NEIL ABERCROMBIE
GOVERNOR OF HAWAI'I

FILE COPY

JUL 08 2013

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ESTHER KIA'AINA
FIRST DEPUTY

WILLIAM M. TAM
DEPUTY DIRECTOR - WATER

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

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

REF:OCCL:TM

CDUA: HA-3676
Acceptance Date: June20, 2013
180-Day Exp. Date: December 14, 2013
SUSPENSE DATE: 21 Days from stamped date

JUN 24 2013

MEMORANDUM

TO: Genevieve Salmonson, Interim Director
Office of Environmental Quality Control

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

SUBJECT: Draft Environmental Assessment (EA) for Conservation District Use Application (CDUA) HA-3676 for a Single Family Residence & Related Improvements Located at Keonepoko Iki, Puna, County of Hawai`i, TMK: (3) 1-5-009:035

The Department of Land and Natural Resources has reviewed the draft EA for the subject project, and anticipates a Finding of No Significant Impact (FONSI) determination. Please publish notice of availability for this project in the July 8, 2013 issue of the Environmental Notice. We have enclosed a hard copy and a pdf. copy on CD of the draft EA document. A copy of our acceptance letter and a copy of the applicant's Publication Form are also enclosed. An electronic copy of the Publication Form will be forwarded by email to OEQC.

Should you wish to provide comments regarding this project, please respond by the suspense date noted above. If no response is received by the suspense date, we will assume there are no comments. Please contact Tiger Mills of our Office of Conservation and Coastal Lands staff at 587-0382 should you have any questions.

Enclosures

RECEIVED
'13 JUN 24 P4:14
OFC. OF ENVIRONMENTAL QUALITY CONTROL

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ESTHER KIA'AINA
FIRST DEPUTY

WILLIAM M. TAM
DEPUTY DIRECTOR - WATER

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

REF:OCCL:TM

CDUA: HA-3676
Acceptance Date: June20, 2013
180-Day Exp. Date: December 14, 2013

James M. Leonard
JM Leonard Planning, LLC.
1100 Ainalako Road
Hilo, HI 96820

JUN 2 4 2013

Dear Mr. Leonard:

NOTICE OF ACCEPTANCE AND PRELIMINARY ENVIRONMENTAL DETERMINATION
Conservation District Use Application (CDUA) HA-3676
(Board Permit)

This acknowledges the receipt and acceptance for the processing of your client's CDUA for a Single Family Residence (SFR) and associated improvements located at Keonepoko Iki, Puna, island of Hawaii, TMK: (3) 1-5-009:035. The subject parcel is approximately 2.181-acres and lies within the Resource subzone of the Conservation District.

According to the application, the proposed house site is located in the interior of the lot in an existing clearing and setback approximately 235-feet from the sea cliff. An area less than half an acre would be cleared for the construction of the house, driveway and related utilities with minimal grading.

The proposed residence would be a two-story structure, slab on grade and approximately 25-feet in height with 3 bedrooms, 2 bathrooms with a great room comprising the kitchen, dining and living room areas, a family room, 2 covered lanais and a garage. Other planned improvements include an individual wastewater system, a 12,000 gallon water tank, utility poles and lines, a paved driveway, stone pavings and landscaping.

Flora and fauna are characterized as being dominantly non-native species. No rare or endangered species were found on the property as a result of the flora and fauna survey conducted of the property. Native plants include a few hala and naupaka that are found in the makai portion of the property that will remain undisturbed. Common shorebirds may be observed on the rocky shoreline. Endangered species such as the Hawaiian Hawk, Hoary Bat, Petrel and Newell's Shearwater may overfly or be present in the general area.

The applicant has completed an archaeological survey of the property and a Cultural Impact Assessment. Based upon those studies, there does not appear to be any evidence of archaeological resources on the site and the CIA did not reveal any cultural resources or practices occurring on or near the site that may be affected by the proposed construction.

DRAFT ENVIRONMENTAL ASSESSMENT

YERMIAN SINGLE-FAMILY RESIDENCE IN THE CONSERVATION DISTRICT AT KEONEPOKO IKI

June 2013

TMK (3rd): 1-5-009:035
Keonepoko Iki, Puna, County of Hawai‘i, State of Hawai‘i

APPLICANT:

David A. Yermian
1824 Loma Vista Dr
Beverly Hills CA 90210

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

DRAFT ENVIRONMENTAL ASSESSMENT
YERMIAN SINGLE-FAMILY RESIDENCE IN THE CONSERVATION DISTRICT AT KEONEPOKO IKI

TMK (3rd): 1-5-009:035
Keonepoko Iki, Puna, County of Hawai‘i, State of Hawai‘i

APPLICANT:

David A. Yermian
1824 Loma Vista Dr
Beverly Hills CA 90210

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

CLASS OF ACTION:

Use of Land in Conservation District

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

[This page intentionally left blank]

TABLE OF CONTENTS

SUMMARY OF PROJECT, ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

David Yermian (the applicant) seeks a Conservation District Use Permit (CDUP) to build a single-family residence and related improvements on a 2.181-acre lot located *makai* of the Old Government Road, adjacent to an existing developed lot, just northwest of the Hawaiian Shores subdivision in the Puna District of the Island of Hawai‘i. The proposed home will be 4,470 square feet, including the two-story house and garage. The home will have three bedrooms and two baths, and will be set back a minimum of 110 feet from the shoreline at an elevation of approximately 36 feet above sea level, outside the flood zone. An Individual Wastewater System in compliance with State Department of Health regulations will be built. Other features include a driveway, poles and lines for utilities and a catchment water tank with a capacity of 12,000 gallons to provide both water supply and fire flow.

The lot was cleared several decades ago in connection with a former residence that has since been demolished, and it contains almost entirely non-native vegetation except near the shoreline, where some *naupaka* and *hala* trees are present. The *makai* third of the long narrow property also has a grove of coconuts and Cook Island Pines. Except where clearing for the residence area and driveway is necessary, the existing vegetation on the lot will be left intact. 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. No modification to the terrain or vegetation within the minimum 110-foot area between the shoreline and the residence will occur. Archaeological survey has determined that no historic properties are present.

Landclearing and construction activities would occur over less than an acre, which would produce 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. Archaeological survey has determined that no sites are present, and research and consultation has revealed no cultural practices on the site. 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.

PART 1: PROJECT DESCRIPTION AND E.A. PROCESS

1.1 Project Description and Location

David Yermian (the applicant) seeks a Conservation District Use Permit (CDUP) to build a single-family residence and related improvements on a 2.181-acre lot located *makai* of the Old Government Road, adjacent to an existing developed lot, just northwest of the Hawaiian Shores subdivision in the Puna District of the Island of Hawaiʻi (see Figures 1-2).

