard is due to the subject property's proximity to the northeast rift zone of Kilauea volcano, which is also partly responsible for the seismic hazard.

3.0 Shoreline Erosion Rate Evaluation

3.1 Methodology

In order to evaluate the rate of shoreline erosion at the Meurer Property, we utilized information gained from field studies, aerial photographs, two provided certified shoreline surveys from 2007 and 2015, as well as other relevant information. Our field studies revealed pertinent characteristics of the property that provided a baseline over which apparent erosion could be evaluated. Undercutting of coconut palm root platforms provided some evidence. We also estimated the erosion rate by comparing aerial photographs taken more than 50 years apart, by direct comparison of the available shoreline surveys, and by dating based upon the published age of the underlying formation and the extent of embayment formation. We also profiled the beaches on the site, in an attempt to understand beach processes.

3.2 GCI Field Studies

GCI mobilized to the project site on September 30 and October 10, 2016. The tide state and wave conditions during our inspections, are summarized as follows:

Date of inspection:	September 30, 2016	October 10, 2016
Time:	0900-1200 HST	1000-1300 HST
Tide State:	Low: +0.32 ft (10 cm) @ 0842 HST	High: +2.3 ft (+75 cm) @ 1112 HST
Wave conditions:	Small to Moderate southeast trade wind swell	Moderate and intermittent trade wind southeast swell

In order to understand ongoing shoreline processes, beach profiles were measured from 2015 Shoreline Survey points "SL-5", "SL-4", and "SL-2" (these correspond to points B, C and E on Figure 3 and are referred to with those designations below). Transect bearings were orthogonal to shore. The three profiles show very similar slopes of 0.20 +/- 0.01 ft/ft (1 standard deviation). Slope "E" shows the abrupt grade change at the edge of the soil platform, and profile "B" shows a similar change in slope at the upper beach. Profile "C" however, shows a shallower slope on the upper beach, and a change in slope nearer the water, likely related to the lateral sorting of cobble sizes noted on this portion of the beach. This is likely due to sheltering of prevailing easterly trade-wind swell energy by the adjacent ʻaʻā promontory. So, all three beach profiles show evidence of a beach berm at different locations from the shoreline. The beach makai of points B and C appear different in the position of their berms because the bern makai of point C is reflective of a more mature beach, the berm being composed of beach material. The berm makai of point B, while on the same beach, is 15-20 feet inland, relatively. This appears to be because the near-shore are behind point B is lower-lying. However, it is clear that the three profiles are not equivalent and thus beach processes are somewhat distinct at different locations, also evidenced by the sorting of gravel/cobble size along the beach. We were unable to determine the thickness of the beach material but it undoubtedly varies widely across the varying topography of the underlying wave-beaten lava flow.

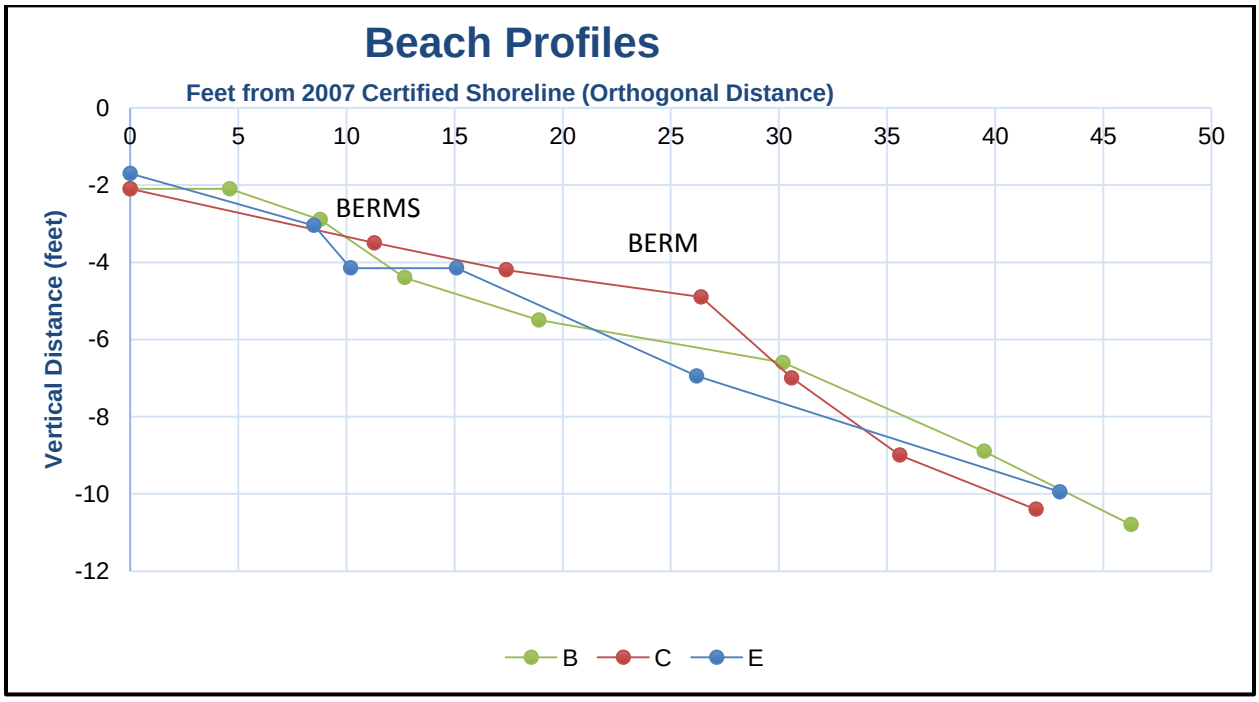

Figure 4. Beach Profiles Measured Orthogonally From Points "B", "C", and "E"

3.3 Coconut Palm Dating

Coastal erosion is displayed where waves have undercut root-bound soil mats beneath overhanging palms at the water's edge. Palm trees lack annual growth rings, as they are monocots, and lacking photos taken along shore over a number of years, the best one can do to determine a rough age for the coastal palms on the property. This is done by comparing the sizes of these trees with other specimens of *known* ages elsewhere. On this basis very rough minimal erosion rates may be determined along the coast of the Meurer property.

The documented shoreline erosion takes the form of undercutting and removal of soil mats by wave activity, accompanied by destruction or weakening of the vegetation that holds these soils in place. The toppling of a palm tree into the ocean, toward which most trees along this stretch of coast lean, could suddenly dislodge and remove soil matting as effectively as wave action over a longer period of time. Wave activity is the likely causal agent of tree toppling at the coastline.

Figure 5 illustrates one example of many palms along the shoreline fronting the Meurer property. A minimum erosion rate from such sites simply compares the degree of overhanging root platform, here about 24 inches (60 cm), with the roughly estimated age of the tree. A palm will typically grow 12 to 20 in/yr (30-50 cm/yr, Chan & Elevitch 2006). So, a 25 foot (7.5 m) tall tree, such as the one shown in this figure, would be 15-25 years old. The erosional undercutting rate in this instance, roughly 1.6 in/yr (4.0 cm/year), may be too low, however, because it does not take into account the possible presence of soil formerly extending shoreward of the base of the palm. We assume an error of 50% due to the possible presence of a soil platform on the makai side of the root platform. Since the certified shoreline mapped in 2007 fairly closely matches the position of these palms at present, a local erosion rate of no higher than approximately 0.13±0.07 ft/yr (4.0±0.2 cm/yr) is implied by this method of inquiry. Where root mats are less well developed, faster rates of back-cutting might be expected, possibly partly explaining the zig-zag pattern of erosion marking the shoreline soil limit.

Figure 5. Undercutting of Coconut Palm Root Platforms.

3.4 Comparison of Existing Conditions with 2007 and 2015 Shoreline Surveys

GCI was provided with two certified shoreline surveys dated September 2007 and October 2015 (Appendix I). Survey stakes and flagging tape related to this 2015 survey remained visible during this assessment and were used for mapping reference.

During our October 10, 2016 site visit, all of the points delineating the 2015 certified shoreline were observed and were observed to be consistently at the upper fringe of the diffuse region of vegetative debris. In this case, however, the debris was entirely composed of coconut palm fronds, and some fraction of them may not have been deposited by wave action. Instead they may have simply fallen in place. As coconut palms on the property are located in the upper shoreline area and near-shore area, with an open area with no trees behind the shoreline, GCI could not determine whether these fronds had been deposited by waves or had simply fallen into place, and coconut palm leaves, were spread out over a distance perpendicular to the shoreline of as much as 10-16 ft (3-5 meters). It is our opinion that wave debris may not accurately indicate the location of the shoreline during our site visits or, for that matter, during the shoreline surveys.

Direct comparison of the two shoreline surveys shows shoreline migration in the vicinity of point C (2015 survey: SL-4) of about 9.5 feet (2.9 meters). Taking both shoreline surveys at face value in spite of the limitation noted above, we assume a crescent-shaped portion of shoreline

migration from 2007 to 2015 over this portion of shoreline only. This implies total migration during this period of 4.75 feet (9.5 feet ÷2) over 46% (about 83 feet) of the approximately 180-foot shoreline frontage of the property, or ((9.5 feet ÷ 2) × 46%) ÷ 9 years = 0.25±0.08 ft/yr (7.4±2.5 cm/yr). We assume a measurement error of 33%. We consider this method to be reasonable, albeit limited, as localized shoreline migration of the sort noted in the 2015 shoreline survey, would only progress a limited extent before lateral infilling.

3.5 Shoreline "Encroachment" Method

A direct method of measuring the shoreline erosion rate is to estimate lateral change in the position of the shoreline given an assumed rate of sea level rise.

The three beach profiles yield a mean slope of 0.20 ± 0.01 (ft/ft) with a (percent relative standard deviation of 1.2). Given a rate of sea level rise of 0.8 in/yr (2.1 cm/year), using the one standard deviation high range from Hwang and Brooks (2007), yields a shoreline encroachment rate of 0.2 ±0.08 ft/yr (6.1±2.4 cm/yr). While application of this method to the more-shallow local slope of 3-4% would produce a greater rate, on the order of one ft/yr, it is our opinion that this would not be realistic as it would not consider the energy-buffering capacity of the beaches present.

3.6 Stereographic Imagery Inspection

We acquired a set of high quality aerial photographs of the subject property from the UH-Manoa Library from 1954, 1966, and GoogleEarth images from 2007 and 2011. A comparison of these images does not show any significant, discernable migration of the shoreline. Because of the resolution of these images, we can state that no more than about 16 feet of erosion could have occurred during this 62 year period. This resolution limit is defined by the minimum distance between two objects for their separation to be distinguishable. Therefore we are able to designate a maximum rate of shoreline erosion at 0.26 ft/yr.

3.7 Shoreline Retreat

Given the published minimum age for the formation present of 400 years (Moore and Trusdell 1991), and an estimated distance from the shoreline to the estimated edge of the lava shelf beyond the shoreline of 100 feet, based upon inspection of aerial imagery, we interpret a rate of shoreline retreat of 0.25±0.04 ft/yr (7.3±2.4 cm/yr). As above, the error here is based upon the resolution of the aerial photographs and amounts to 16 ft. (4.9 meters).

4.0 Findings and Conclusion

Site investigation of the Meurer property on the east coast of Puna revealed an elevated coastal shelf with gentle inlet development in a rocky shoreline of primarily ʻaʻā lava and related breccia. The shelf exhibits considerable strength and resistance to erosion, though evidence of undercutting and collapse over a period of centuries is plentiful. Aerial images show no clear evidence of significant erosion since the mid-1950s. Measured rates of tectonic subsidence and projected sea level rise do not appear to pose immediate threats (i.e.—within the coming few decades) to the shoreline of the subject property.

Table 3. Summary of Shoreline Erosion Estimation Methods

Method	**Rate**	**Type (Site-Specific or General)**	**Notes**
Coconut Palm Dating	0.13±0.07 ft/yr (4±2 cm/yr)	Site-Specific	Limited to areas with coconut palms.
Comparison of 2007 & 2015 Shoreline Surveys	0.25±0.08 ft/yr (7.4±2.5 cm/yr)	Site-Specific	Limited to areas of undercutting
Shoreline Encroachment	0.20±0.08 ft/yr (6.1±2.4 cm/yr)	General	Assumes SLR of 2.1 cm/yr
Stereographic Imagery Analysis	<0.26 ft/yr (<8 cm/yr)	Site-Specific	No quantifiable change in shoreline over baseline of 64 years.
Shoreline Retreat	0.25±0.05 ft/yr (7.3±1.4 cm/yr)	Site-Specific	Assuming a lava flow age of 400 years.

Note: All stated errors are one standard deviation.

Table 3 summarizes the findings of the five shoreline erosion rate methods. Combining these results, we find that the estimated average shoreline erosion rate is 0.21±0.05 ft/yr. This value does not include the maximum possible determined by image analysis, but the image analysis upper bound is consistent with our mean value of the shoreline erosion rate.

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APPENDIX

2007 and 2015 Shoreline Surveys

Environmental Assessment

Meurer Single-Family Residence in the Conservation District at ‘Opihikao

APPENDIX 3
Archaeological Inventory Survey/SHPD Letters

Errata: The statement within the project description on page 4 of the AIS that “the seaward portion of the project area is comprised of a shoreline easement that occupies 0.125 acres or 13% of the total project area” is incorrect, as there are no recorded easements, either public or private, over this portion of the property. The statement has no bearing on the findings of the study.

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Report 556-110607

ARCHAEOLOGICAL INVENTORY SURVEY
TMK: (3)1-3-04:08, LAND OF OPIHIKAO
PUNA DISTRICT, ISLAND OF HAWAI'I

Haun & Associates

Archaeological, Cultural, and Historical Resource Management Services
HCR 1 Box 4730, Keaau, Hawaii 96749 Phone: 982-7755 Fax: 982-6343

ARCHAEOLOGICAL INVENTORY SURVEY

TMK: (3)1-3-04:08, LAND OF OPIHIKAO

PUNA DISTRICT, ISLAND OF HAWAI'I

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December 2007

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SUMMARY

At the request of Mr. Robert Silacci, Haun & Associates conducted an archaeological inventory survey of the 0.958-acre TMK: (3) 1-3-04:08 located in the Land of Opihikao, Puna District, Island of Hawai'i. The objective of the survey was to satisfy historic preservation regulatory review inventory requirements of the Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD), as contained within Hawaii Administrative Rules, Title 13, DLNR, Subtitle 13, State Historic Preservation Rules.

The inventory survey resulted in the identification of two sites comprised of single walls. These walls are interpreted as historic livestock control features Based on their formal type and heights (greater than 1.0 m). The sites within the parcel are assessed as solely significant for their information content, and have yielded information important for understanding historic land use in project area. The mapping, written descriptions and photography of the two sites adequately document them and no further work or preservation is recommended.

CONTENTS

Introduction · 1

Scope of Work · 1

Project Area Description · 1

Field Methods · 4

Archaeological and Historical Background · 4

Historical Documentary Research · 4

Previous Archaeological Work · 11

Project Expectations · 14

Findings · 15

Conclusion · 19

Discussion · 19

Significance Assessments · 19

Recommended Treatments · 19

References · 20

ILLUSTRATIONS

Figure 1. Portion of USGS Pahoa South Quadrangle Showing Survey Area · 2

Figure 2. Bulldozed Road Cut and Berm · 3

Figure 3. Coconut Tree with Modern Stone Ring · 3

Figure 4. Project Area Vegetation · 5

Figure 5. Shoreline Area · 5

Figure 6. Ahupua'a Boundaries and Previous Archaeological Work · 6

Figure 7. Reg. Map No. 1411 · 8

Figure 8. Undated Map of Kehena Lots · 9

Figure 9. Portion of Wall's 1902 Map of Puna District · 10

Figure 10. Portion of Wall's 1915 Puna Gov't. Tracts Map · 11

Figure 11. Site Location Map · 16

Figure 12. Site 26265 Wall · 17

Figure 13. Site 26266 Wall · 17

Figure 14. ST 1 and 2 Soil Stratigraphy · 18

TABLES

Table 1. Previous Archaeological Work · 13

INTRODUCTION

At the request of Mr. Robert Silacci, Haun & Associates conducted an archaeological inventory survey of the 0.958-acre TMK: (3)1-3-04:08 located in the Land of Opihikao, Puna District, Island of Hawai'i - *Figure 1*). The objective of the survey was to satisfy historic preservation regulatory review inventory requirements of the Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD), as contained within Hawaii Administrative Rules, Title 13, DLNR, Subtitle 13, State Historic Preservation Rules (2003).

The survey fieldwork was conducted November 7, 2007 under the direction of Dr. Alan Haun. The fieldwork portion of the project required 1 person day to complete with a crew of one archaeologist. Described in this final report are the project scope of work, field methods, background information, survey findings, and significance assessment of the sites with recommended treatment.

Scope of Work

Based on DLNR-SHPD rules for inventory surveys, the following specific tasks were determined to constitute an appropriate scope of work for the project:

1. Conduct background review and research of existing archaeological and historical documentary literature relating to the project area and its immediate vicinity--including examination of Land Commission Awards, *ahupua'a* records, historic maps, archival materials, archaeological reports, and other historical sources;

2. Conduct a high intensity, 100% pedestrian survey coverage of the project area;

3. Conduct detailed recording of all potentially significant sites including scaled plan drawings, written descriptions, and photographs, as appropriate;

4. Conduct limited subsurface testing (manual excavation) at selected sites to determine function if necessary;

5. Analyze background research and field data; and

6. Prepare and submit Final Report.

Project Area Description

The project area consists of a roughly rectangular-shaped 0.958-acre parcel located in the Land of Opihikao. The Kapoho-Kalapana Road borders the parcel along the north-northwest side, with the ocean located along the south and south-southeast side. A stone wall forms the east-northeastern boundary and undeveloped land is located to the southwest. The project area ranges in elevation from c. 10 to 25 ft. Rainfall in the area ranges from 60 to 100 inches per year (Juvik and Juvik 1998:57).