The proposed home will be 4,470 square feet, including the two-story house and garage (Figure 3). The home will have three bedrooms and two baths, and will be set back a minimum of 110 feet from the shoreline at an elevation of approximately 36 feet above sea level, outside the flood zone. An Individual Wastewater System in compliance with State Department of Health regulations will be built. Other features include a driveway, poles and lines for utilities and a catchment water tank with a capacity of 12,000 gallons to provide both water supply and fire flow.

The lot was cleared several decades ago in connection with a former residence that has since been demolished, and it contains almost entirely non-native vegetation except near the shoreline, where some *naupaka* and *hala* trees are present. Archaeological survey has determined that no historic properties are present. The *makai* third of the long narrow property also has a grove of coconuts and Cook Island Pines. The house site was chosen to avoid shoreline vegetation and take advantage of any existing clearing that provides sunlight and air, where only 6 to 10 coconut trees will require removal. Except where clearing for the residence area and driveway is necessary, the existing vegetation will be left intact. No modification to the terrain or vegetation within the minimum 110-foot area between the shoreline and the residence will occur.

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. 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.

Figure 1a Project Location Map

Figure 1b TMK Map (Plat 1-5-009, por.)

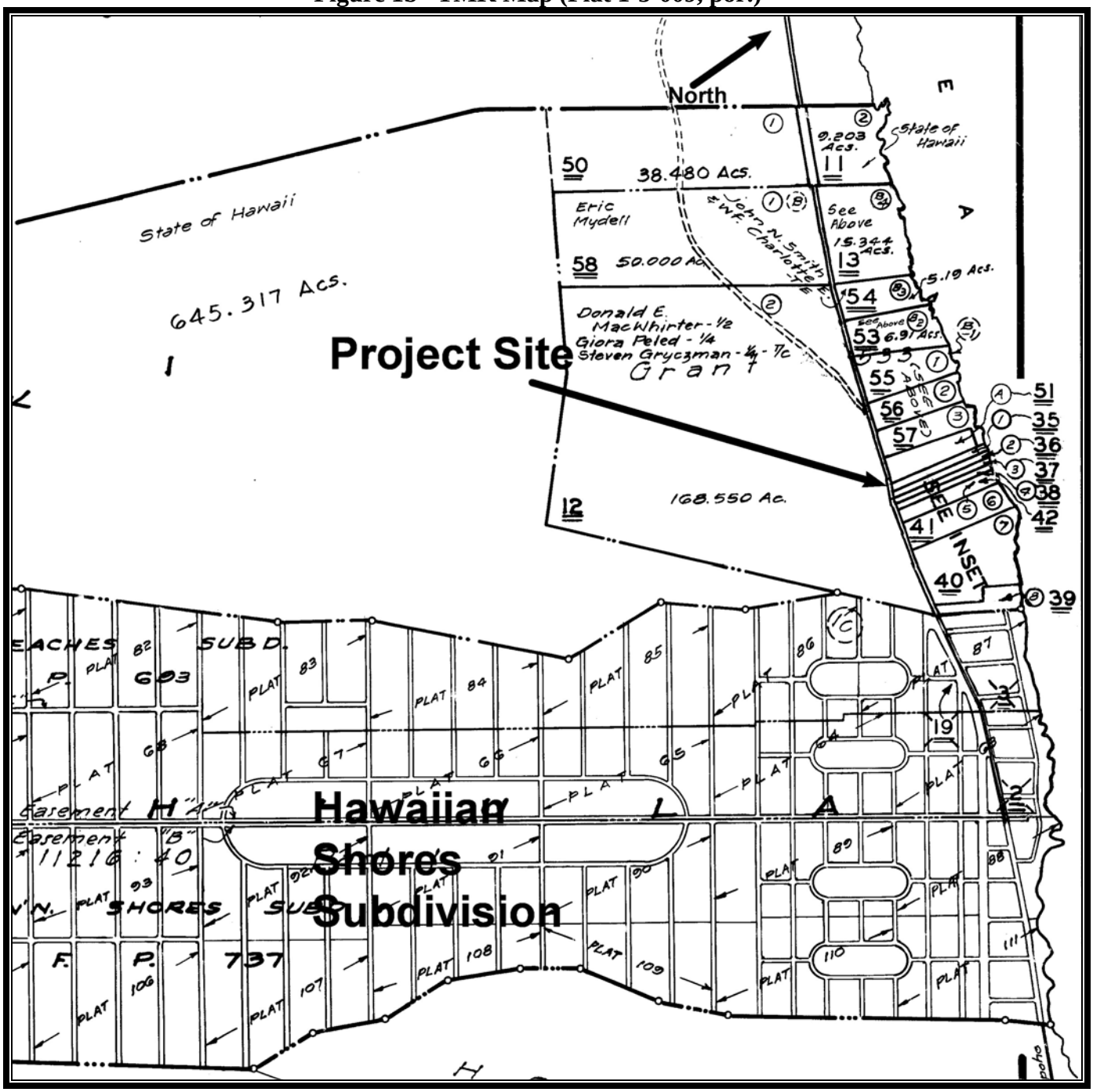
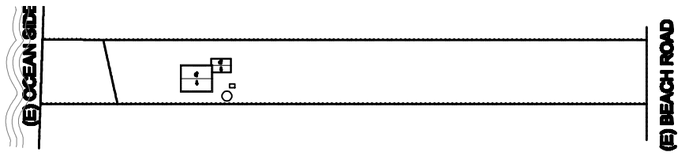


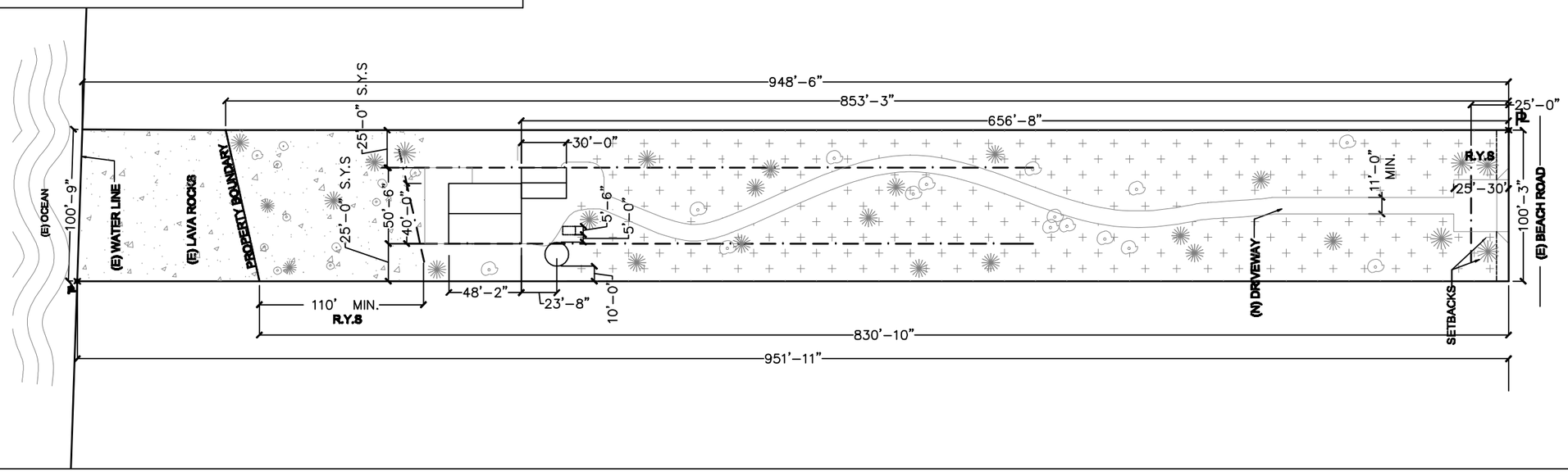
Figure 2a Site Photos: Aerial View

Figure 2b-c. Site Photos. Top: Coastal Bluff. Bottom: Building Site.