The project area has been impacted by modern activity. A metal gate is present in the northern corner of the parcel, seaward of the Kapoho-Kalapana Road. This gate is located at the inland end of a bulldozed road cut that leads towards the shoreline. The road cut is 58.0 m long (north-south) and from 2.5 to 4.8 m wide. A linear berm of stones and soil is located along the western side of the road cut, apparently created during the dozing of the road (*Figure 2*). Another indication of the modern use of the parcel consists of a circular ring of piled cobbles and small boulders that is built around the base of a coconut tree (*Figure 3*). This ring is 3.3 m in diameter and 0.3 to 0.4 m in height. Though moss is growing on several of the stones, others are free of moss, indicating that the ring is recent.

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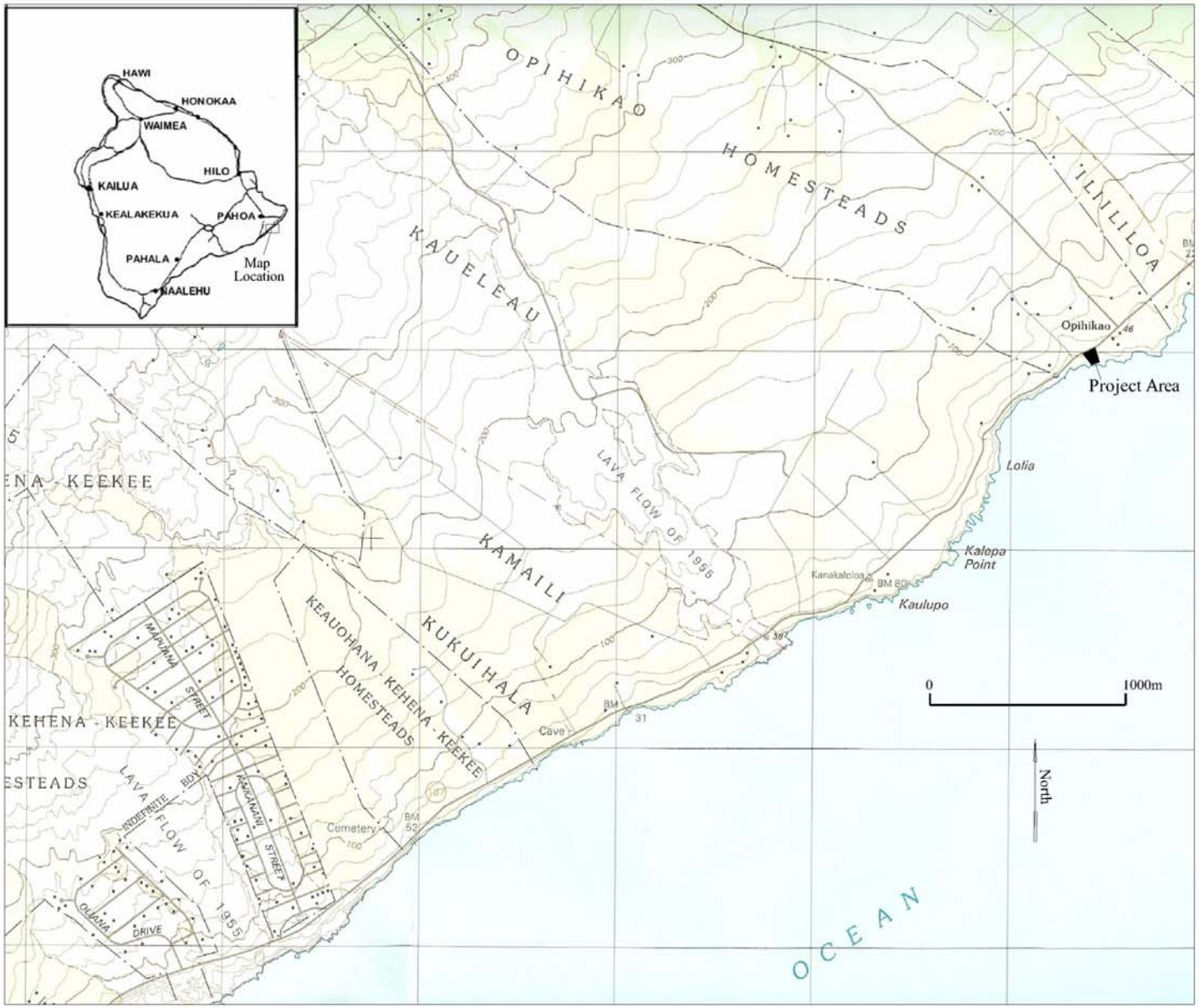


Figure 1. Portion of 1994 Pahoa South Quadrangle showing Project Area

Figure 2. Bulldozed Road Cut and Berm, view to south

Figure 3. Coconut Tree with Modern Stone Ring, view to south

The topography within the project area is relatively level with the ground surface comprised of soil and exposed outcrops. The soil within the project area is comprised of Malama extremely stony muck on 3-15% slopes (Sato et al. Sheet 147). This soil is typified by a thin very dark brown very stony muck over fragmented a'a lava. It has a rapid permeability, a slow runoff and a slight erosional hazard. Sato et al. indicate that this soil is most commonly used for woodland, pasture and orchards (1973:37). The substrate in this area consists of lava from Kilauea Volcano that was deposited 400 to 750 years ago (Wolfe and Morris 2001:10 and Sheet 2).

Ag Services, Inc. of Salinas, California conducted a vegetation study within the project area (see *Figure 11*). This study identified several species of trees within the project area, consisting of coconut palms (*Cocos nucifera* L.), monkeypod (*Samanea saman* [Jacq.] Merr.) java plum (*Eugenia cuminii* [L.] Pruce), *kukui* (*Aleurites* moluccana) and guava (*Psidium guajava* L.). The understory is comprised of ferns and vines. An example of the project area vegetation is depicted in *Figure 4.*

The seaward portion of the project area is comprised of a shoreline easement that occupies 0.125-acres or 13% of the total project area (see *Figure 11*). This area is comprised of waterworn basalt boulders and cobbles that have been washed on shore by wave activity (*Figure 5*). This shoreline easement was certified by the Board of Land and Natural Resources in 2007.

Field Methods

The project area was subjected to a 100% surface examination with the surveyor conducting 10 m wide sweeps. The transects were oriented in a north-northwest by south-southeast direction, perpendicular to the Kapoho-Kalapana Road. Ground surface visibility during the survey was good to excellent due to the high canopy of large trees throughout the parcel.

The sites within the parcel consisted of two stone walls. These sites were flagged with pink and blue flagging tape. Due to the dense canopy, Global Positioning System technology could not be utilized to locate the sites. The sites were located on a survey map provided by the landowner by establishing a base line that extended along the eastern project area boundary. Perpendicular measurements were then made from the baseline to the identified wall sites. These features were recorded by plotting their extents on the site location map, by the completion of standardized site/feature forms and photographic documentation.

Subsurface testing during the project consisted of the excavation of two 0.3 m diameter shovel tests. The shovel tests were excavated within a single stratigraphic layer and were terminated on bedrock. Standardized excavation records were prepared after the completion of each stratigraphic layer. The fill removed during excavation was screened through ¼" mesh. Following the excavations, a section drawing depicting the stratigraphy was prepared, post-excavation photographs were taken, and the units were back-filled. No cultural remains were recovered from the shovel tests or from the surface of the sites and no laboratory analysis was conducted.

ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

Historical Documentary Research

The project area is situated in the *ahupua'a* of Opihikao in Puna District (*Figure 6*). There is little mention of Opihikao in Hawaiian traditional and legendary accounts. Crozier and Barrere (1971) note that in Puna, few pre-missionary traditions and legends survived because of intensive mission work by Reverend Titus Coan between 1835 and the 1870s. Emory et al. (1959) suggest that Puna's traditional history is difficult to follow because of the dominating influence of the ruling families in the neighboring districts of Hilo and Ka'u. Handy and Handy (1972:542) state that Hawaiian traditions suggest that Puna "was once Hawaii's richest agricultural region and that it is only in relatively recent time that volcanic eruption has destroyed much of its best land".

Figure 4. Project Area Vegetation, view to southwest

Figure 5. Shoreline area, view to west

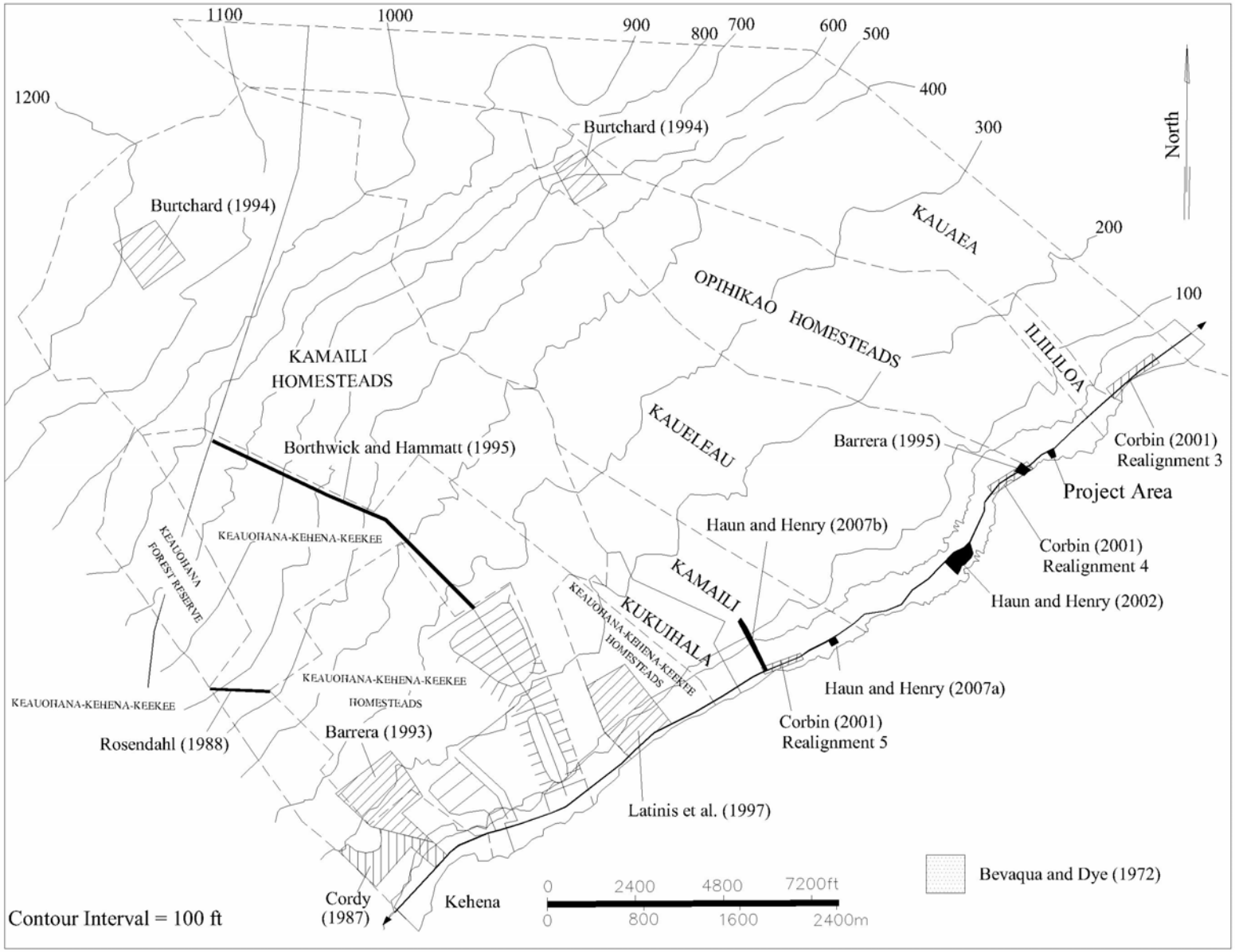


Figure 6. Ahupua`a Boundaries and Previous Archaeological Work

Hawaii (Kamakau 1961). Hua‘a was killed during a battle with one of ‘Umi’s warrior sons, Pi‘i-mai-wa‘a, at Kuolo in Kea‘au. Kalani`opu`u unified his control over Hawaii Island when he gained control of Ka‘u and Puna following Alapa‘i’s defeat in a battle at Mahinaakaka. During Kalani`opu`u’s rule, the Puna chief, I-maka-koloa, attempted a rebellion and seized the valuable products of the district including *‘o‘o* and *mamo* bird features, hogs, fine mats made from pandanus blossoms and from young pandanus leaves, gray tapa cloth, and tapa cloth made from *mamaki* bark (Kamakau 1961).

Following the death of Kalani`opu`u, in 1782, a dispute over ascendancy ensued culminating in the battle of Moku‘ohai (Kamakau 1961, Kuykendall 1938). Following the battle, control over the island was divided between Keoua Ku‘ahulu‘ula, who held Ka‘u and a portion of Puna; Keawema‘uhili, who controlled the remainder of Puna, Hilo, and southern Hamakua; and Kamehameha, who controlled northern Hamakua, Kohala, and Kona. A feud between Keoua and Keawema‘uhili in 1785, resulted in Keawema‘uhili’s death and the expansion of Keoua’s territory, including the unification of Puna. The island was finally re-unified in 1791 when Kamehameha killed Keoua at Kawaihae. In 1790, a lava flow extended diagonally across Kaueleau from the northeast above Opihikao to the coast at Kamaili (Wolfe and Morris 2001).

Early historic accounts document that Puna was well populated and intensively cultivated. In 1823, Ellis (1963) traveled along the coast from Kaimu to Kapoho, probably passing through the project area. At Kaimu, there was a sandy beach and village with an estimated 725 occupants. Also described, are plantations and groves of coconuts and *kou*. Ellis estimated that the population of Kaimu and nearby villages was approximately 2,000. Ellis described a village at Kamaili surrounded by plantations where they were given taro and potatoes. Other crops noted by Ellis in Puna included bananas and sugar cane.

The following summarizes Burtchard (1994) discussion of Puna’s later history. Prior to the 1870s, foreign influence in Puna primarily was limited to missionaries. In the late 1870s, Robert Rycroft moved to Pohoiki and built a home, wharf, sawmill, jail and courthouse. He later began growing coffee in the area and built a coffee mill. In the mid-1880s, the government began selling land in Puna for homesteads. Most of the homestead land was acquired for coffee cultivation in the 1890s.

Figures 7 and 8 depict lands at ‘Opihikao to be leased in 1892 and lots to be sold at Kehena, respectively. The ‘Opihikao land consisted of 1,500 acres to be auctioned for lease for a period of 25 years with an upset price of $200 per year. *Figure 8* is an undated map, probably dating to the late 1800s to early 1900s showing two lots for sale inland of Kehena Village. The map also shows that the land bordering the coast consisted of a patchwork of bare a‘a lava and a‘a covered with guava or pandanus. The main road parallels the shoreline.

Figure 9 is a portion of Wall’s 1902 map of Puna. The map shows at least twenty land grants; however most are illegible. *Figure 10* is a portion of Wall’s 1915 map of government lands in Puna. The map shows a coastal road and villages at ‘Opihikao and Kehena.

Puna Sugar Company was established in 1900 at Kapoho. Between 1900 and the 1930s, the population of the region grew dramatically with the expansion of sugar cane cultivation, pineapple production, the timber industry, and other commercial developments. In the early 1900s, the Hilo Railroad Company developed a rail system from Hilo Town to Puna. A section of the railway extended through the inland portion of Kaueleau (Burtchard 1994: Figure 11). In 1907, the Hawaiian Mahogany Lumber Co. was established by James B. Castle to provide railroad ties to the mainland United States. A mill was built at Pahoa and lands being cleared for sugar cane cultivation provided a steady supply of timber. The mill lost its contract to provide railroad ties in 1913 because the ties did not last as long as anticipated. The mill was leased for sugar plantation use in 1917.

By the late 1920s, concern over forest depletion and watershed maintenance lead to the creation of the Puna, Nanawale, and Malama-Ki Forest Reserves. Handy and Handy (1972) citing oral historical sources, indicate that in the 1930s there were homesteading areas in ‘Opihikao, Kaueleau, Kamaili, Ke‘eke‘e, Kehena, and Keauohana. Dry land taro was grown throughout the inland portions of these *ahupuaa‘a*. A particular taro cultivation method, *pa-hala,* is described for the area from Kalapana to Kamaili.

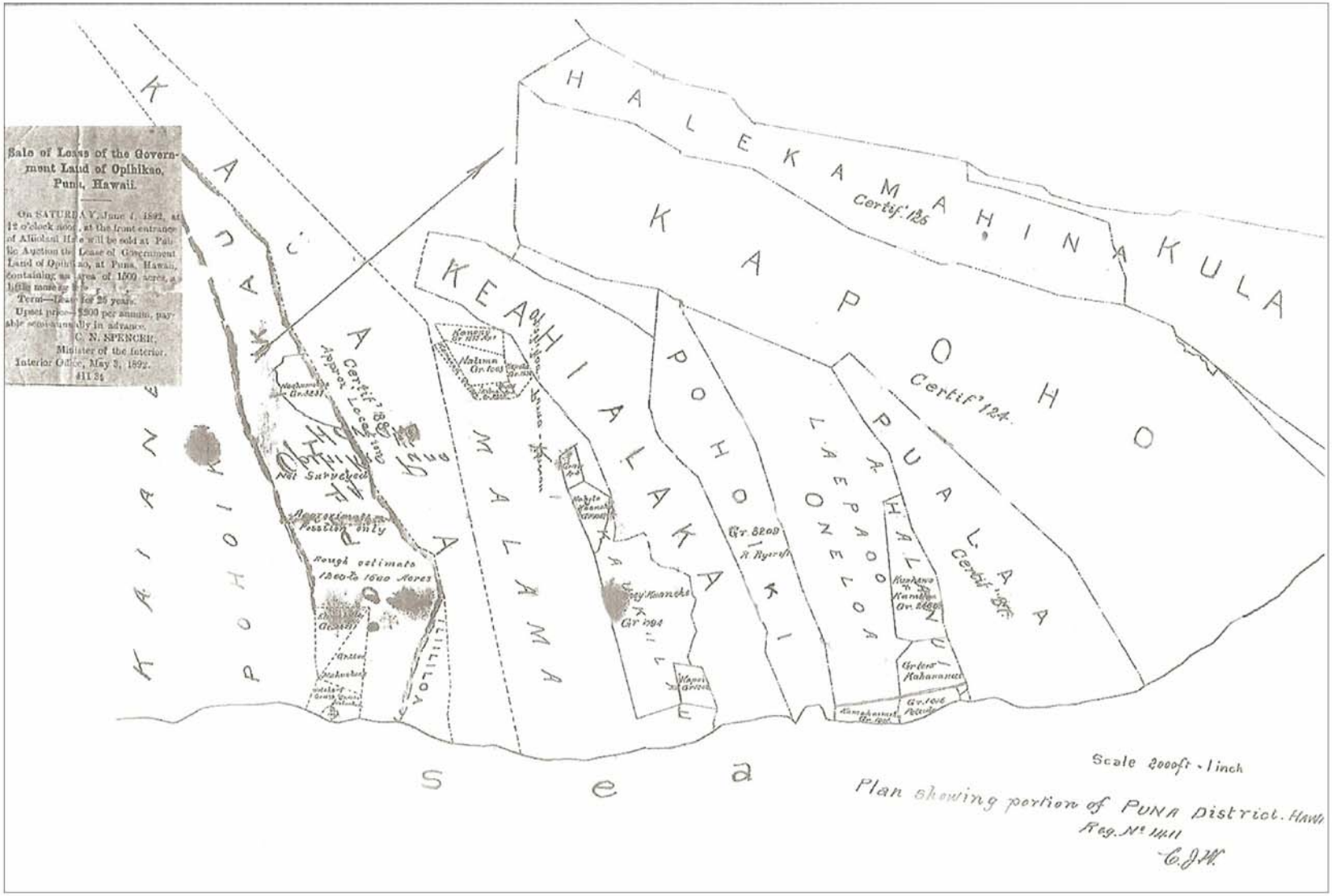


Figure 7. Reg. Map No. 1411

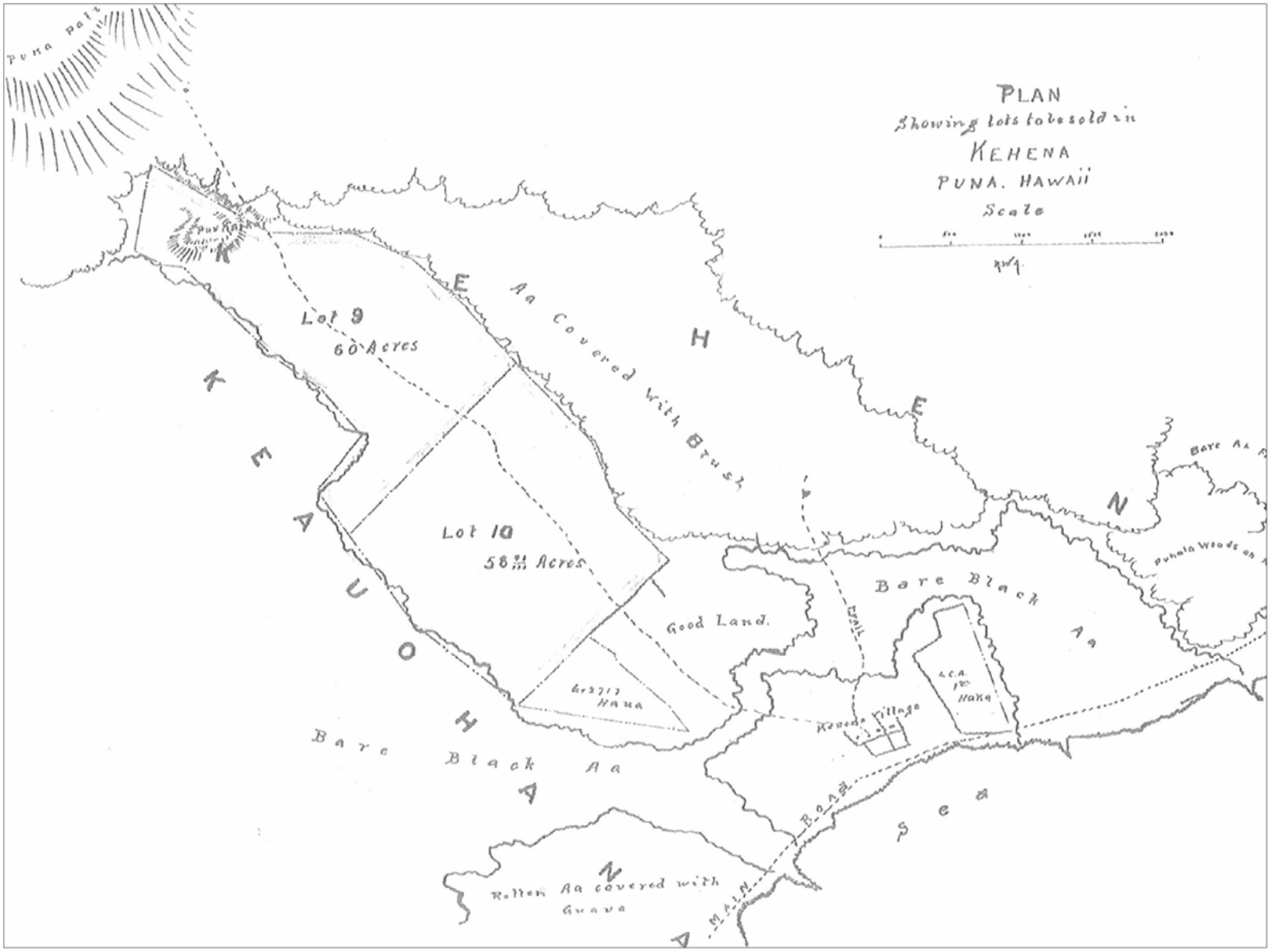


Figure 8. Undated Map of Kehena Lots

Figure 9. Portion of Wall's 1902 Map of Puna District

Figure 10. Portion of Wall's 1915 Puna Gov't Tracts Map

The method involved excavating a hole in a‘a lava in a pandanus grove. The hole was then filled with weeds, which were allowed to rot for six weeks or more. A taro cutting (*huli*) was wrapped in pandanus leaves and planted in the hole. After the cutting produced three or four leaves, the pandanus branches were cut to provide sunlight and the taro plant was covered with pandanus leaves. After the pandanus leaves were sufficiently dry, the leaves were burned reducing them ash that provided nourishment to the taro plant, which grew tall enough to hide a man beneath the leaves.

Puna Sugar Company continued in operation until the early 1980s. Beginning in the late 1950s, real estate development, along with tourism and diversified agriculture gradually replaced plantation agriculture in Puna.

Previous Archaeological Research

A search of the DLNR-SHPD archaeological report database and other sources identified 16 archaeological projects in between Kauaea and Kehena. *Figure 6* shows the project locations and *Table 1* summarizes the projects. Not included in the figure or table are the studies by Stokes (Stokes and Dye 1991), which focused on major sites, primarily *heiau* throughout Hawaii Island and a survey of east Hawaii by Hudson (1932).

Stokes (Stokes and Dye 1991), relying in part on the earlier observations of Thrum, reported fourteen *heiau* in Puna of which three were destroyed at the time of Stokes fieldwork in 1906. Several of the *heiau* were reported to be agricultural temples. Hudson (1932) reported 32 sites along the coast between Kapoho and Kaimu including the Hilo-Puna Trail, habitation platforms and enclosures, water sources (cave and well), windbreak shelters, and four *heiau*: Mahina‘akaka Heiau at Keahialaka, Kalepa at Kalepa Point, “Old” Wahaula Heiau at Kamaili, and Kumakaula at Ke‘eke‘e.

The surveys in *Table 1* cover nearly 640 acres of Puna between sea level and 1,540 ft elevation. Cultural remains identified by the surveys consist of 113 sites with over 900 features. To aid in reconstructing settlement patterns, features were quantified by probable age and function, and the studies are ordered by elevation. Traditional Hawaiian features were categorized as habitation, agricultural, burial (including possible burials), ritual, and trail. Features not assignable to these categories were categorized as miscellaneous. Traditional sites in this category include petroglyphs, *holua* slides, water sources, and *ahu*. Density values are given for sites, features, and habitation and agricultural features.

Overall, the studies have identified more than 76 habitation features, 314 agricultural features, 269 burials, 7 ritual features, and 18 trails. The large number of burials includes several historic cemeteries. Other historic features were not segregated by function. The majority of the historic features are walls and roads. None of the studies processed radiocarbon dates. With the exception of some small inland *kipuka* and a 1790 lava flow, the surface of the terrain in the vicinity of the project area is between 400 and 750 years old (Wolfe and Morris 2001). Thus, except for the *kipuka*, any evidence of occupation would postdate A.D. the mid-1200s to 1600s.

McEldowney (1979) primarily used historic documentary evidence to develop a land use and settlement pattern model for the windward Hilo area that is probably applicable to most of Puna. The model consists of five elevationally-defined zones: Coastal Settlement, Upland Agricultural, Lower Forest, Rainforest, and Sub-Alpine or Montane. The Coastal Settlement Zone extended approximately 0.5 miles inland from the shoreline between sea level and 50 ft elevation. The zone was the most densely populated with both permanent and temporary habitations, high status chiefly residences, and *heiau*. Settlements were concentrated at Hilo Bay and sheltered bays and coves. Also present were fishponds and gardens where breadfruit, coconut, *kukui*, banana, *wauke*, sugar cane, sweet potato, and wet and dryland taro were cultivated. The ocean provided fish and other marine resources.

The Upland Agricultural Zone was situated between approximately 50 ft and 1,500 ft elevation. Settlement in the zone consisted of scattered residences among economically beneficial trees and agricultural plots of dryland taro and bananas. Lava tubes were utilized for shelter. A pattern of shifting cultivation

Table 1. Previous Archaeological Work

Author	Land	Study Type*	Elevation	Acreage	No. of sites	Sites/ acre	No. of Feas.	Feas/ acre	Hab Feas	Hab Feas/ acre	Ag Feas	Ag Feas/ acre	Burial Feas	Ritual Feas	Trail	Misc	Historic Feas	Comment
Corbin (2001)	Kamaili, Kauaea, Kaueleau	IN	20-40	5.3	1	0.19	40	7.55			40	7.55	1					
Bevaqua and Dye (1972)	Kapoho-Kalapana	RN	20-40	151	48	0.32	426	2.82	61	0.40	many		156	3	5	188	7	Feature totals estimated, most not quantified in report; misc. incl. 165 petroglyphs
Haun and Henry (2007a)	Kamaili	IN	20-38	1	*		*											* = Identified portion of trail initially identified by Bevaqua and Dye (1972)
Haun and Henry (2007b)	Kamaili	IN	30-115	4.274	5	1.17	10	2.34									10	
Barrera (1995)	Kaueleau	DR	35-40	3	3	1.00	9	3.00	2	0.67							7	
Haun and Henry (2002)	Kaueleau	IN	80-100	7	0	0.00												
Cordy (1987)	Keauohana	RN	80-250	39	15	0.38	92	2.36		0.00	20	0.51	63		4		5	
Latinis, Moore and Kennedy (1997)	Keekee	IN	100-300	94	6	0.06	128	1.36	3	0.03	88	0.94	24	3	4	2	4	
Barrera (1993)	Keauohana	RN	120-300	66	1	0.02	167	2.53	5	0.08	150	2.27	3				9	
Borthwick and Hammatt (1995)	Kamaili, Keekee, Kehena, Keauohana	AS	280-860	9.99	0													
MLK Rosendahl (1988)	Keauohana and Kehena	FI	540-620	1.7	0													
Burtchard (1994)	various	RN	650-1200	247	34	0.14	65	0.26	5	0.02	16	0.06	22	1	5	8	11	
Bonk (1989, 1990)	Kaimu, Makuu, Kaohe, Kehena, Kaapahu and Mamaili	RN/ MON	1480-1540	10	0													
Total/Average				**639.26**	**113**	**0.36**	**937**	**2.78**	**76**	**0.20**	**314**	**2.27**	**269**	**7**	**18**	**198**	**53**	

is believed to have converted the original forest cover to parkland of grass and scattered groves of trees. Wetland cultivation of taro occurred along streams.

The Lower Forest Zone ranged from 1,500 ft to 2,500 ft elevation. Timber and other forest resources such as medicinal plants, *olona*, and birds were gathered from the zone. Site types consisted of temporary habitations, trials, shrines, and minor agricultural features in forest clearings and along streams. Sites in the Rainforest Zone (2,500-5,000 ft elevation) and Subalpine or Montane Zone (5,000-9,000 ft) were limited to trails and associated temporary habitations. These zones were used for intra-island travel and gathering of valued resources including hardwoods, birds, and stone for tool making.

The project area is situated within the area previously examined by Bevaqua and Dye (1972). No sites were identified within the Land of Opihikao during this study.

PROJECT EXPECTATIONS

Based on historic documentary research and previous archaeological work prehistoric use of coastal Kamaili likely included habitation, burial, ritual, and fishing and collecting of marine resources based on McEldowney's (1979) model. Historic sites dating to the 1900s would consist of roads, ranching related features, and habitations.

FINDINGS

The survey resulted in the identification of two sites. These sites consist of a wall that forms the east-northeastern project area boundary (Site 26265) and an L-shape wall situated in the southeastern corner of the parcel (Site 26266). Additionally, two 0.3 m diameter shovel tests were excavated within the project area to determine if subsurface cultural deposits were present. The location of the two sites and the two shovel tests are presented in *Figure 11.*

Site 26265

Site 26265 is a linear stone wall that extends along the east-northeastern boundary of the project area. The wall originates at the northeastern corner of the parcel adjacent to the Kalapana-Kapoho road and extends 63.0 m to the south-southeast where it terminates 9.5 m inland from the shoreline. The wall is generally collapsed though stacked sections are present, indicating its original method of construction. The wall ranges in width from 0.7 to 1.1 m and in height from 0.5 to 1.05 m (*Figure 12*). The wall is constructed predominately of subangular basalt cobbles and small boulders, though waterworn basalt stones are incorporated into its length in the seaward portion. No cultural remains were found in association with the wall.

The wall angles to the northeast at the northern end, following the seaward side of the Kalapana-Kapoho Road. This indicates that the Site 26265 wall encloses the parcel of land to the east of the present project area (TMK: 1-3-04:07 – see *Figure 11*). The wall does not appear to border this parcel along its seaward side. Site 26265 is interpreted as an historic livestock control feature likely used to prevent grazing cattle from entering the adjacent parcel. This is based on the height of the intact sections and its location on the boundary of the adjacent TMK: 1-3-04:07. The site is unaltered and in poor to fair condition.

Site 26266

Site 26266 is an L-shaped stone wall that is situated in the southeastern portion of the project area. The wall originates 2.8 m west-southwest of the Site 26266 wall and extends 9.5 m in this direction to where a 2.0 m wide gap is encountered. The wall is present on the west side of the gap, though it angles to the southwest for 13.5 m where it terminates. This gap was likely created during the bulldozing of the road cut that extends through this portion of the project area

As at Site 26265, the wall is mostly collapsed with some remnant stacking present. The wall varies in width from 0.8 to 1.0 m and in height from 0.5 to 0.8 m (*Figure 13*). It is constructed mostly of subangular basalt cobbles and small boulders though waterworn stones are also present. No cultural remains were observed in association with the wall.

The Site 26266 wall forms a roughly U-shaped enclosure open towards the ocean, with Site 26265 wall forming the eastern side. This enclosed area measures 14.2 m long (north-northwest by south-southeast) and from 8.5 to 13.3 m wide. The interior of this enclosed space is comprised of a level soil with scattered cobbles and several coconut trees. A 0.3 by 0.3 m shovel test pit (ST-1) was excavated within the interior, revealing a single soil deposit over bedrock (*Figure 14*). Layer I consisted of 0.12 m of a dark brown (10YR 3/3) silty clay with 30% gravel inclusions. The soil was very moist and contained numerous small roots, though no cultural remains were present. Site 26266 is interpreted as a probable historic livestock control feature that may have served as an animal pen. This is based on its formal type and the height of the wall and on the absence of surface and subsurface habitation debris. The site is altered and in poor to fair condition.

A second shovel test was excavated in the north-central portion of the project in an area of level soil that was relatively free of surface stones. This shovel test (ST-2) revealed soil stratigraphy nearly identical to that observed in ST-1 (see *Figure 14*). Layer I in this unit consisted of 0.14 m of the dark brown silty clay soil, over bedrock. Layer I in this shovel test was also moist and contained 10-20% gravel inclusions. No cultural remains were present in ST-2.