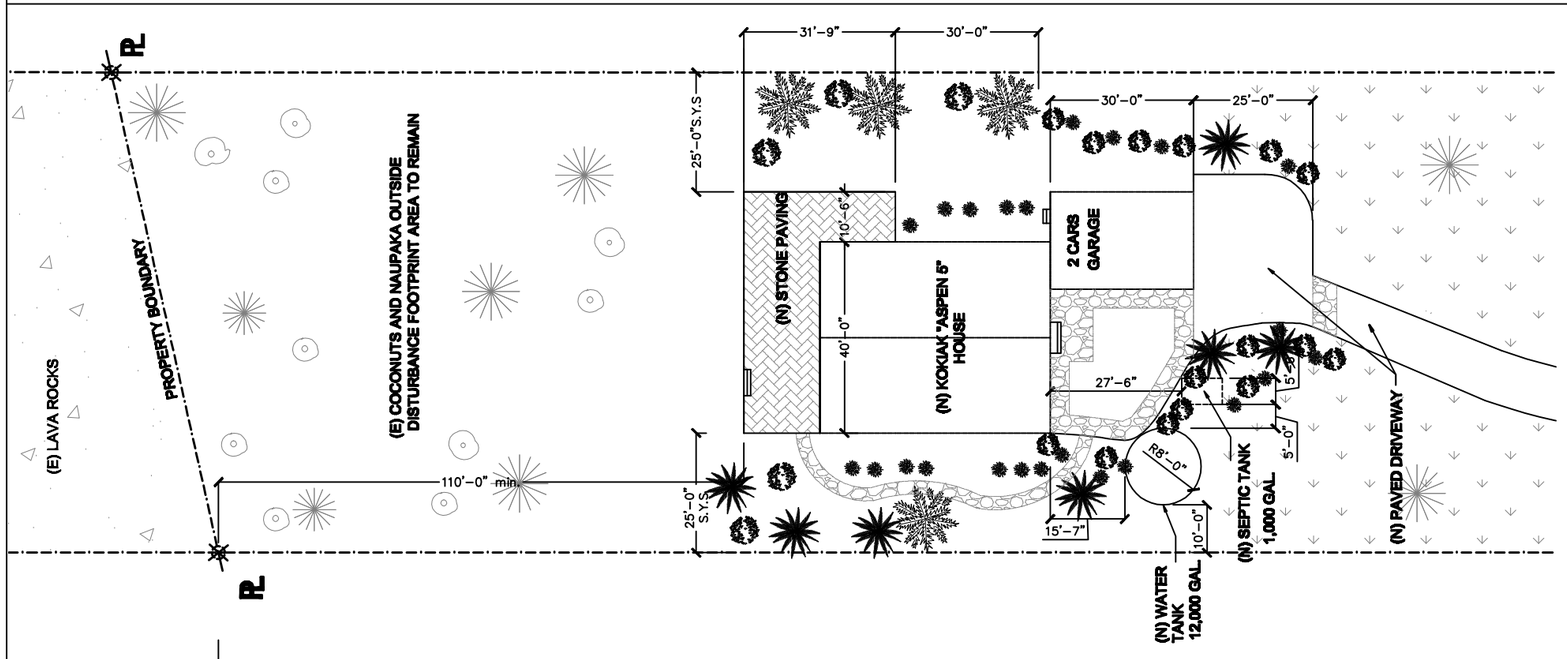
Figure 2d-e. Site Photos. Top: Interior Vegetation. Bottom: Former Dumping on Adjacent Property



PLOT PLAN N.T.S



SITE PLAN SCALE: 1"=80'-0"



ENLARGED PARTIAL SITE PLAN SCALE: 1/32"=1'-0"

PROJECT DESCRIPTION:

* LOT 1, KEONEPOKO IKI, PUNA, HAWAII
* 948'x 100' APPROX.= 94,800 SQ. FT. APPROX.
* PROPOSED HOUSE (KODIAK STEEL HOMES /ASPEN 5)
  1ST FLOOR 40'x48'=1,920 SQ.FT.
  2ND FLOOR 40'x48'=1,920 SQ.FT.
  TOTAL LIVING AREA =3,840 SQ.FT.

2-CAR GARAGE (KODIAK / 1A) 21'x30'= 630 SQ.FT.

12,000 GAL. WATER TANK 201 SQ.FT

DEVELOPMENT AREA= 4,671 SQ.FT.

HABITANT CLASSIQUE INC.
ARCHITECTURAL, ENGINEERING, CONSTRUCTION SERVICES
109 E. ARROW HWY., SAN DIMAS, CA 91773
PHONE: (626) 380-8028 FAX: (626) 380-8028