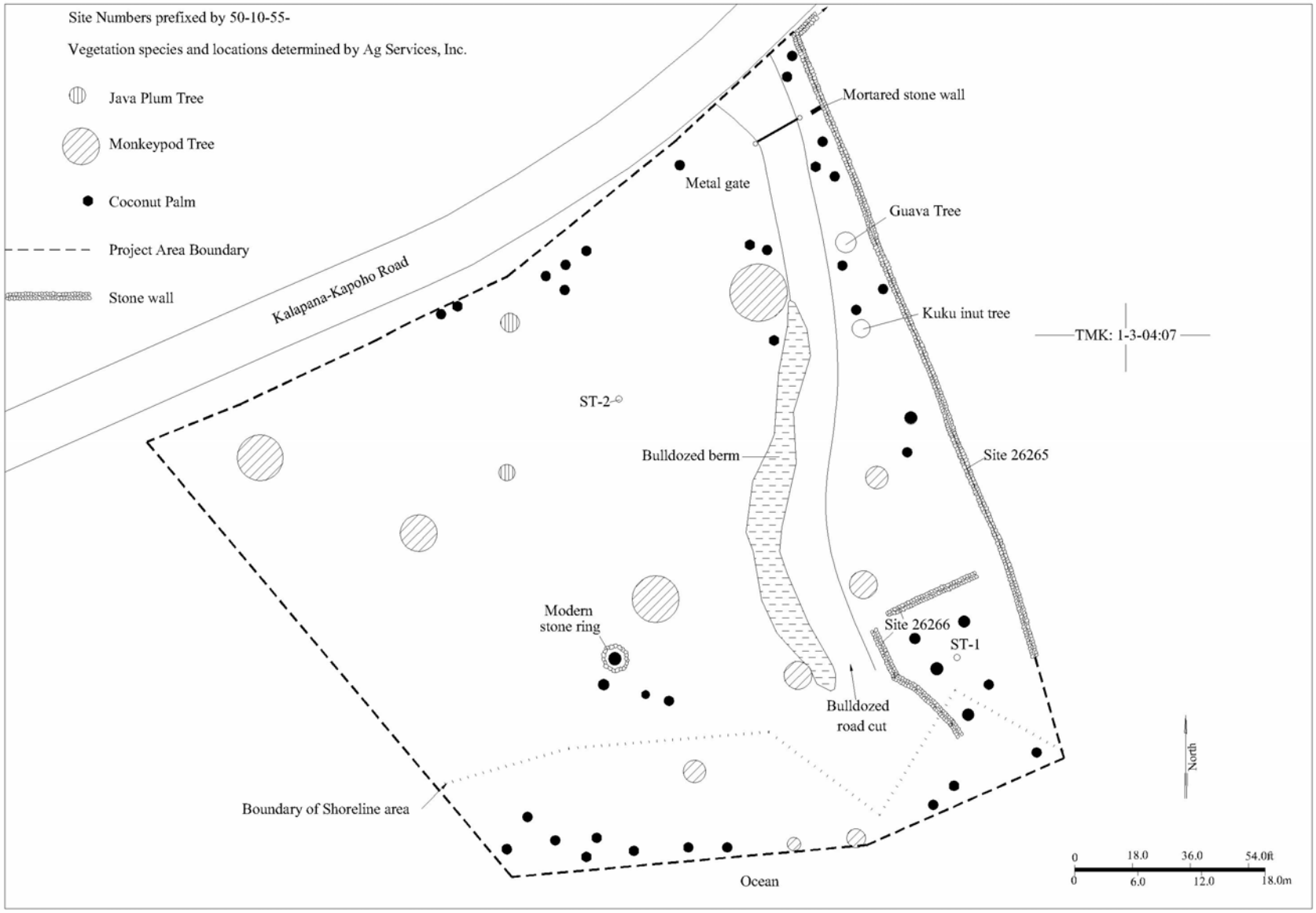
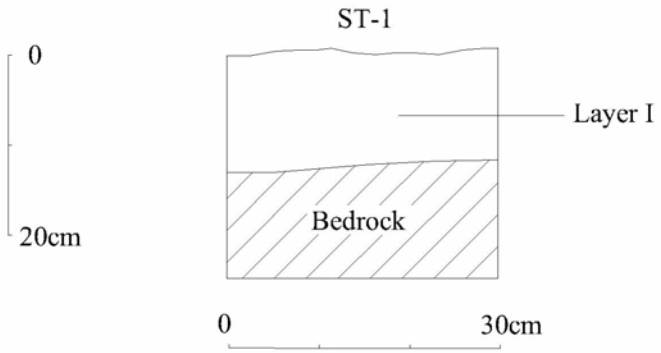


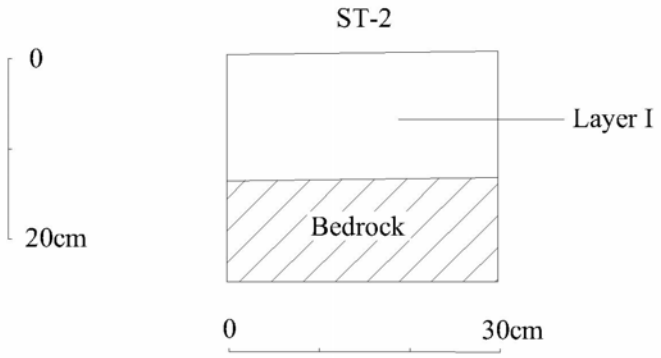
Figure 11. Site Location Map

Figure 12. Site 26265 Wall, view to east-southeast

Figure 13. Site 26266 Wall, view to north-northeast



Layer I: Dark brown (10YR3/3) silty clay
with 30% gravel inclusions;
No cultural remains



Layer I: Dark brown (10YR3/3) silty clay
with 10-20% gravel inclusions;
No cultural remains

Figure 14. ST 1 and 2 Soil Stratigraphy

CONCLUSION

Discussion

The absence of traditional habitation, ritual, and burial features in the parcel is likely due to several factors: (a) the presence of coastal bluffs seaward of the parcel that would make landing a canoe difficult, (b) prior disturbance associated with the historic utilization of the parcel for ranching activity and (c) the thin soil present throughout the study area.

The sites within the parcel are associated with historic ranching activity in the area. These walls likely functioned to restrict the movement of livestock based on the height (greater than 1.0 m) of the remnant intact sections.

Significance Assessments

Pursuant to DLNR (2003) Chapter 275-6 (d), the initial significance assessments provided herein are not final until concurrence from the DLNR has been obtained. Sites identified during the survey are assessed for significance based on the criteria outlined in the Rules Governing Procedures for Historic Preservation Review (DLNR 2003, Chapter 275). According to these rules, a site must possess integrity of location, design, setting, materials, workmanship, feeling, and association and shall meet one or more of the following criteria:

1. Criterion "a". Be associated with events that have made an important contribution to the broad patterns of our history;

2. Criterion "b". Be associated with the lives of persons important in our past;

3. Criterion "c". Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;

4. Criterion "d". Have yielded, or is likely to yield, information important for research on prehistory or history; and

5. Criterion "e". Have an important traditional cultural value to the native Hawaiian people or to another ethnic group of the state due to associations with traditional cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts--these associations being important to the group's history and cultural identity.

Based on the above criteria, the two sites within the project area are assessed as solely significant under Criterion "*d"*. These sites have yielded information important for understanding historic land use in project area.

Recommended Treatments

The mapping, written descriptions and photography of the two sites adequately document them and no further work or preservation is recommended.

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March 17, 2008

Alan Haun, Ph.D.
Haun and Associates, Inc.
HCR 1 Box 4730
Kea`au, HI 96749

LOG NO: 2008.0392
DOC NO: 0803TS16
Archaeology

Dear Dr. Haun:

SUBJECT: Chapter 6E-42 Historic Preservation Review – Archaeological Inventory Survey of Silacci Property Opihikao Ahupua'a, Puna District, Island of Hawai'i TMK: (3) 1-3-04:08

Thank you for the opportunity to comment on the aforementioned project by Haun and Associates, Inc. (Haun and Henry 2007) which we received on January 02, 2008.

This Archaeological Inventory Survey investigated 0.958 acres along the coastline near Opihikao and reports on the identification of two (2) new sites. Both of these sites are stacked rock wall alignments, likely used in historic livestock control.

The report adequately describes the physical project area. The background section reviewing previous archaeological work in the vicinity is thorough. We believe the survey has covered the entire area of the property including an effort to identify subsurface features through limited shovel testing. The descriptions of historic properties are acceptable and we concur with the evaluations of significance. Both identified sites are evaluated as significant under criterion "d" only, and require no further work.

The report satisfies the requirements of Hawaii Administrative Rules Chapter 13-276. We approve of the report as final, concur with its recommendations and conclude that the historic preservation review end here.

Please contact Assistant Hawaii Island Archaeologist, Tim Scheffler ((808) 981-2979 or, timothy.e.scheffler@hawaii.gov) if you have any questions or concerns regarding this letter.

Aloha,

Nancy McMahon, Acting Archaeology Branch Chief
State Historic Preservation Division

TS

cc- Mr. Robert Silacci, 820 Park Row #680, Salinas, CA 93901.

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Environmental Assessment

Meurer Single-Family Residence in the Conservation District at ‘Opihikao

APPENDIX 4
Cultural Impact Assessment

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SCS Project Number 1965-CIA-1

A CULTURAL IMPACT ASSESSMENT OF COASTAL LANDS IN KANANE AND ‘OPIHIKAO AHUPUA‘A, PUNA DISTRICT, ISLAND OF HAWAI‘I [TMK: (3) 1-3-004:008]

Prepared By:
Glenn G. Escott, M.A.

DRAFT REPORT
December 2016

Prepared For:
William Meurer
701 Linda Vista Drive
Pasadena, CA 91105

SCIENTIFIC CONSULTANT SERVICES Inc.
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TABLE OF CONTENTS

TABLE OF CONTENTS i

LIST OF FIGURES ii

LIST OF TABLES ii

INTRODUCTION 1

METHODOLOGY 5
- ARCHIVAL RESEARCH 6
- INTERVIEW METHODOLOGY 6
- PROJECT AREA NATURAL ENVIRONMENT 8

HISTORICAL AND CULTURAL CONTEXTS 8
- TRADITIONAL SETTLEMENT PATTERNS, SUBSISTENCE, AND LAND-USE 9
- THE *MĀHELE* OF 1848 AND LAND COMMISSION AWARDS 10
- CHANGING RESIDENTIAL AND LAND-USE PATTERNS (1845–1865) 10
- THE PUNA TRAIL AND OLD GOVERNMENT ROAD 13
- SUGARCANE AND THE RAILROAD 14
- FISHING PRACTICES 20

PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS 21

CULTURAL INFORMANT INTERVIEWS 24

SUMMARY 25

CIA INQUIRY RESPONSE 26

CULTURAL ASSESSMEMNT 27

REFERENCES CITED 28

APPENDIX A: PUBLIC NOTICES AND AFFIDAVITS 1

LIST OF FIGURES

Figure 1: 5,500 K-Series Map of Hawai‘i Showing Location of Project Area (National Geographic Topo!, 2003. Sources: National Geographic Society, USGS). 1
Figure 2: 7.5-Minute Series USGS Topographic Map Showing Location of Project Area (Pāhoa South Quad, ESRI, 2013. Data Sources: National Geographic Society, USGS). 2
Figure 3: Aerial Photograph Showing Project Area ‘Opihikao, Hawai‘I, WSGS84 Datum, Zone 5 North, 302400 m E, 2148957 m N (Google Earth, 2016. Image Date: 2009. Data Sources: Digital Globe, GeoEye, Earthstar, USDA, and USGS). 3
Figure 4: Portion of TMK: (3) 1-3 Map Showing Project Area and Land Grants Within ‘Opihikao Ahupua‘a (Hawai‘i County Planning Department 2016). 11
Figure 5: Portion of Puna District Map Showing Location of Project Area, Land Boundaries, Roads, and Trails (adapted from Cook 1902). 12
Figure 6: 7.5-Minute Series USGS Topographic Map Showing Location of Project Area and Previous Archaeological Studies (Pāhoa South Quad, ESRI, 2013. Data Sources: National Geographic Society, USGS). 22
Figure 7: Plan View Map of Project Area Archaeological Sites (Haun and Henry 2007:16). 23

LIST OF TABLES

Table 1: Individuals Responding to CIA. 24

INTRODUCTION

At the request of William Meurer, Scientific Consultant Services, Inc. (SCS) conducted a Cultural Impact Assessment (CIA) of a 0.958-acre parcel [TMK: (3) 1-3-004:008] located in ‘Opihikao Ahupua‘a, Puna District, Island of Hawai‘i (Figures 1, 2, and 3). The project area is located along the coast in ‘Opihikao and is bounded by Kapoho-Kalapana Road (Route 137) to the northwest, by undeveloped property to the northeast and southwest, and by the Pacific Ocean to the southeast. The parcel is currently undeveloped land that has been cleared and partially landscaped. There is a rock wall along the east/northeast property boundary and a metal gate in the northern corner of the property. The CIA was undertaken as part of the landowner's application for a Special Management Area (SMA) permit. The landowner’s address is 701 Linda Vista Drive Pasadena, CA 91105.

The Constitution of the State of Hawai‘i clearly states the duty of the State and its agencies is to preserve, protect, and prevent interference with the traditional and customary rights of native Hawaiians. Article XII, Section 7 requires the State to “protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by *ahupua‘a* tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778” (2000). In spite of the establishment of the foreign concept of private ownership and western-style government, Kamehameha III (Kauikeaouli) preserved the people's traditional right to subsistence.

As a result, in 1850 the Hawaiian Government confirmed the traditional access rights to native Hawaiian *ahupua‘a* tenants to gather specific natural resources for customary uses from undeveloped private property and waterways under the Hawai‘i Revised Statutes (HRS) 7-1. In 1992, the State of Hawai‘i Supreme Court, reaffirmed HRS 7-1 and expanded it to include, “native Hawaiian rights…may extend beyond the *ahupua‘a* in which a native Hawaiian resides where such rights have been customarily and traditionally exercised in this manner” (Pele Defense Fund v. Paty, 73 Haw.578, 1992). Act 50, enacted by the Legislature of the State of Hawaii (2000) with House Bill 2895, relating to Environmental Impact Statements, proposes that:

> …there is a need to clarify that the preparation of environmental assessments or environmental impact statements should identify and address effects on Hawai‘i’s culture, and traditional and customary rights… [H.B. NO. 2895].

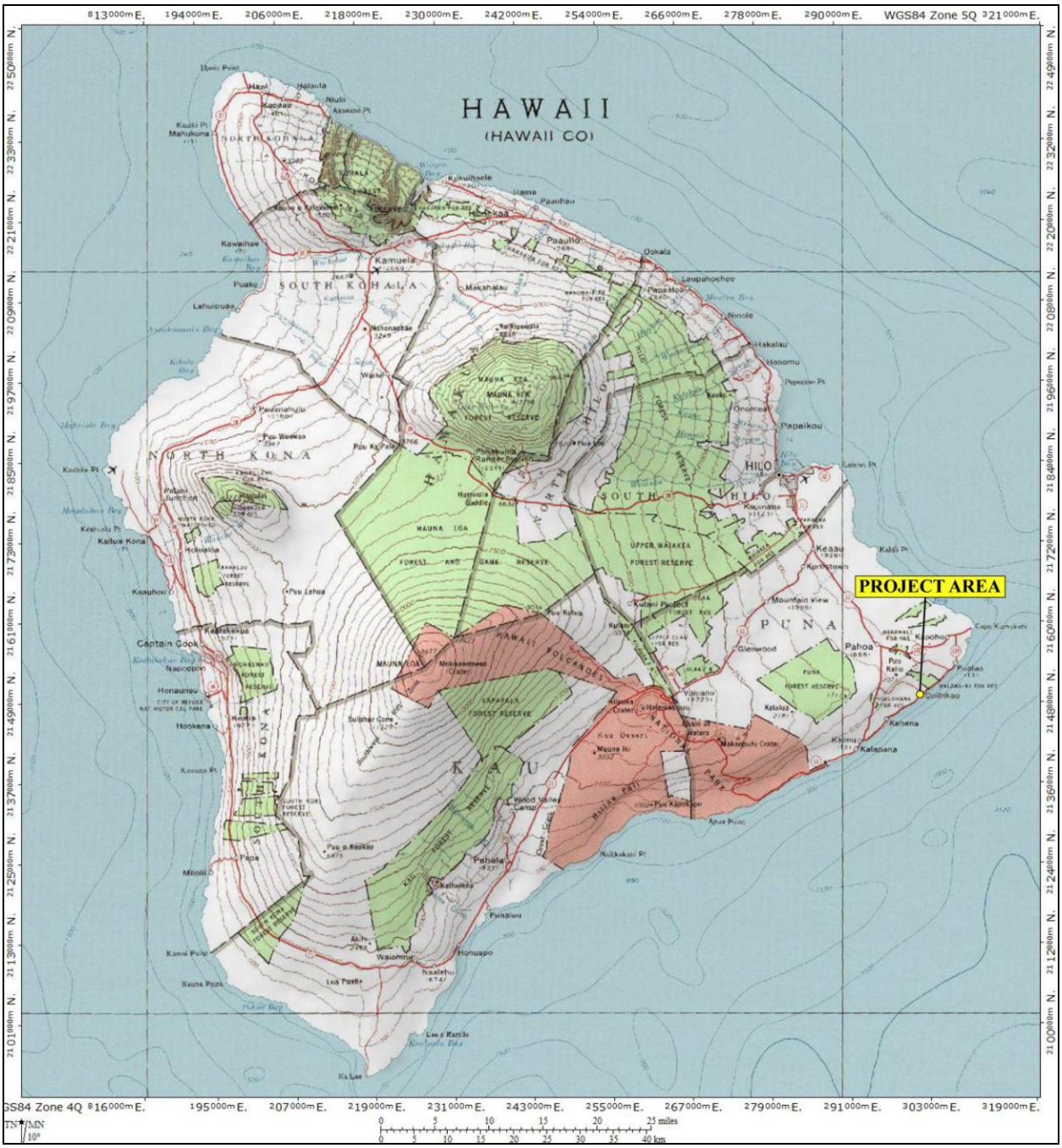

Figure 1: 5,500 K-Series Map of Hawai‘i Showing Location of Project Area (National Geographic Topo!, 2003. Sources: National Geographic Society, USGS).