S.F.D. HOME
DEVELOPED FOR
DAVID YEREMIAN
LOT 1, KEONEPOKO IKI, PUNA, HAWAII
TMK 1-5-009-035

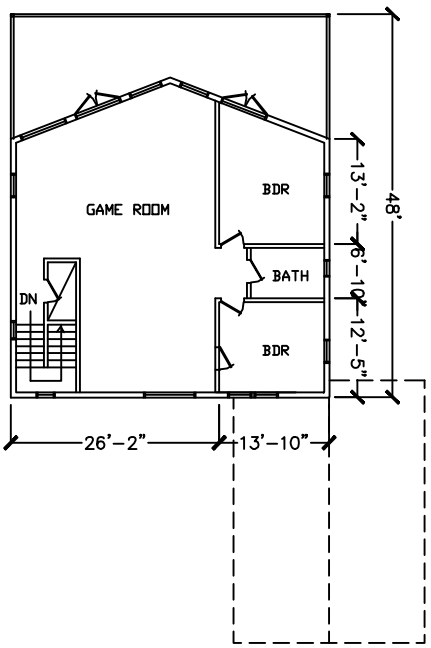
TITLE SHEET
PROPOSED SITE PLAN

DATE	
JOB NO.	A1206
BID SET	__/__/__
PLAN CHECK	__/__/__
PERMIT SET	__/__/__
PRINT DATE	10/15/12
	__/__/__
	__/__/__

A1.0
SHEET

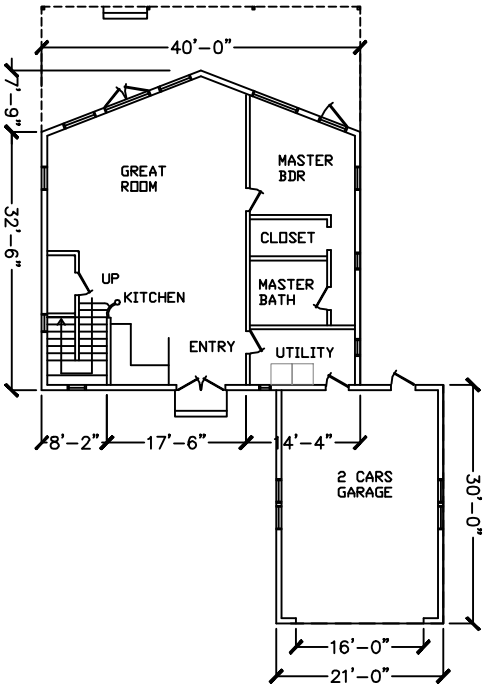
[This page intentionally left blank]

2ND FLOOR PLAN



SCALE: 0 1' 3' 5' 10' 25'

GROUND FLOOR PLAN



SCALE: 0 1' 3' 5' 10' 25'

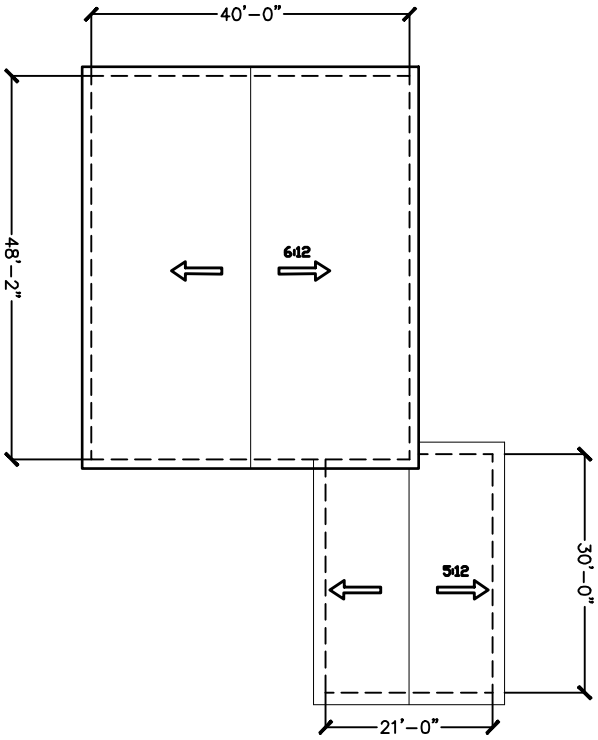
ROOF PLAN

PROJECT DESCRIPTION:

* LOT 1, KEONEPOKO IKI, PUNA, HAWAII
* 948'x 100' APPROX.= 94,800 SQ. FT. APPROX.
* PROPOSED HOUSE (KODIAK STEEL HOMES /ASPEN 5)
  1ST FLOOR 40'x48'=1,920 SQ.FT.
  2ND FLOOR 40'x48'=1,920 SQ.FT.
  TOTAL LIVING AREA =3,840 SQ.FT.

  2-CAR GARAGE (KODIAK / 1A)
  21'x30'= 630 SQ.FT.
  12,000 GAL. WATER TANK 201 SQ.FT

DEVELOPMENT AREA= 4,671 SQ.FT.



SCALE: 0 1' 3' 5' 10' 25'

A2.0

SHEET

DATE	
JOB NO.	A1206
BID SET	
PLAN CHECK	
PERMIT SET	
PRINT DATE	10/15/12

TITLE SHEET

PROPOSED FLOOR PLANS

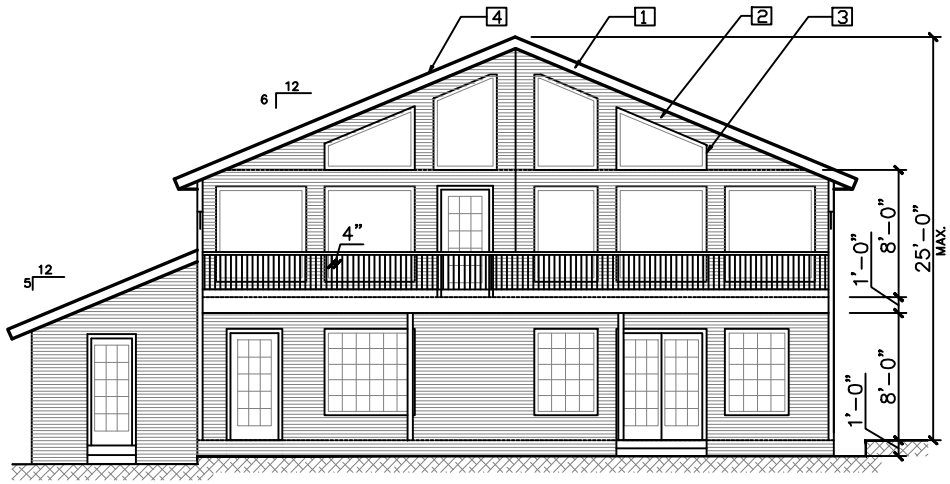
S.F.D. HOME

DEVELOPED FOR

DAVID YEREMIAN

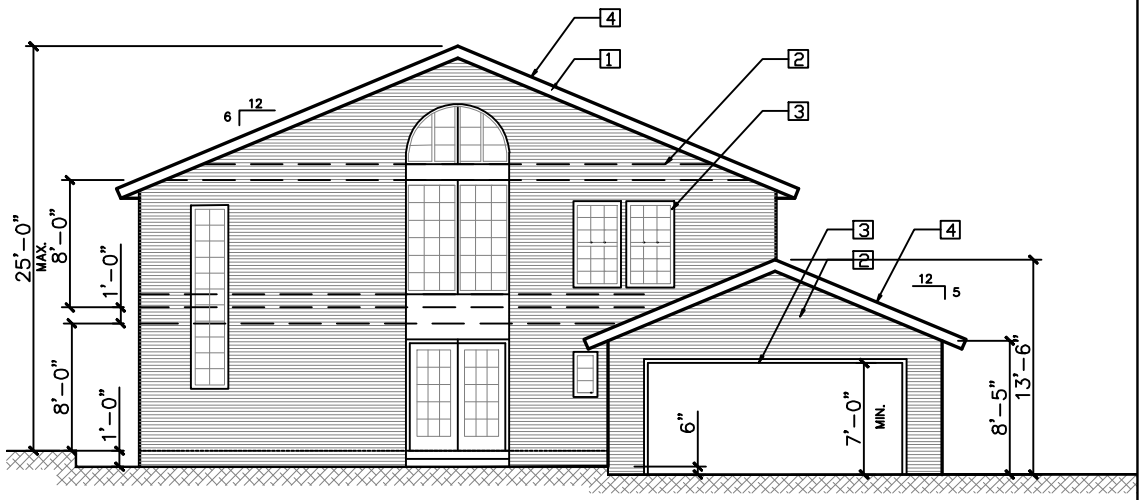
LOT 1, KEONEPOKO IKI, PUNA, HAWAII
TMK 1-5-009-035

HABITANT CLASSICUS INC.
ARCHITECTURE | INTERIORS | CONSTRUCTION
109 E. ARROW HWY., SAN DIMAS, CA 91773
PHONE: (909) 305-9028 FAX: (909) 305-9028



NORTH ELEVATION

SCALE: 0 1' 5' 10' 3'



SOUTH ELEVATION

SCALE: 0 1' 5' 10' 3'

1. ROOF TRIM: KODIAK POLYVINYL
   OR EQUAL
   COLOR: WHITE
2. POLYVINYL SIDING: REYNOLD
   EASY STREET D4 OR EQUAL
   COLOR: STONE CHAMPAGNE
3. TRIM: KODIAK POLYVINYL
   OR EQUAL
   COLOR: STONE WHITE
4. ROOF: KODIAK STEEL
   OR EQUAL
   COLOR: CLASSIC GREEN OR EQUAL

HAINTANT CLASSIQUE INC.
ARCHITECTURE, DESIGNING, CONTRACTOR SERVICES
109 E. ARROW HWY., SAN DIMAS, CA 91773
PHONE: (626) 380-8028 FAX: (626) 380-8028

S.F.D. HOME

DEVELOPED FOR
DAVID YEREMIAN
LOT 1, KEONEPOKO IKI, PUNA, HAWAII
TMK 1-5-009-035

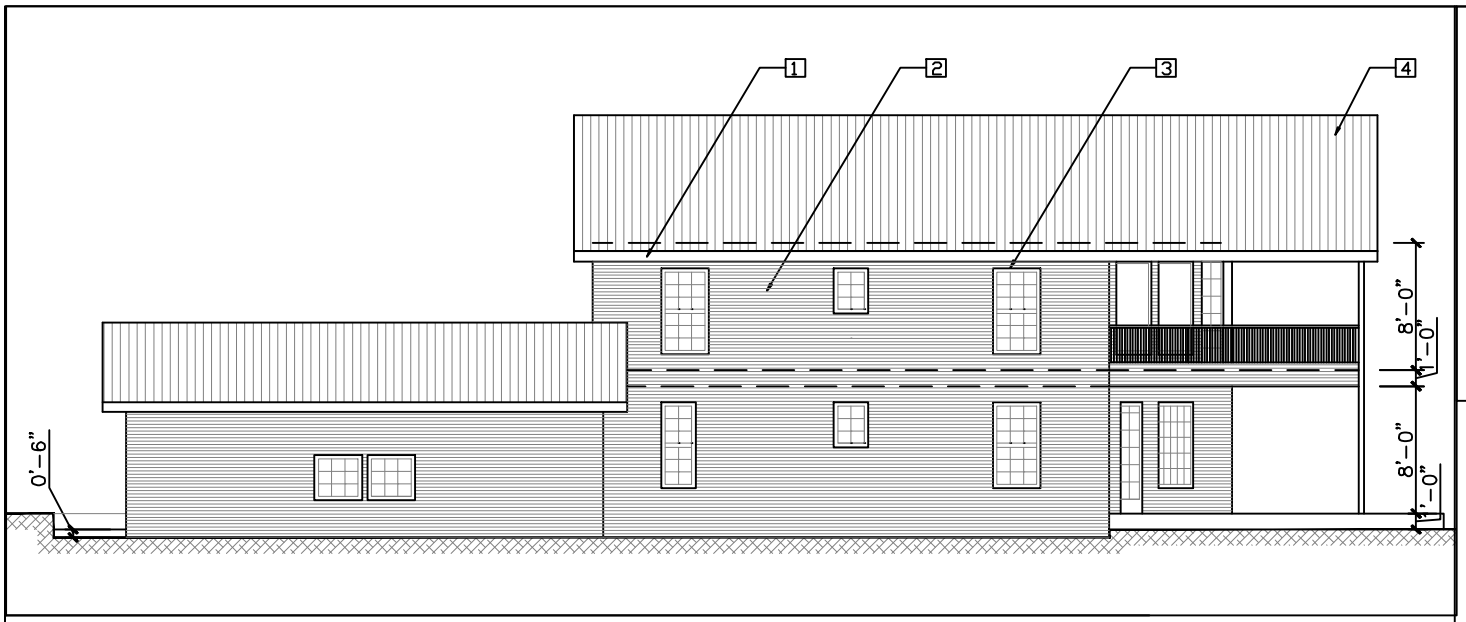
TITLE SHEET

PROPOSED NORTH AND SOUTH ELEVATIONS

DATE	
JOB NO.	A1206
BID SET	__/__/__
PLAN CHECK	__/__/__
PERMIT SET	__/__/__
PRINT DATE	10/15/12
△	__/__/__
△	__/__/__
△	
△	
△	