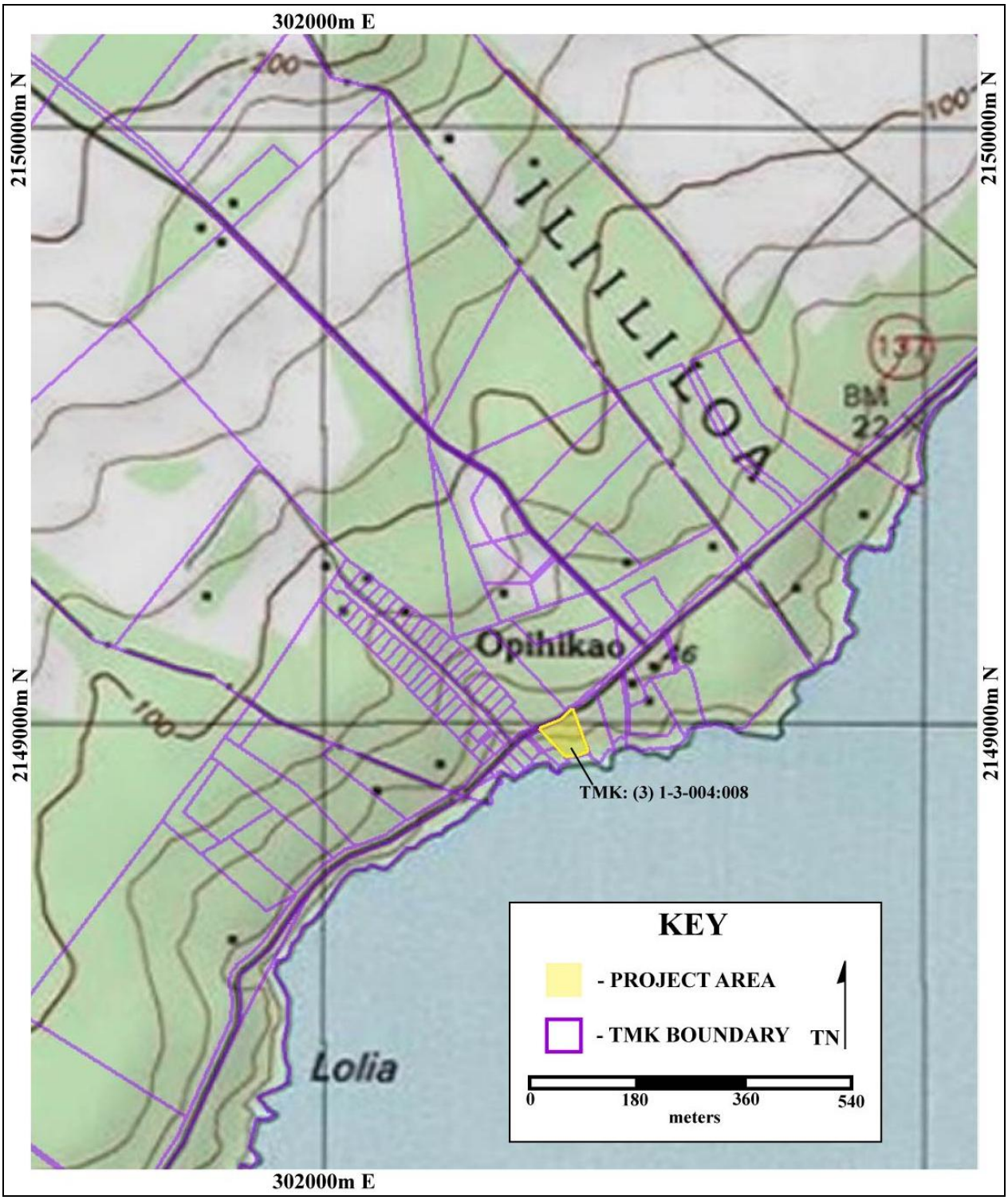

Figure 2: 7.5-Minute Series USGS Topographic Map Showing Location of Project Area (Pāhoa South Quad, ESRI, 2013. Data Sources: National Geographic Society, USGS).

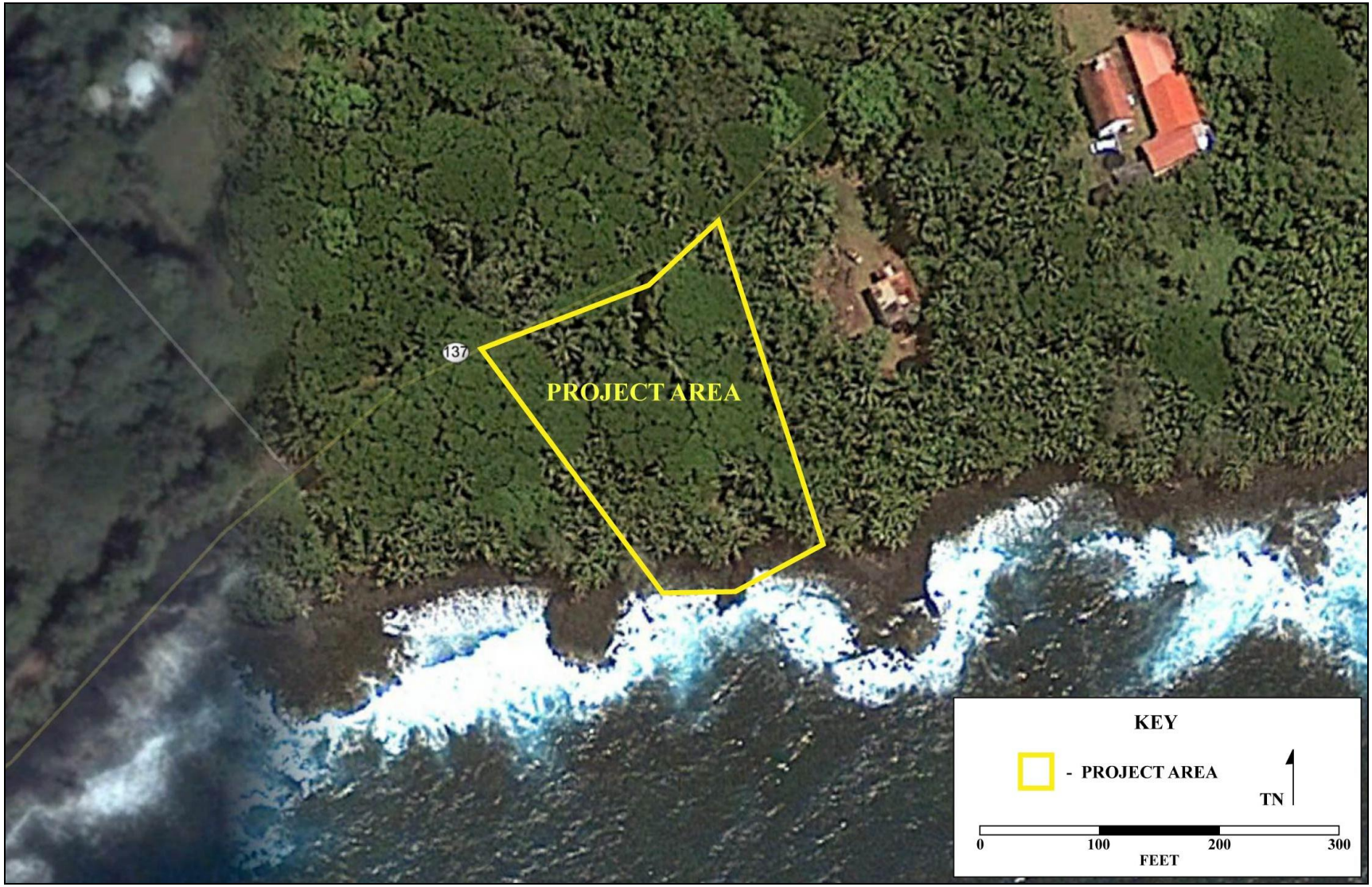

Figure 3: Aerial Photograph Showing Project Area ‘Opihikao, Hawai‘I, WSGS84 Datum, Zone 5 North, 302400 m E, 2148957 m N (Google Earth, 2016. Image Date: 2009. Data Sources: Digital Globe, GeoEye, Earthstar, USDA, and USGS).

Act 50 requires state agencies and other developers to assess the effects of proposed land use or shoreline developments on the "cultural practices of the community and State" as part of the HRS Chapter 343 environmental review process (2001).

Its purpose has broadened, "to promote and protect cultural beliefs, practices and resources of native Hawaiians [and] other ethnic groups, and it also amends the definition of 'significant effect' to be re-defined as "the sum of effects on the quality of the environment including actions that are…contrary to the State's environmental policies…or adversely affect the economic welfare, social welfare, or cultural practices of the community and State" (H.B. 2895, Act 50, 2000).

Thus, Act 50 requires an assessment of cultural practices to be included in the Environmental Assessments and the Environmental Impact Statements, and to be taken into consideration during the planning process. The concept of geographical expansion is recognized by using, as an example, "the broad geographical area, e.g. district or *ahupua'a*" (OEQC 1997). It was decided that the process should identify 'anthropological' cultural practices, rather than 'social' cultural practices. For example, *limu* (edible seaweed) gathering would be considered an anthropological cultural practice, while a modern-day marathon would be considered a social cultural practice.

> According to the Guidelines for Assessing Cultural Impacts established by the Hawaii State Office of Environmental Quality Control (OEQC 1997): The types of cultural practices and beliefs subject to assessment may include subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs. The types of cultural resources subject to assessment may include traditional cultural properties or other types of historic sites, both manmade and natural, which support such cultural beliefs.

This Cultural Impact Assessment involves evaluating the probability of impacts on identified cultural resources, including values, rights, beliefs, objects, records, properties, and stories occurring within the project area and its vicinity (H.B. 2895, Act 50, 2000).

METHODOLOGY

This Cultural Impact Assessment was prepared in accordance with the methodology and content protocol provided in the Guidelines for Assessing Cultural Impacts (OEQC 1997). In outlining the "Cultural Impact Assessment Methodology", the OEQC states: …information may be obtained through scoping, community meetings, ethnographic interviews and oral histories… (1997).

The report contains archival and documentary research, as well as communication with organizations having knowledge of the project area, its cultural resources, and its practices and beliefs. This Cultural Impact Assessment was prepared in accordance with the methodology and content protocol provided in the Guidelines for Assessing Cultural Impacts (OEQC 1997). The assessment concerning cultural impacts should address, but not be limited to, the following matters:

(1) a discussion of the methods applied and results of consultation with individuals and organizations identified by the preparer as being familiar with cultural practices and features associated with the project area, including any constraints of limitations with might have affected the quality of the information obtained;

(2) a description of methods adopted by the preparer to identify, locate, and select the persons interviewed, including a discussion of the level of effort undertaken;

(3) ethnographic and oral history interview procedures, including the circumstances under which the interviews were conducted, and any constraints or limitations which might have affected the quality of the information obtained;

(4) biographical information concerning the individuals and organizations consulted, their particular expertise, and their historical and genealogical relationship to the project area, as well as information concerning the persons submitting information or interviewed, their particular knowledge and cultural expertise, if any, and their historical and genealogical relationship to the project area;

(5) a discussion concerning historical and cultural source materials consulted, the institutions and repositories searched, and the level of effort undertaken, as well as the particular perspective of the authors, if appropriate, any opposing views, and any other relevant constraints, limitations or biases;

(6) a discussion concerning the cultural resources, practices and beliefs identified, and for the resources and practices, their location within the broad geographical area in which the proposed action is located, as well as their direct or indirect significance or connection to the project site;

(7) a discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project;

(8) an explanation of confidential information that has been withheld from public disclosure in the assessment;

(9) a discussion concerning any conflicting information in regard to identified cultural resources, practices and beliefs;

(10) an analysis of the potential effect of any proposed physical alteration on cultural resources, practices or beliefs; the potential of the proposed action to isolate cultural resources, practices or beliefs from their setting; and the potential of the proposed action to introduce elements which may alter the setting in which cultural practices take place, and;

(11) the inclusion of bibliography of references, and attached records of interviews, which were allowed to be disclosed.

Based on the inclusion of the above information, assessments of the potential effects on cultural resources in the project area and recommendations for mitigation of these effects can be proposed.

ARCHIVAL RESEARCH

Archival research focused on a historical documentary study involving both published and unpublished sources. These included legendary accounts of native and early foreign writers; early historical journals and narratives; historic maps and land records such as Land Commission Awards, Royal Patent Grants, and Boundary Commission records; historic accounts, and previous archaeological project reports.

INTERVIEW METHODOLOGY

Interviews are conducted in accordance with applicable state laws and guidelines. Individuals and/or groups who have knowledge of traditional practices and beliefs associated with a project area or who know of historical properties within a project area are sought for consultation. Individuals who have particular knowledge of traditions passed down from preceding generations and a personal familiarity with the project area are invited to share their relevant information. Often people are recommended for their expertise, and indeed, organizations, such as Hawaiian Civic Clubs, the Island Branch of Office of Hawaiian Affairs,

historical societies, Island Trail clubs, and Planning Commissions are depended upon for their recommendations of suitable informants. These groups are invited to contribute their input, and suggest further avenues of inquiry, as well as specific individuals to interview.

If knowledgeable individuals are identified, personal interviews are sometimes taped and then transcribed. These draft transcripts are returned to each of the participants for their review and comments. After corrections are made, each individual signs a release form, making the information available for this study. When telephone interviews occur, a summary of the information is often sent for correction and approval, or dictated by the informant and then incorporated into the document. Key topics discussed with the interviewees vary from project to project, but usually include: personal association to the *ahupua'a*, land use in the project's vicinity; knowledge of traditional trails, gathering areas, water sources, religious sites; place names and their meanings; stories that were handed down concerning special places or events in the vicinity of the project area; evidence of previous activities identified while in the project vicinity.

In this case, letters with maps and descriptions the project area were sent to individuals and organizations whose jurisdiction includes knowledge of the area with an invitation for consultation. Consultation was sought from Kai Markell, the Director of Native Rights, Land and Culture, Office of Hawaiian Affairs (OHA); Kamuela Bannister, OHA East Hawai'i Representative; Shane Palacat-Nelsen, OHA West Hawai'i Representative; Herbert Poepoe, SHPD Burial Sites Specialist; Sean Naleimaile, State Historic Preservation Division (SHPD) Assistant Archaeologist; Nalei Pate-Kahakalau, Chairman of the Hawai'i Island Burial Council (HIBC); Keikialoha Kekipi, HIBC Puna District Representative; Rick Gmirkin, Ala Kahakai National Historic Trail, National Park Service (NPS) Archaeologist; Clement Chang, Nā Ala Hele Trail and Access Specialist; Moana Rowland, Nā Ala Hele Abstractor; Deborah Chang, Chairperson of the County of Hawai'i Cultural Resources Commission and Member of the Hawai'i Island Advisory Council, Nā Ala Hele Statewide Trail and Access System; Theresa Donham, County of Hawai'i Cultural Resources Commission Board Member; and longtime 'Opihikao residents Violet Makuakane and Bernice Kaleikini. If cultural resources are identified based on the information received from these organizations and/or additional informants, an assessment of the potential effects on the identified cultural resources in the project area and recommendations for mitigation of these effects can be proposed. Public notices (Appendix A) were placed in the September issue of the Office of Hawaiian Affairs (OHA) Ka Wai Ola Newspaper. Public notices were also published in the Honolulu Star-Advertiser, and the Hawai'i Tribune Herald on September 11th, 14th, and 15th.

PROJECT AREA NATURAL ENVIRONMENT

The project area is a partially landscaped undeveloped parcel [TMK: (3) 1-3-004:008] situated on level land between 0 m (0 feet) to 9 m (30 feet) above mean sea level (amsl). The project area substrate is a single Kīlauea lava flow dated to between 400 and 750 years before present (ybp) (Wolfe and Morris 1996). Soils in the project area belong to the Malama (rMAD) series characterized as extremely stony muck (Sato 1973:37). Rainfall in the project area is high, ranging between 203 and 305 centimeters (80 and 120 inches) per year (Kelly *et al*. 1981). Natural drainage in the area runs from northwest to southeast. There are no seasonal gulches or drainage spillways in the immediate area.

A 1945 USGS aerial photograph shows that the property was undeveloped in the 1950s (USGS 1954). There are no structures on the property, though there are residential structures *mauka* of the project area lands. The property has been bulldozed and partially landscaped since the mid-1950s. The improved portion of the parcel has been planted with coconut palms (*Cocos nucifera*), monkeypod (*Samanea saman*), java plum (*Syzygium cumini*), and *kukui* (*Aleurites moluccana*) (Starr Environmental 2016). Guava (*Psidium guajava*), ferns, and vines are also growing on the property. The property owner is proposing to build a small house in the northern portion of the parcel.