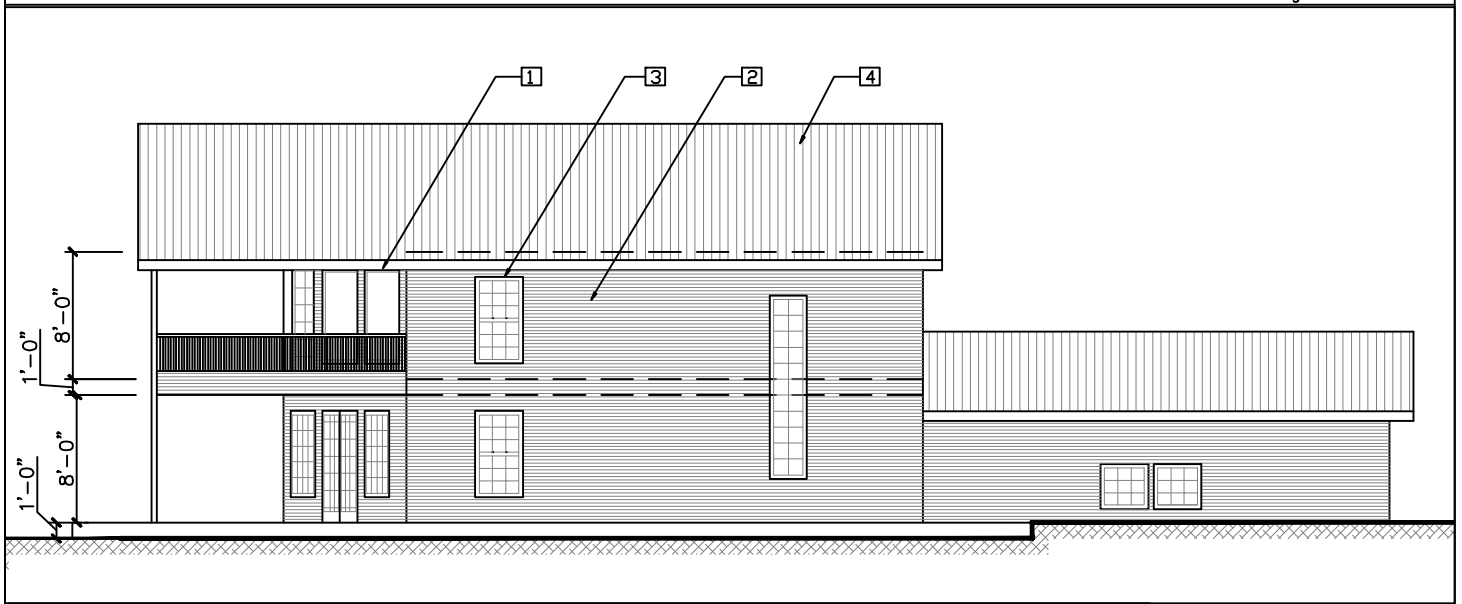
A3.0

SHEET



EAST ELEVATION

SCALE: 0 1' 3' 5' 10'



WEST ELEVATION

SCALE: 0 1' 3' 5' 10'

1 ROOF TRIM: KODIAK POLYVINYL OR EQUAL
COLOR: WHITE

2 POLYVINYL SIDING: REYNOLD EASY STREET D4 OR EQUAL
COLOR: STONE CHAMPAGNE

3 TRIM: KODIAK POLYVINYL OR EQUAL
COLOR: STONE WHITE

4 ROOF: KODIAK STEEL OR EQUAL
COLOR: CLASSIC GREEN OR EQUAL

HAINTANT CLASSIQUE INC.
ARCHITECTURE, DESIGNING, CONTRACTOR SERVICES
109 E. ARROW HWY., SAN DIMAS, CA 91773
PHONE: (626) 380-8028 FAX: (626) 380-8028

S.F.D. HOME

DEVELOPED FOR
DAVID YEREMIAN
LOT 1, KEONEPOKO IKI, PUNA, HAWAII
TMK 1-5-009-035

TITLE SHEET

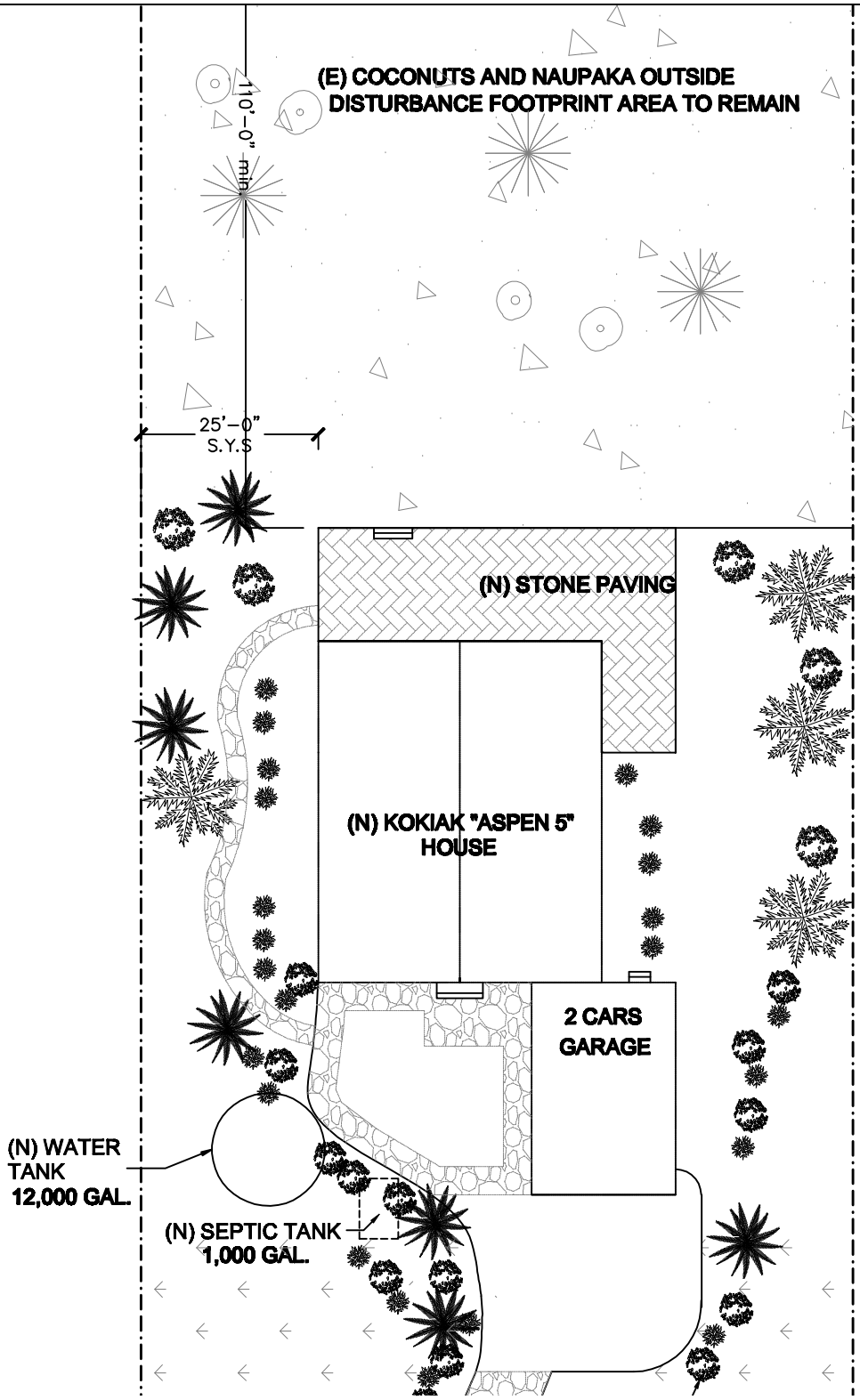
PROPOSED EAST AND WEST ELEVATIONS

DATE	
JOB NO.	A1206
BID SET	__/__/__
PLAN CHECK	__/__/__
PERMIT SET	__/__/__
PRINT DATE	10/15/12
△	__/__/__
△	__/__/__
△	
△	
△	

A4.0

SHEET

LANDSCAPE PLAN



LANDSCAPE DESCRIPTION:

* LOULU PALM (PRITCHARDIA SP.)
* HINAHINA KAHAKAI (VITEX ROTUNDIFOLIA)
* HALA (PANDANUS TECTORIUS)
* NAUPAKA (SCAVEOLA TACCADA)
* TIARE OR NANU GARDENIA (GARDENIA TAITENSIS))

DATE	
JOB NO.	A1206
BID SET	
PLAN CHECK	
PERMIT SET	
PRINT DATE	10/15/12

PROPOSED LANDSCAPE PLAN

TITLE SHEET

S.F.D. HOME

DEVELOPED FOR

DAVID YEREMIAN

LOT 1, KEONEPOKO IKI, PUNA, HAWAII
TMK 1-5-009-035

HABITANT CLASSIQUE INC.
ARCHITECTURE | CONSTRUCTION
109 E. ARROW HWY., SAN DIMAS, CA 91773
PHONE: (626) 300-9028 FAX: (626) 300-9028

SHEET L 1.0

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 Hawaiian Home Lands
- Department of Health
- Department of Land and Natural Resource (DLNR)
- Office of Hawaiian Affairs

Private:
- Sierra Club
- Malama O Puna
- Adjacent Property Owners

Copies of communications received during early consultation are contained in Appendix 1a.

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 home site, 110 feet from the shoreline, was chosen in order to enjoy coastal breezes and views on a property that in its inland section is very densely vegetated with non-native trees, while avoiding the actual shoreline area and its resources and hazards. The house site was chosen to avoid shoreline vegetation and take advantage of any existing clearing that provides sunlight and air, where only 6 to 10 coconut trees will require removal. There are no public trails and there is very little public use of the rugged shoreline area, and there are no public vistas or sightlines that would be impaired. The proposed home location is a reasonable and environmentally sensible location on the property.

2.2 No Action

Under the No Action Alternative, the residence would not be built. The lot would remain unused. Persistent trash dumping, including potentially toxic materials and bulky items that the owner has had to periodically remove, would remain a severe problem, as it has in all surrounding vacant land in this area (see Figure 2e). This EA considers the No Action Alternative as the baseline by which to compare environmental effects from the project. No other alternative uses for the property are currently desired by the applicant, and thus none are addressed in this EA.

PART 3: ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION

The long, narrow 2.181-acre property is located between the shoreline and the unpaved Government Beach Road and is flanked by similar shoreline lot; the lot to the east contains a residence (see Figures 1-3). It is presently vacant and unused and is covered with dense, primarily non-native vegetation except near the shoreline (see photos in Figure 2). At its highest point the lot is approximately 50 feet above mean sea level.

3.1 Physical Environment

3.1.1 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 *ahupua‘a* of Keonepoko Iki, on lava flows dated at between 200 and 750 years ago, including a portion of the massive ‘Ai La‘au Flow (Wolfe and Morris 1996). Soil in the area is Malama extremely cobbly highly decomposed plant material, 2 to 40 percent slopes (U.S. Soil Conservation Service 1973). This well-drained soil is formed from organic material on ‘a‘a parent material and 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. This area receives an average of about 120 inches of rain annually, with a mean annual temperature of approximately 75 degrees Fahrenheit (Giambelluca et al 2012; UH Hilo-Geography 1998:57).

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 3 on a scale of ascending risk 9 to 1 (Heliker 1990:23). The relatively high hazard risk is because Kilauea is an active volcano. In Zone 3, approximately 1-5 percent of the land area has been covered by lava flows since 1800, but more than 75 percent has been covered in the last 750 years. As such, there is modest risk of lava inundation over short time scales on the subject property.

In terms of seismic risk, the entire Island of Hawai‘i is rated Zone 4 Seismic Hazard (*Uniform Building Code, 1997 Edition*, Figure 16-2). Zone 4 areas are at risk from major earthquake damage, especially to structures that are poorly designed or built. The project site does not appear to be subject to subsidence, landslides or other forms of mass wasting.

Impacts and Mitigation Measures

In general, geologic conditions impose no constraints on the proposed action, as much of Hawai‘i Island faces similar volcanic and seismic hazard and yet continues to be the fastest growing region of the State. It is important to note in this EA that DLNR-OCCL may not share this assessment. In their comment letter to early consultation, they stated:

> "Research shows that the Puna District on the Island of Hawaii is considered one of the most frequently flooded and hardest hit by flash floods on the Big Island and perhaps the entire state. The overall hazard assessment (OHA) for the Nanawale-Makuʻu coastal region runs from high (6/7) to moderate-high (5/7); this includes impacts associated with tsunamis, stream flooding, high waves, high winds and volcanic/seismic activity"

In evaluating the applicability of this statement, it is important to note that the Puna District is as large as the island of Oʻahu and has highly variable conditions. Although tsunami, high waves, high winds, stream flooding, and volcanic/seismic activity are all possible at some location in Puna, only seismic activity is a substantial potential hazard throughout the entire district, and it is highly inaccurate to assign all hazards that could occur in a large district to any particular site. In terms of the proposed single-family home location at Keonepoko that is under consideration:

- Tsunami: The home would be located 36 feet above sea level, 110 feet back from the shoreline (and about 200 feet from open water) in an area with no evidence of tsunami inundation, out of the flood zone. *Other than mega-tsunami of the type that would inundate all of Hilo and Honolulu, the site is not at risk of tsunami.*
- High waves: The position of the home site 36 feet above sea level, 110 feet back from the shoreline takes it completely out of the area affected by high waves. *The site is not affected by high waves.*
- High winds: Research in fact indicates that this part of the Puna District is *not* known to regularly experience high winds and has much gentler winds than the majority of the Big Island coastline, including the long large stretches of coastline from Kapoho to Manuka and from Kiholo to Laupahoehoe[1]. *The site is not subject to high winds.*
- Stream flooding: the nearest stream is the intermittent Waipahoehoe Stream, more than five miles away. *The site is not affected by stream flooding.*
- Volcanic hazard: As discussed above, the site shares the same level of volcanic hazard as most of Puna, as well as the most populated area of the Big Island, the city of Hilo. *The level of volcanic hazard at the site is typical of that borne by over 100,000 residents of East Hawaiʻi and is not undue.*
- Seismic hazard. As discussed above, the site shares the same level of seismic hazard as the entire island of Hawaiʻi. *The level of seismic hazard is at the site typical of that borne by over 180,000 residents of Hawaiʻi and is not undue.*

The applicant understands that there are geologic and climatic hazards associated with any home in East Hawaiʻi, and like 100,000 other residents before him, has made the decision that a residence is not imprudent to construct or inhabit.