HISTORICAL AND CULTURAL CONTEXTS

Archaeologists have long thought Hawai‘i Island was first settled between around A.D. 700 by people sailing from the Marquesas (Cordy 2000:104-109). Recently, there has been debate surrounding the archaeological dating of the initial settlement of Hawai‘i. An article published in the Journal of Archaeological Science reviewing radiocarbon dates recovered at archaeological sites on the Island of Hawai‘i suggests that, by relying on only carbon samples from short-lived plant remains, the most reliable dates point to initial Polynesian colonization of Hawai‘i Island occurring between AD 1220 and 1261 (Rieth et al. 2011:2747).

Early settlers established settlements on the windward shores in likely places such as Waipi‘o, Waimanu, and Hilo Bay. People at these locations were able to sustain themselves through inshore and pelagic fishing, gathering shellfish from the shore and strand, plant and animal husbandry, and the utilization of natural terrestrial flora and fauna (Kirch and Kelly 1975; Pearson *et al*. 1971; Kirch 1985). The pattern of this early settlement is thought to have consisted of widely spaced, permanent home bases that gradually expanded to form a nearly continuous zone of permanent settlement along the windward coasts as local populations grew.

TRADITIONAL SETTLEMENT PATTERNS, SUBSISTENCE, AND LAND-USE

Situated along the windward coast of Hawai‘i Island, Puna is a verdant and abundant district with good rainfall and rich soils. However, it is also subject to volcanic eruptions and has been covered by new lava in many places over the last 1,000 years (Cordy 2000:17, and 22). Much of the district's coastal area has thin soils and there are no good deep water harbors. The ocean along the Puna coast is often rough and wind-blown.

As a result of these two factors, settlement patterns in Puna tend to be dispersed and without major population centers. Villages in Puna tended to be spread out over larger areas and were, at times, inland and away from the coast, where the soil is better for agriculture (Cordy 2000: 45). The lack of population centers also had an effect on the development of a hierarchy of district rulers. Puna was often not strongly tied together by a tight web of allegiances between *ali‘i* and *konohiki*. As a result, Puna was often conquered and ruled by stronger district leaders in Hilo or Ka‘ū (Kamakau 1992:17 and 77).

Puna was famous as a district for some of its valuable products, including "hogs, gray tapa cloth (*‘eleuli*), tapas made of *mamaki* bark, fine mats made of young pandanus blossoms (‘*ahuhinalo*), mats made of young pandanus leaves (*‘ahuao*), and feathers of the *‘o‘o* and *mamo* birds" (Kamakau 1992:106).

Historical accounts of ‘Opihikao and the project area region are scarce, but provide some information on traditional residence patterns, land-use, and subsistence horticulture. ‘Opihikao is literally translated as a “crowd gathering limpets” (Pukui et al. 1974:171). William Ellis stopped to preach at ‘Opihikao in 1823 while travelling along the coast from Kilauea to Waiākea Ahupua‘a, Hilo. Ellis described it as “another populous village, situated within a short distance of the sea” (Ellis 1963:278).

Ellis mentions numerous canoes and fishing nets in the populous village of Kahena southwest of the project area (Ellis 1963:276-277). He described how the Hawaiians had built a large ladder for carrying their light, one-man canoes up the rocky cliffs. Ellis also mentions the village of Kamā‘ili, in Kamā‘ili Ahupua‘a, west of ‘Opihikao Ahupua‘a. Along the way northeast from Kamā‘ili Village, his guide pointed out Kalepa *heiau*, a *heiau* dedicted to Ku and Lono (Ellis 1963:278). Thrum recorded that Kalepa *heiau*, or Kalelepa, was used during the time of Keawema‘uhili (ruler of Hilo, 1782-1790) and was "almost wholly destroyed; its stones taken for roads" (Thrum 1908:39). Ellis made no further mention of the lands of the project area as he passed through.

THE *MĀHELE* OF 1848 AND LAND COMMISSION AWARDS

With the Māhele of 1848 and the two Acts of 1850, authorizing the sale of land in fee simple to resident aliens and the award of *kuleana* lands to native tenants, land tenure in Hawaii arrived at a significant turning point (Chinen 1961:13). There were no Land Commission awards (LCA) made in ʻOpihikao Ahupuaʻa. There were numerous Land Grants (LG) made in ʻOpihikao. The entire *ahupuaʻa* was divided into land grants, many of them sold to Hawaiians (Figure 4). The project area is the coastal portion of LG #1279 made to Kalakane in 1853 (Figure 5). LG #1279 was for 16.95 acres.

CHANGING RESIDENTIAL AND LAND-USE PATTERNS (1845–1865)

Between 1845 and 1865, traditional land-use and residential patterns underwent a change. In particular, the regular use of Hilo Bay by foreign vessels, the whaling industry, the establishment of missions in the Hilo area, the introduction of the sandalwood trade, the legalization of private land ownership, the introduction of cattle ranching, and the introduction of sugar cane cultivation all brought about changes in settlement patterns and long-established land-use patterns (Kelly *et al*. 1981).

Hilo became the center of population and village settlements in outlying regions declined or disappeared. While food was still grown for consumption, greater areas of land were continually given over to the specialized cultivation and processing of commercial foodstuffs for export. Sugar cane plantations, coffee plantations, and processing facilities were established in areas that were once upland agricultural areas and coastal settlements, respectively. With the establishment of new commercial agricultural enterprises and new employment opportunities in the outlying regions, people began to resettle around the nascent commercial centers.

A wharf was built northeast of the project area in Pohoiki in the 1870s. The ʻŌlaʻa/Puna Sugar Company was established in 1900 at Kapoho and sugarcane fields were planted and tended inland to the west and southwest of the current project area. The Hawaiian government surveyed and began selling homestead lots in Puna in the 1880s. The newly established agricultural businesses and influx of homesteaders and employees necessitated the upgrade of existing transportation routes and the construction of new routes. The construction of new travel routes influenced where people settled and lived.

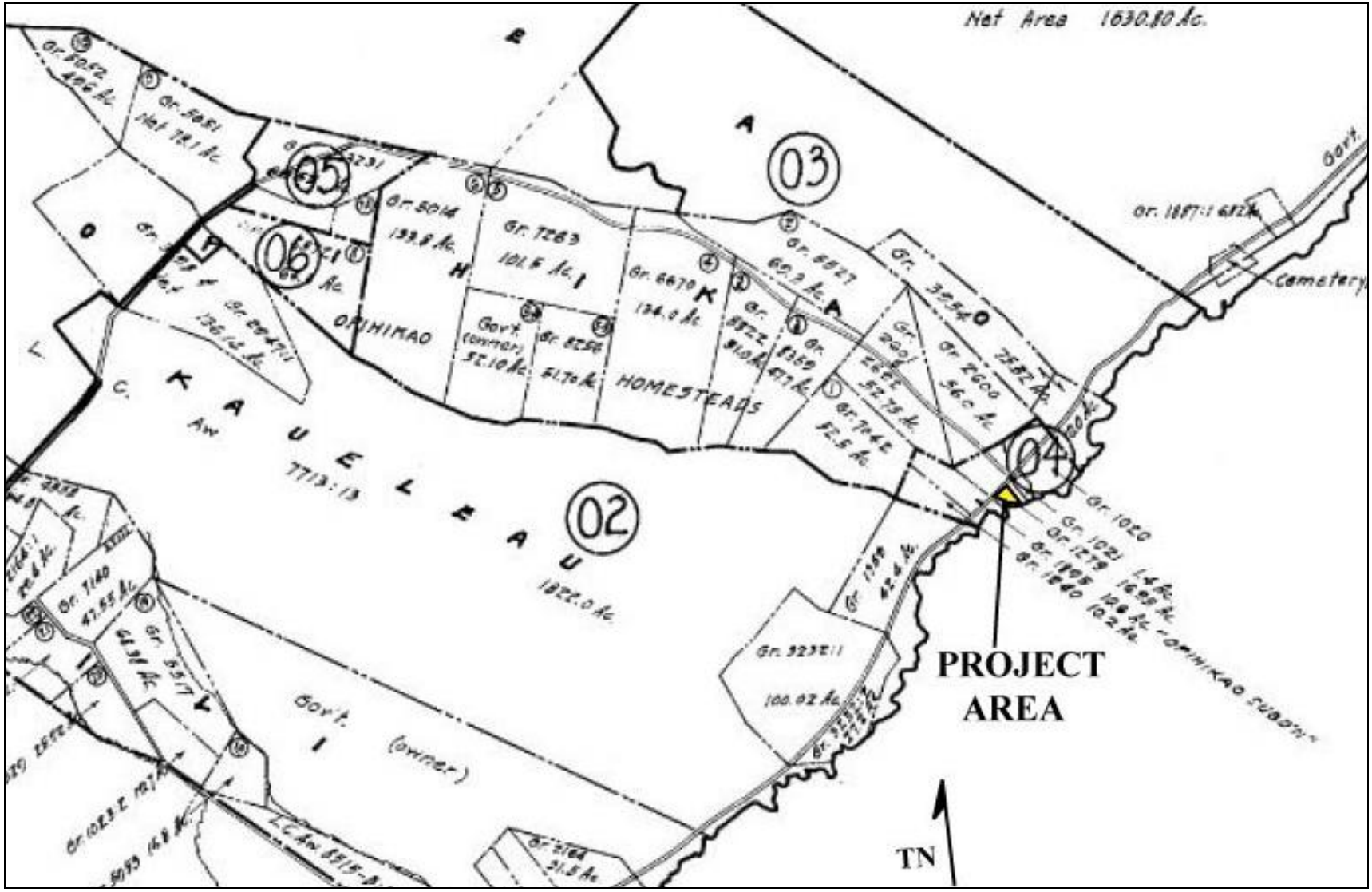

Figure 4: Portion of TMK: (3) 1-3 Map Showing Project Area and Land Grants Within ‘Opihikao Ahupua‘a (Hawai‘i County Planning Department 2016).

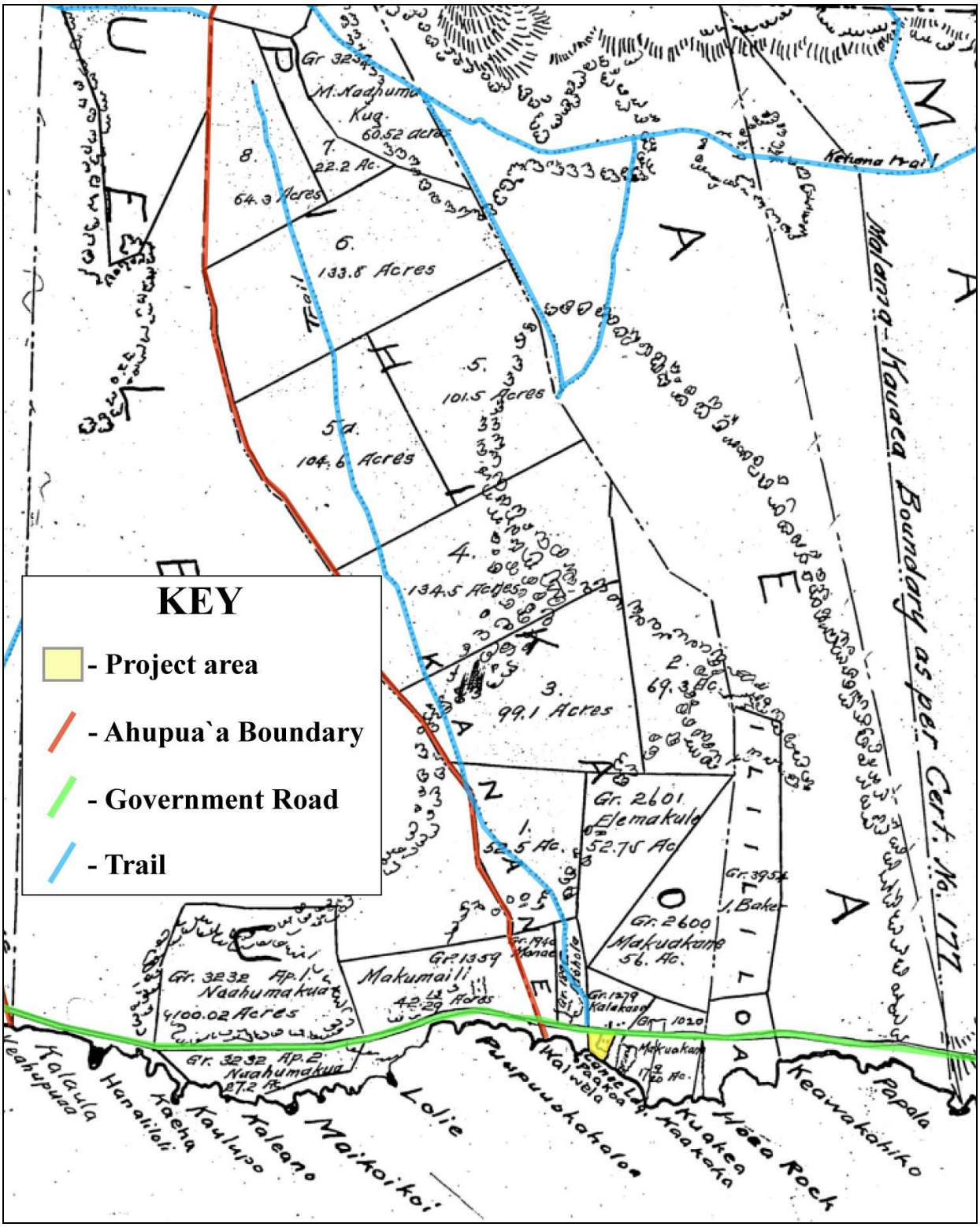

Figure 5: Portion of Puna District Map Showing Location of Project Area, Land Boundaries, Roads, and Trails (adapted from Cook 1902).

THE PUNA TRAIL AND OLD GOVERNMENT ROAD

There is an historic trail that leads from the modern day Lili‘uokalani Gardens area in Hilo to Hā‘ena along the Puna coast. The trail is often called the old Puna Trail and/or Puna Road. There is an historic trail/cart road that is also called the Puna Trail (*Ala Hele* Puna) and/or the Old Government Road that continues from the south end of the Puna Trail to Kapoho Ahupua‘a and points further southwest. Lass also refers to the entire route from Hilo to Ka‘ū as the Puna-Ka‘ū trail. A portion of the Old Government Road is now named Kalapana-Kapoho Beach Road and borders the northwest edge of the current project parcel.

Whatever name the trail/cart road alignment is referred to by, it likely incorporated segments of the traditional Hawaiian trail system often referred to as the *ala loa* or *ala hele* (Hudson 1932:247, Kuykendall 1966:23-25, Lass 1997:15, and Maly 1999:5). Lass suggests the full length of the Puna Trail, or Old Government Road, might have been constructed or improved just before 1840 (Lass 1997:15). The trail was called the Old Government Road, or *Ala Nui Aupuni* (Maly 1999:5).

A general description of the area between the Old Government Road and the newer upper road from Hilo through Kea‘au to Pahoa was recorded in 1889 by the Surveyor General of the Hawaiian Government Survey. The description affords a glimpse into inland and coastal settlement patterns and land use.

> The first settlement met with after leaving Hilo by the sea coast road, is at Keaau, a distant 10 miles where there are less than a dozen inhabitants; the next is at Makuu, distant 14 miles where there are a few more, after which there is occasionally a stray hut or two, until Halepuaa and Koae are reached, 21 miles from Hilo, at which place there is quite a village; thence to Kaimu there are only a few scattered settlements here and there. A good many of those living along the lower road have their cultivating patches in the interior, along or within easy accessibility to the new road (Alexander 1891, cited in Maly 1999:107).

The 1889 description suggests depopulation along the majority of the Puna near-coastal area, in contrast with Ellis' description of 1823 (above). In 1889 people were cultivating small patches of *kalo*, *awa*, and coffee as well as other food items at inland gardens. The patches were placed in pockets of soil in holes amidst the lava flows. Additionally, sweet potatoes were grown on rock mounds. By 1889, it appears that very few people lived along the Old Government Road (Maly 1999:6). The Surveyor General stated,

> The old sea coast road cannot be kept in repair with the means now at its disposal and its condition each year is becoming more unsafe and ruinous, there is but little travel over it; it has been shown that there is little land capable of cultivation or development either side of it and whatever travel there is now over it would soon be entirely diverted to the upper road (Alexander 1891, cited in Maly 1999:107).

The new road being constructed from Hilo through Kea‘au to Pāhoa, and on to Kalapana, was designed to allow access to the more arable inland areas. People who traditionally had lived along the Puna coast were moving toward Hilo and into the more fertile upland areas of Puna in order to find paid work and to produce cash crops for local markets and for export. In particular, people began to work in the inland areas to grow sugarcane.

There was also an unnamed *mauka/makai* trail (see Figure 5) along the southwest portion of ‘Opihikao. It is unclear in Figure 5 whether the trail terminated at Government Road or continued to the coast. No archival documentation on the trail could be located, other than the 1902 map. There was no evidence of the trail across the subject property at the time the archaeological inventory survey study (Haun and Henry 2007) was conducted (see below). Information concerning the trail was sent to Nā Ala Hele during the course of the CIA consultation process.

SUGARCANE AND THE RAILROAD

By 1901 sugar dominated the island’s industry, and Hilo was the epicenter of production and export. Railroads connected sugar mills and sugar plantations in Hilo, the Hāmākua and Puna. The railroad also connected the mills to the wharves at Hilo Bay. The railroad began operation in the Hilo area in 1899, and was abandoned in 1946 (Kelly *et al*. 1981). A main railroad line and several feeder lines were constructed in the early 1900s from Kea‘au to locations in lower Puna District. The major line ran from Hilo through Kea‘au to the Kapoho area. This line passed some distance *mauka* (south) of the current project area. The junction of the Hilo to Kapoho line and the Pāhoa branch was located in Waiakahiula Ahupua‘a. The trains provided transportation for sugarcane as well as for passengers traveling through Puna and on to other destinations such as Hilo and the Hāmākua coast.

Early on, one of the major export items transported by the railroad was timber. The Hawaiian Mahogany Company began cutting timber in Puna District in 1907. Trees were felled in areas to be cleared for sugarcane agriculture. The logs were brought to Pāhoa Town to be

milled, sent to Hilo Harbor, and eventually shipped to the U.S. Mainland as railroad ties for the Santa Fe Railroad. The lumber mill facilities and the railroad line that served them were located just east of the current project area, where the present day Pāhoa Farmer's Market is held and where the Akebono Theater is located.

In 1909, the company was renamed Pāhoa Lumber Company. In 1913 the main mill facilities burned to the ground. That same year, the mill was rebuilt and the company was renamed the Hawaiian Hardwood Company. The company's main export was milled *‘ōhia* lumber. The company had several large clients in California and even sold lumber to the U.S. Navy. The company closed down in 1916 when the Santa Fe Railroad ended it contract to by lumber. The defunct company then leased its mill facilities, buildings, and railroad tracks to the expanding ‘Ōla‘a Sugar Company.

The ‘Ōla‘a Sugar Company, established in 1899, soon became the largest sugarcane plantation and milling operation in Puna District. According to the Hawai‘i Sugar Planter's Association, Plantation Archives,

> [The] Olaa Sugar Company was located on the Island of Hawaii just nine miles from Hilo on the road to Volcano and the National Park [Figure 9]. The plantation fields extended for ten miles along both sides of this highway as well as in the Pahoa and Kapoho areas of the Puna District. The elevation of the land ranged from sea level to 2,200 feet. The area was in the wet belt of Hawaii amid forests of fern trees and ohia with an average monthly rainfall of 18-30 inches. Finding varieties of cane that would thrive on forest soil in a cloudy district at various elevations was a major problem.
>
> In 1899, B.F. Dillingham, Lorrin A.Thurston, Alfred W. Carter, Samuel M. Damon, and Wm. H. Shipman pooled their resources and started what they believed would become Hawaii's largest and most prosperous sugar plantation. Their original plan was that Olaa would be instrumental in bringing about the Americanization of Hawaii by fostering a home owning class of small farmers who would grow cane for the mill. The venture was planned as a demonstration of a plantation as small farming enterprise in which a large portion of the crop would be cared for by laborers on shares. L.A. Thurston believed that Hawaii's future prosperity depended in the long run on the production of crops by small independent farmers who owned or leased the land they cultivated. The

corporation would operate the mill and assure a market for produce. The promoters predicted that Olaa would become the banner plantation for all Hawaii. This was a radical departure from the ideas of the old plantation system, which opposed both independent cane growers and diversification.

On May 3, 1899, the Olaa Sugar Company was incorporated. With a $5,000,000 investment, the promoters purchased 16,000 acres in fee simple land and nearly 7,000 acres in long leasehold from W.H. Shipman. They also purchased 90% of the stock in the adjacent Puna Plantation, adding another 11,000 acres to the holdings. Olaa Sugar Company began as one of Hawaii's largest sugar plantations with much of its acreage covered in trees.

The task of setting up the plantation was enormous. Before 1900, coffee was the chief agricultural crop in the area. Over 6,000 acres of coffee trees were owned by approximately 200 independent coffee planters and 6 incorporated companies. The coffee trees were uprooted to make way for cane. Ohia forests had to be cleared, field rock piled, land plowed by mules of dug up by hand with a pick, quarters for laborers and staff had to be built, the mill constructed, and the first cane planted.

On July 1, 1899, active operations began under the management of Frank B. McStocker. In his first report, he stated, "As soon as the planting of the main crop begins, which will be about the month of March [1900], arrangements will be made by which a large portion of the crop will be cared for by laborers on shares." From this early start of "share planting," the company branched out into the leasing of land to individuals to raise cane and to making contracts to purchase cane from persons who owned or leased their own land. In most cases, the company carried the financial burden for the planter until he was paid for his cane and then recovered the advances made. Other independent cane farmers lived in their own homes, used their own work animals and tools, and supplied their own fertilizers.

In 1900, a twelve-roller, 2,000 ton mill was erected at Olaa. The mill was planned for a 60,000-ton crop and was of a size to accommodate future expansion. Everything was planned for a large-scale production, unlike most sugar companies, which expanded as the output increased.

The cane from the adjacent plantation, the Puna Plantation, was ground at the Olaa mill. Puna Plantation Company, established in the late 1890s, was taken over by Olaa Sugar Company in 1905.

A succession of experiments molded the history of Olaa Sugar Company. Because of heavy rains, numerous cane varieties were tried out. Lahaina cane was abandoned early because of being particularly susceptible to root diseases due to moisture. New varieties were constantly being planted. The weather was also conducive to the growth of weeds. An experiment in paper mulching was started in 1916. The object of the paper mulch was to suppress the weed growth and keep the soil warm. But it also reduced labor costs for hoeing by 50% and provided an extra application of fertilizer.

In 1919, Olaa Sugar Company had the distinction of operating the first bagasse paper mill in the Territory and the only one of its kind in the United States at that time. The mill was erected alongside the sugar factory where bagasse was converted into mulching paper. C.F. Eckart, manager, originated the idea. The mill produced enough paper daily to cover 9 to 11 acres, with about 1,600 lbs. of paper per acre. The paper was used over the young ratoons, which pierced their way through to the light, while the weeds died. This asphalt-saturated paper used at Olaa became a forerunner of mulch paper developed for use in Hawaii's pineapple industry. Eventually the paper mill was dismantled, but mulching was still used for weed control.

The cane was transported to the mill by fluming and by railroad. Although Olaa Sugar Company had 72 miles of flumes, it had no dependable water source for their operation. The railroad was relied upon for delivery of 60% of the cane. In addition to its own standard gauge 35 miles of railway track, the company ran cars over the Consolidated Railway tracks to bring its cane in from more distant fields. The history of Olaa Sugar Company is closely connected with the southern branches of the Hawaii Consolidated Railway Co. because they were interdependent from the start. The cane fields were in four widely separated areas cut off from each other by stretches of barren lava. The railroad was therefore vital to the plantation, which in turn helped support the railroad. When a tidal wave on April 1, 1946 destroyed much of the Hawaii Consolidated Railway

Company's tracks, it ceased operations. The plantation was then forced to convert to trucks in order to transport sugar and molasses to the Hilo wharf.

Fortunately, under the management of Wm. L.S. Williams, a major road-building program had been started in 1939 for the purpose of eliminating the portable track. He started the plantation on its way to modernization by laying a network of 500 miles of roads for hauling cane. Since 1948, all the cane hauling has been by truck.

By the end of 1947, Olaa Sugar Company owed it agents, American Factors, Ltd., $2,000,000. Sugar prices, the tariff, rationing, epidemics of leafhoppers and armyworms, and volcanic eruptions had taken their toll on company profits. Manager C.E. Burns surmised that the only way for the plantation to stay alive was to mechanize harvesting operations. Because of the rocky and uneven condition of the land, Olaa was one of the last sugar companies to eliminate hand-cutting of cane. This conversion to mechanical harvesting was a turning point in cost reduction in the fields, but became a problem in the mill as a result of all the trash and rocks coming in with the cane. Cane cleaners were installed but the conventional cleaners could not remove the fine volcanic cinders. Olaa Sugar Company solved the grit problem with an ingenious flotation tank.

Another problem, which resulted when mechanical harvesting went into effect, was a need to layoff laborers. Manager Burns worked out an equitable schedule of layoffs. The first severance pay and repatriation formulas, which were later to serve as patters for the sugar and pineapple industries, were agreed to. In addition, both management and union members located new jobs in the Islands for most of those who were laid off. As a result, the transition from hand to mechanical harvesting was achieved without labor grievances.

Attention to employee welfare was demonstrated by Olaa Sugar Company in the housing program, free medical attention, and recreational facilities. Manager A.J. Watt modernized the housing by building new family units and relocating outlying houses scattered about the plantation into nine main villages. They became miniature towns with running water, electric lights, schools, churches, stores, clubhouses, theaters, parks and ball fields. The plantation roads radiated from these nine camps to cover the cane areas where the

men worked. The 1930 plantation census noted a total of 5,999 men, women and children residing in 1,098 houses at Olaa.

In spite of Olaa Sugar Company's efforts to reduce operating costs, the plantation was still in debt. In 1953, a minority stockholders' suit was brought against American Factors, Ltd. The suit alleged that the plantation company paid" excessive" commissions to AMFAC and insufficient dividends to stockholders. By this time Olaa Sugar Co. was over $4.1 million in debt to the agency and possible liquidation of the company was being considered. After six years of litigation, the suit was finally dismissed by the court in 1959. In the wake of statehood, it was decided that the company would take advantage of the land boom and sell some of its fee simple land. By this time, the plantation had accumulated 35,700 acres of which 22,000 were used by Olaa and the remainder by independent planters. They also offered employees the opportunity to purchase their houses.

On March 28, 1960, a name change from Olaa Sugar Company, Ltd. to Puna Sugar Company, Ltd. was voted on at a stockholders meeting. Apparently, the directors felt "Olaa" was jinxed and that a name change might erase the failures of the past. With a new name and the monies accrued from land sales, the company did make a comeback and by 1963 had the best year ever with a 36% profit gain. In 1966, Puna Sugar Company was free of debt for the first time in its history. The reduction in the cost of operations and the improvements in the field and mill were regarded throughout the industry as a major accomplishment. American Factors offered to buy out the minority shareholders and by 1969 Puna Sugar Company was a wholly owned AMFAC subsidiary.

AMFAC launched an expansion program by converting to the diffusion method of cane processing and by installing a modern steam generating facility. A $4.5 million power plant was built at Puna, which used bagasse and trash fuel to generate 15,000 kilowatts of electricity. Hilo Electrical Light Co. contracted to purchase 12,500 kilowatts.

The 1980's brought bleak prospects to the company once again. The sugar industry could no longer depend on government subsidies or tax breaks. High fructose corn syrup, a low cost substitute, and artificial sweeteners were

hurting the sugar market. On January 7, 1982, AMFAC announced that it would be shutting down Puna Sugar Company.

The chore of closing down was phased out over a two-year period. It involved negotiating leases and contracts, disposing of equipment, and the most difficult of all, working out employee layoffs. Once again in an unprecedented move, AMFAC included in the severance package a gift of five acres of land for each employee. They also donated $2 million towards improvement costs of the land and offered to help locate other agricultural related jobs for the employees, it they desired. The last worker was gone by December 1, 1984. The entire sugar mill was sold to Fiji Sugar Corporation, Ltd. in 1988 and Hawaiian Electric Light Company took over the power plant (Campbell and Ogburn 2004).

The growth of the ʻŌlaʻa Sugar Company impacted the development of regional land-use, tenure, and the transportation network. Homestead lots and agricultural plots were surveyed and cleared from the surrounding forests. Sugar camps, housing and facilities for workers, were constructed. Over time, many of the smaller agricultural lots initially purchased by private owners to grow sugarcane were bought up by the large sugar plantation.

FISHING PRACTICES

Ellis' descriptions of the people he met and the villages he travelled through along the Puna coast in 1823 illustrate the long and well developed Hawaiian traditions of fishing and collecting food from the ocean. This orientation to the coast and the traditional practices developed in Hawaiʻi are still passed down generation to generation and persist today (Maly and Maly 2004).

Many fishermen catch *pūhi* to fish for *ʻulua* along the cliffs of Puna. Whether they use a hand-line or rod and reel, they use knowledge and techniques of past fishermen to select fishing locations, proper bait, and technique. Fishermen throw net, fish by rod and reel, or spear fish at different locations along the shoreline to catch specific fish such as *āholehole, ʻāweoweo, kala, kole, kūmū, manini, mamo, moana, moi, mū, palani, taʻape, uhu, ʻūʻū, uouoa, wekeʻā, and wekeʻula*. Many people still fish with rod and along the shore at Pohoiki, or fish by boat out of Pohoiki for *akule, kaweleʻā, mahimahi, ono, ʻōpakapaka, ʻulaʻula*, and other species. In addition, the traditional collection of *ʻōpihi, ʻaʻama, and limu* along the rocky shoreline is still practiced. Traditional Hawaiian fishing practices, shoreline gathering practices, and ocean access are protected by state law.

PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

Thrum's 1908 study of *heiau* in Hawai'i noted that, while there were *heiau* in nearby Kahauale'a, Kalapana, Kaimū, Pohoiki, Kamā'ili, Kahena, and Kapoho, there were no known *heiau* in 'Opihikao (Thrum 1908:38-40). Stoke (Stokes and Dye 1991) reported 14 known *heiau* in Puna District, although three of those were no longer present in 1906 when he conducted his study. Three archaeological investigations have been conducted near the project parcel (Figure 6).

Barrera (1995) conducted a data recovery study at three sites in Kaueleau Ahupua'a southwest of the current project area. Two of the sites contained Historic era habitation features. Corbin (2001) conducted an archaeological inventory survey along located Kapoho-Kalapana Road in Kamā'ili and Kaueleau Ahupua'a. The AIS documented 40 pre-Contact era to early post-Contact era features at a single site. The majority of features were related to traditional agriculture and a single burial feature was also documented.

Haun and Henry (2007) conducted an Archaeological Inventory Survey (AIS) of the current project area. Two Historic era rock walls (Site #50-10-55-26265 and Site #50-10-55-26266) likely associated with livestock control were identified in the AIS report (Figure 7). There was no evidence of the *mauka/makai* trail on the current project property at that time.

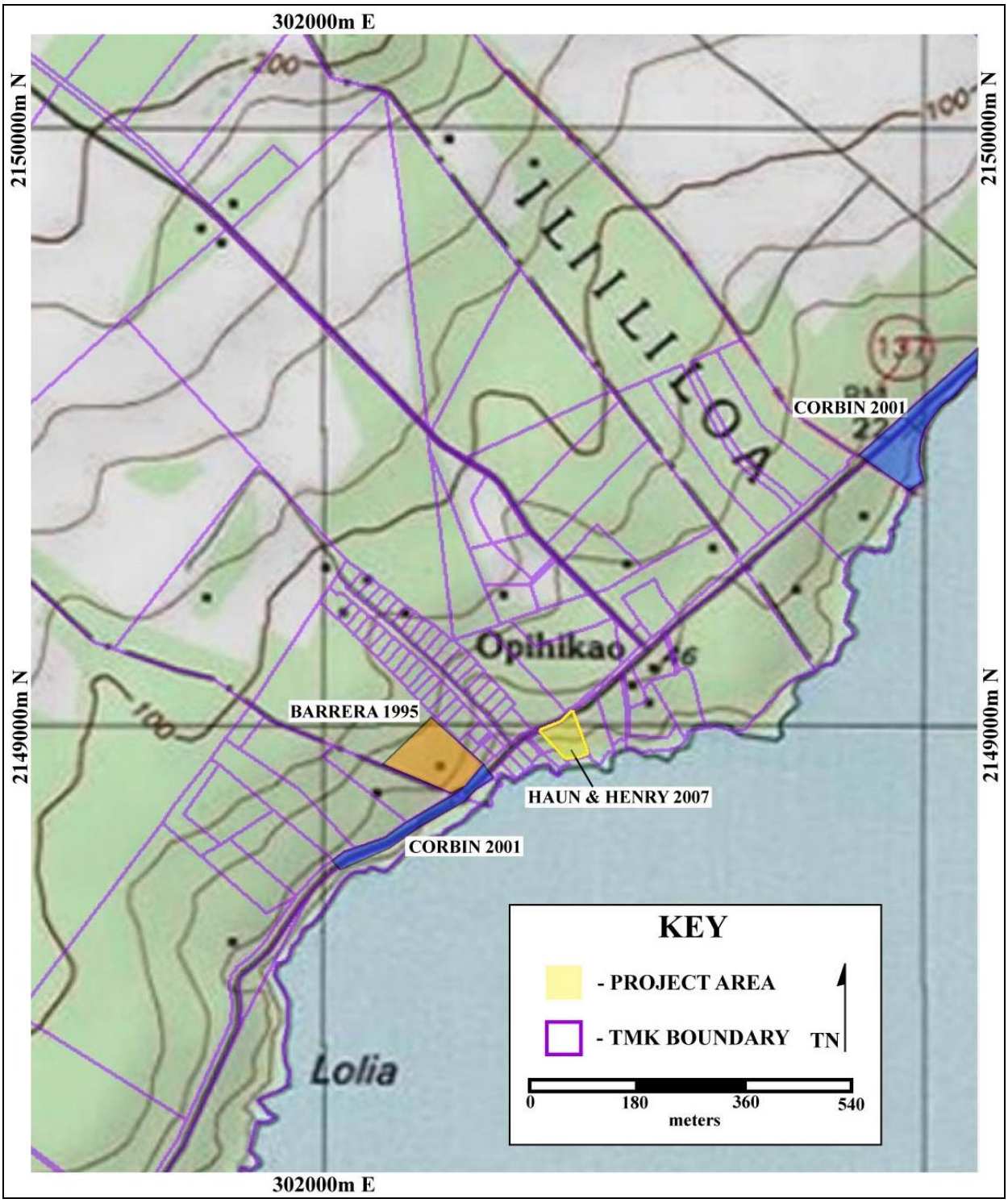

Figure 6: 7.5-Minute Series USGS Topographic Map Showing Location of Project Area and Previous Archaeological Studies (Pāhoa South Quad, ESRI, 2013. Data Sources: National Geographic Society, USGS).

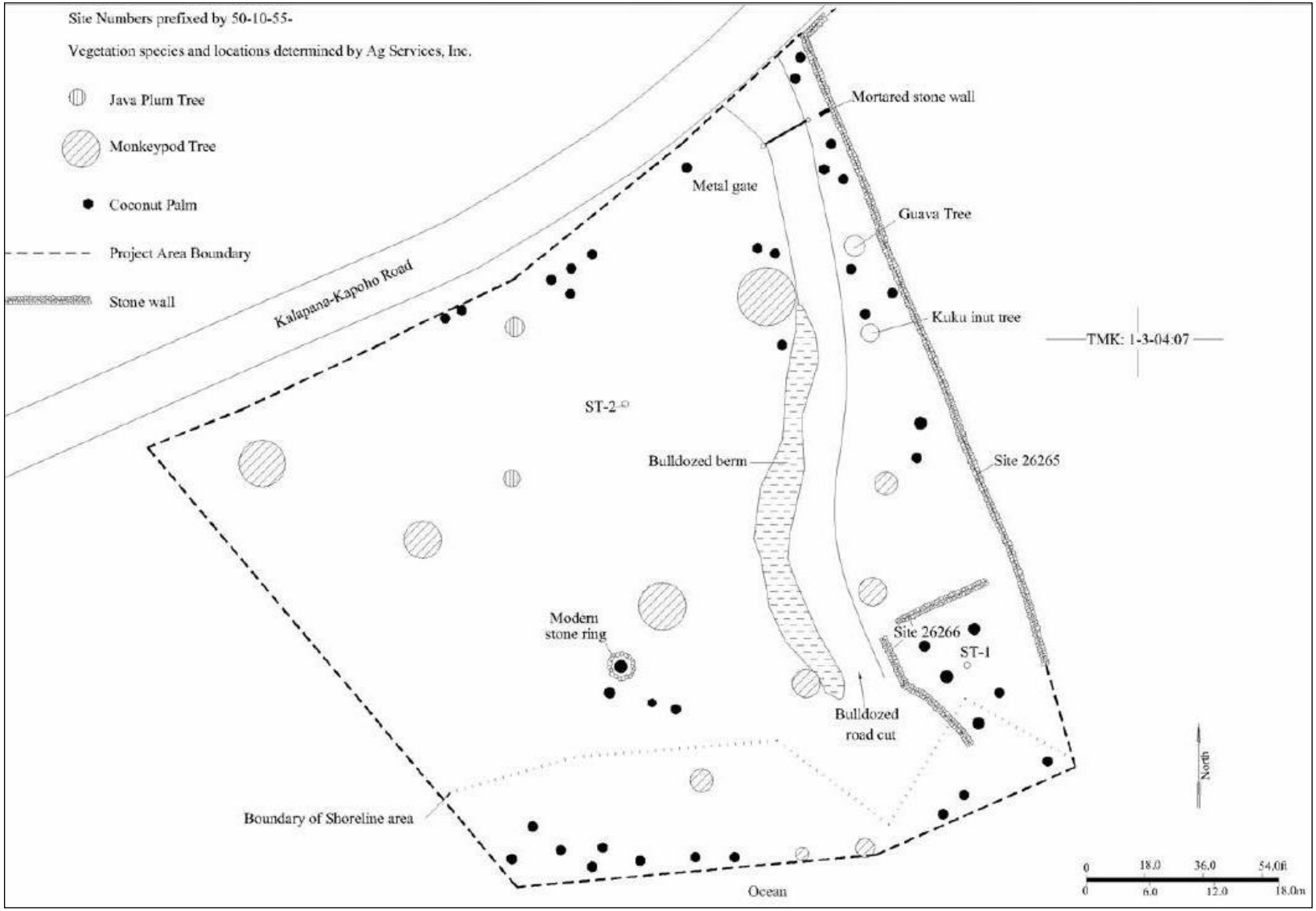

Figure 7: Plan View Map of Project Area Archaeological Sites (Haun and Henry 2007:16).

CULTURAL INFORMANT INTERVIEWS

SCS, Inc contacted fifteen individuals who, either work for the Office of Hawaiian Affairs, are SHPD personnel, are familiar with the project area lands through cultural, professional, or historical work, or are long-time residents of the area (Table 1). One of the individuals contacted, Violet Makuakane, was aware of cultural activities conducted on the subject parcel.

Table 1: Individuals Responding to CIA.

Name	Affiliation	Responded	Has Knowledge	Cultural Practices
Kamuela Bannister	OHA	Yes	Yes	No
Clement Chang	Nā Ala Hele	No	-	-
Deborah Chang	County of Hawai‘i Cultural Resources Commission	Yes	Yes	No
Theresa Donham	County of Hawai‘i Cultural Resources Commission	No	-	-
Rick Gmirkin	Ala Kahakai NHT, NPS	Yes	No	-
Bernice Kaleikini	Longtime Resident	Yes	Yes	No
Keikialoha Kekipi	HIBC Puna Representative	Yes	Yes	No
Nicole Lui	Cultural Practitioner	No	-	-
Violet Makuakane	Longtime Resident	No	-	-
Kai Markell	OHA	Yes	Yes	Yes
Sean Naleimaile	SHPD Assistant Archaeologist	No	-	-
Shane Palacat-Nelsen	OHA	Yes	No	-
E. Nalei Pate-Kahakalau	HIBC Chairman	Yes	No	-
Herbert Poepoe	SHPD Burial Sites Specialist	No	-	-
Moana Rowland	Nā Ala Hele	No	-	-

Violet Makuakane is 83 years old and has lived in ‘Opihikao for most of her life, although she is originally from Pāhala. Her maiden name is Akamu. Her husband was born and raised in ‘Opihikao, where the Makuakane family has lived for generations. Her husband was the pastor of the ‘Opihikao Congregational Church for many years. He passed away 10 years ago and she became pastor. The ‘Opihikao Congregational Church was founded 175 years ago.

Violet stated that in the old days, there was a trail along the stone wall that borders the Meurer property on the Pohoiki side. The trail led to the canoe landing shown on the old Puna District map (see Figure 5). The trail is a *mauka/makai* trail also shown on the map. She stated that when she married her husband, the road along the ocean (Red Road) was a single lane dirt road. Cars would have to pull off of the road to get by one another. Now the road is paved.

The *mauka/makai* trail crossed the road and continued to the beach area marked "canoe landing". In the old days they didn't build structures for canoe landings. It was just a clearing with pebble rocks. Over time, bigger rocks have come up so that you don't see the pebble rocks anymore. It only makes sense that if you had a canoe landing, there would have to be a trail to get the canoes in and out. The area along the wall has always been the trail. It was only wide enough to back a truck up into, although now the area has been cleared. It is not like it used to be.

The trail was the access way to ocean, which by law is open to the Hawaiian people. They should not be stopped from gathering resources at the beach. They enter through the right of way to access the area along the ocean in both directions. The people cannot be stopped from gathering there. The canoe landing was used for many generations, although large rocks have washed up and now prevent canoes from coming in there.

There are not only people from the area using the access, but people from all over. Her husband's nieces and nephews live in the Puna area. Family members living in the area and those who moved away for work still use the access. They generally do not gather plants in this area, they access the ocean and ocean resources. It is their right to gather there. People are fishing and picking *'opihi* and *limu*. They use the ocean resources to feed their families. Fish is a main staple for them to live on.

SUMMARY

The "level of effort undertaken" to identify potential effect by a project to cultural resources, places or beliefs (OEQC 1997) has not been officially defined and is left up to the investigator. A good faith effort can mean contacting agencies by letter, interviewing people who may be affected by the project or who know its history, research identifying sensitive areas and previous land use, holding meetings in which the public is invited to testify, notifying the community through the media, and other appropriate strategies based on the type of project being proposed and its impact potential.

In the case of the present parcel, letters of inquiry were sent to organizations and individuals whose expertise would include the project area. Consultation was sought from Kai Markell, the Director of Native Rights, Land and Culture, Office of Hawaiian Affairs (OHA); Kamuela Bannister, OHA East Hawai'i Representative; Shane Palacat-Nelsen, OHA West Hawai'i Representative; Herbert Poepoe, SHPD Burial Sites Specialist; Sean Naleimaile, State

Historic Preservation Division (SHPD) Assistant Archaeologist; Nalei Pate-Kahakalau, Chairman of the Hawai‘i Island Burial Council (HIBC); Keikialoha Kekipi, HIBC Puna District Representative; Rick Gmirkin, Ala Kahakai National Historic Trail, National Park Service (NPS) Archaeologist; Clement Chang, Nā Ala Hele Trail and Access Specialist; Moana Rowland, Nā Ala Hele Abstractor; Deborah Chang, Chairperson of the County of Hawai‘i Cultural Resources Commission and Member of the Hawai‘i Island Advisory Council, Nā Ala Hele Statewide Trail and Access System; Theresa Donham, County of Hawai‘i Cultural Resources Commission Board Member; and longtime ‘Opihikao residents Violet Makuakane and Bernice Kaleikini.

Public notices were published in the Office of Hawaiian Affairs Ka Wai Ola Newspaper, and were published in the Honolulu Star-Advertiser and the Hawai‘i Tribune Herald.

Historical and cultural source materials were extensively used and can be found listed in the References Cited portion of the report. Such scholars as I‘i, Kamakau, Chinen, Kame‘eleihiwa, Fornander, Kuykendall, Kelly, Handy and Handy, Puku‘i and Elbert, Thrum, and Cordy have contributed, and continue to contribute to our knowledge and understanding of Hawai‘i, past and present. The works of these and other authors were consulted and incorporated in the report where appropriate. Land use document research was supplied by the Waihona ‘Aina 2007 Data Base.

CIA INQUIRY RESPONSE

As suggested in the “Guidelines for Accessing Cultural Impacts” (OEQC 1997), CIAs incorporating personal interviews should include ethnographic and oral history interview procedures, circumstances attending the interviews, as well as the results of this consultation. It is also permissible to include organizations with individuals familiar with cultural practices and features associated with the project area.

As stated above, consultation was sought from Kai Markell, the Director of Native Rights, Land and Culture, Office of Hawaiian Affairs (OHA); Kamuela Bannister, OHA East Hawai‘i Representative; Shane Palacat-Nelsen, OHA West Hawai‘i Representative; Herbert Poepoe, SHPD Burial Sites Specialist; Sean Naleimaile, State Historic Preservation Division (SHPD) Assistant Archaeologist; Nalei Pate-Kahakalau, Chairman of the Hawai‘i Island Burial Council (HIBC); Keikialoha Kekipi, HIBC Puna District Representative; Rick Gmirkin, Ala Kahakai National Historic Trail, National Park Service (NPS) Archaeologist; Clement Chang, Nā Ala Hele Trail and Access Specialist; Moana Rowland, Nā Ala Hele Abstractor; Deborah Chang, Chairperson of the County of Hawai‘i Cultural Resources

Commission and Member of the Hawai‘i Island Advisory Council, Nā Ala Hele Statewide Trail and Access System; Theresa Donham, County of Hawai‘i Cultural Resources Commission Board Member; and longtime ‘Opihikao residents Violet Makuakane and Bernice Kaleikini. One of the individuals contacted, Violet Makuakane, was aware of cultural practices associated with lands of the project area. The property was used in the past as a canoe landing. It is no longer used to launch canoes. Fishing and gathering practices are still conducted along the coast in the area.

The current project property owner has no intention to prevent ocean access and shall not prevent people from accessing the ocean to fish and to gather marine resources. The property owner on the Kahena side of the Meurer property, allows people to park in a dirt pullout between the Red Road and the ocean. There is ocean access there where the road comes closest to the ocean. Mr. Meurer will not prevent ocean access at his property.

Analysis of the potential effect of the project on cultural resources, practices or beliefs, its potential to isolate cultural resources, practices or beliefs from their setting, and the potential of the project to introduce elements which may alter the setting in which cultural practices take place is a requirement of the OEQC (No. 10, 1997). To our knowledge, the project area was used in the past as a canoe landing and, more recently, to access the ocean for fishing and gathering marine resources. Based on historical research and the responses from the above listed contacts, it is reasonable to conclude that, as Hawaiian rights related to gathering, access or other customary activities are protected by law, and as the current project property owner will not prevent access, traditional cultural practices within the project area will not be affected and there will be no direct adverse effect upon cultural practices or beliefs. There will also be no visual impact of the project from surrounding vantage points.

CULTURAL ASSESSMEMNT

Based on the results of an Archaeological Assessment of the project area, the results of previous archaeological studies, as well as organizational response, individual cultural informant responses, and archival research, it is reasonable to conclude that, pursuant to Act 50, the exercise of native Hawaiian rights, or any ethnic group, related to gathering, access or other customary activities will not be affected by development activities on this parcel. The property owner will not restrict shoreline access for fishing and gathering purposes, as is protected by law. No cultural activities were identified within the project area, and the proposed undertaking will not produce adverse effects to any native Hawaiian cultural practices.

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APPENDIX A: PUBLIC NOTICES AND AFFIDAVITS

CULTURAL IMPACT ASSESSMENT NOTICE

Information requested by Scientific Consultant Services, Inc. of cultural resources and/or cultural practices on a 0.958-acre property located on lands of Kanane and ʻOpihikao Ahupuaʻa, Puna District, Island of Hawaiʻi [TMK: (3) 1-3-004:008]. Please respond within 30 days to Glenn Escott at (808) 938-0968.

September 2016 Ka Wai Ola Public Notice.

AFFIDAVIT OF PUBLICATION

IN THE MATTER OF
SCS1965 Meurer Opihikao CIA Public Notices

STATE OF HAWAII }
} SS.
City and County of Honolulu }

Doc. Date: SEP 15 2016 **# Pages:** 1
Notary Name: COLLEEN E. SORANAKA First Judicial **Circuit**
Doc. Description: Affidavit of Publication

Notary Signature SEP 15 2016 Date

COLLEEN E. SORANAKA NOTARY PUBLIC No. 90-263 STATE OF HAWAII

Lisa Kaukani being duly sworn, deposes and says that she is a clerk, duly authorized to execute this affidavit of Oahu Publications, Inc. publisher of The Honolulu Star-Advertiser, MidWeek, The Garden Island, West Hawaii Today, and Hawaii Tribune-Herald, that said newspapers are newspapers of general circulation in the State of Hawaii, and that the attached notice is true notice as was published in the aforementioned newspapers as follows:

CULTURAL IMPACT ASSESSMENT NOTICE
Information requested by Scientific Consultant Services, Inc. of cultural resources and/or cultural practices on a 0.958-acre property located on lands of Kanane and 'Opihikao Ahupua'a, Puna District, Island of Hawai'i [TMK: (3) 1-3-004:008]. Please respond within 30 days to Glenn Escott at (808) 938-0968. (SA912435 9/11, 9/14, 9/15/16)

Honolulu Star-Advertiser 3 times on:
09/11, 09/14, 09/15/2016
MidWeek 0 times on:
The Garden Island 0 times on:
Hawaii Tribune-Herald 0 times on:
West Hawaii Today 0 times on:
Other Publications: 0 times on:

And that affiant is not a party to or in any way interested in the above entitled matter.

Lisa Kaukani

Subscribed to and sworn before me this 15th day of September A.D. 2016

Colleen E. Soranaka, Notary Public of the First Judicial Circuit, State of Hawaii
My commission expires: Jan 06 2020

COLLEEN E. SORANAKA NOTARY PUBLIC No. 90-263 STATE OF HAWAII

Ad # 0000912435

SP.NO.: _____ L.N.

September 2016 Honolulu Star-Advertiser Public Notice.

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IN THE MATTER OF
SCS1965 Meurer Opihikao CIA Public Notices

STATE OF HAWAII }
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Doc. Description: Affidavit of Publication

SEP 15 2016
Notary Signature Date

COLLEEN E. SORANAKA NOTARY PUBLIC No. 90-263 STATE OF HAWAII

CULTURAL IMPACT ASSESSMENT NOTICE
Information requested by Scientific Consultant Services, Inc. of cultural resources and/or cultural practices on a 0.958-acre property located on lands of Kanane and 'Opihikao Ahupua'a, Puna District, Island of Hawai'i [TMK: (3) 1-3-004:008]. Please respond within 30 days to Glenn Escott at (808) 938-0968. (HTH912441 9/11, 9/14, 9/15/16)

Lisa Kaukani being duly sworn, deposes and says that she is a clerk, duly authorized to execute this affidavit of Oahu Publications, Inc. publisher of The Honolulu Star-Advertiser, MidWeek, The Garden Island, West Hawaii Today, and Hawaii Tribune-Herald, that said newspapers are newspapers of general circulation in the State of Hawaii, and that the attached notice is true notice as was published in the aforementioned newspapers as follows:

Honolulu Star-Advertiser 0 times on:

MidWeek 0 times on:

The Garden Island 0 times on:

Hawaii Tribune-Herald 3 times on:
09/11, 09/14, 09/15/2016

West Hawaii Today 0 times on:

Other Publications: 0 times on:

And that affiant is not a party to or in any way interested in the above entitled matter.

Lisa Kaukani

Lisa Kaukani

Subscribed to and sworn before me this 15th day of September A.D. 2016

Colleen E. Soranaka, Notary Public of the First Judicial Circuit, State of Hawaii
My commission expires: Jan 06 2020

COLLEEN E. SORANAKA NOTARY PUBLIC No. 90-263 STATE OF HAWAII

Ad # 0000912441 SP.NO.: _____ L.N.

September 2016 Hawai'i Tribune-Herald Public Notice.