[1] See, e.g., maps of wind speed produce by HELCO for potential wind power showing low average wind speeds at Keonepoko: http://www.heco.com/portal/site/heco/menuitem.508576f78baa14340b4c0610c510b1ca/?vgnextoid=596c5e658e0fc010VgnVCM1000008119fea9RCRD&cpsextcurrchannel=1

3.1.2 Flood Zones and Shoreline Setting

Floodplain Environmental Setting, Impacts and Mitigation Measures

Floodplain status for many areas of the island of Hawai‘i has been determined by the Federal Emergency Management Agency (FEMA), which produces the National Flood Insurance Program’s Flood Insurance Rate Maps (FIRM). The map for the project area is 1551661150C, has not been printed. The home building site is classified in Flood Zone X, areas outside the mapped 500-year floodplain, with minimal tsunami inundation.

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.

In the case of this property, 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 Government Beach Road at the back of the property. As discussed above, the proposed home would be outside the Flood Zone, at a distance of about 110 feet from the shoreline.

The amendments to Title 13, Chapter 5, Hawai‘i Administrative Rules (Conservation District), adopted at the BLNR meeting of August 12, 2011, specify new procedures for determining the shoreline setback. Exhibit 4 of the rules state:

> “The shoreline setback line shall be established based on a setback distance from the certified shoreline of 40 feet plus 70 times the average annual coastal erosion rate, based on a coastal erosion study as defined in this chapter. No shoreline setback shall be established for any lot subject to this chapter unless the application for a shoreline setback line includes a shoreline survey certified by the department not more than 12 months prior to submission of the permit application. The shoreline setback line shall be based on the average lot depth (ALD) measured from the current shoreline. For lots with an ALD of two hundred feet or less, the shoreline setback line shall be established based on the ALD of the lot, as provided in Table 1, or based on 40 feet plus 70 times the annual erosion rate. The applicant may choose the lesser of the two methods, but in no case shall the shoreline setback line be calculated to be less than 40 feet. The department may waive the requirement for coastal erosion study based on supportive documentation from the applicant. Such documentation may include, but is not limited to, county or state approved coastal erosion rate data provided through the University of Hawaii, School of Ocean, Earth Science, and Technology, or evidence that the erosion rate is zero.”

Coastal Erosion Analysis

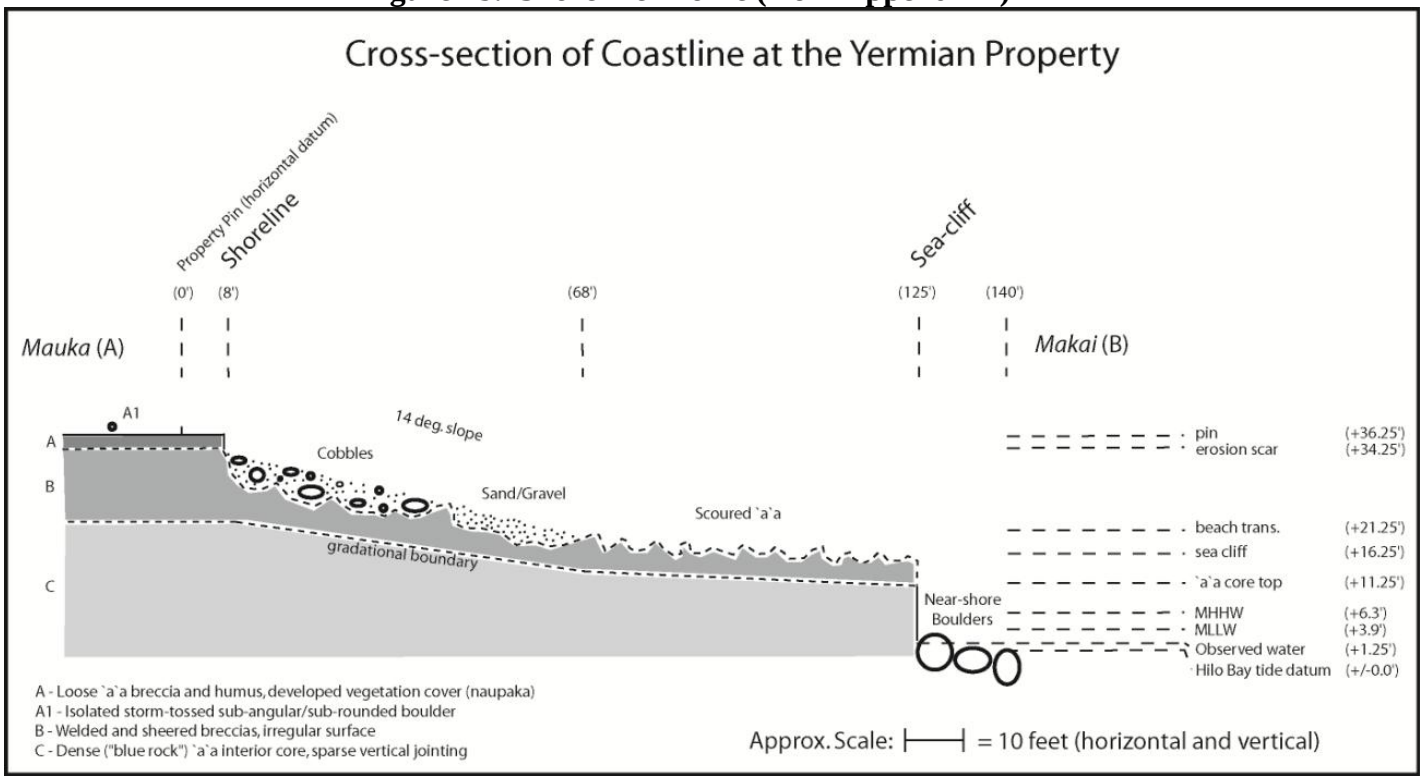
A coastal erosion analysis performed for the property by geologist John P. Lockwood, Ph.D., is attached as Appendix 2 and summarized below. The property was inspected on March 9, 2012, as the tide dropped from 1.98 to .54 feet above the tidal datum, and there were moderate northwest waves and whitecaps.

The lava flow underlying the subject property and forming the coast is a dense ‘a‘a flow with a surface displaying intense shearing and welding of the breccia. The few vesicles within the basalt are angular and elongate, consistent with the internal dynamic forces of a cooling ‘a‘a flow. These flows are geologically young, even for Hawai‘i Island. For this reason the area around Nanawale Bay to the southeast is characteristically rocky, with small cliffs and little reef or sandy beach development.

The shoreline is easily distinguished as a cut bank of about two foot height, eight feet seaward of the property’s southeast corner pin. On top of this bank is dense *naupaka* growth with some large Cook Island pine trees also standing within twenty feet of the shoreline. The “beach”, per se, is a slightly sloping (14 degrees) accumulation of well-worn cobbles and boulders overlying the basal substrate of ‘a‘a (Figure 4a and 4b). This ‘a‘a shelf is scoured clean by storm waves and extends another 60 feet (with an almost horizontal slope) to a 10 to 15-foot high sea cliff. The cliff is very stable, as there is little jointing or fracturing of the ‘a‘a interior. This core or blue rock interior is highly resistant to erosion even by powerful marine wave action, forming a stable “toe” for the beach. Major failures are unlikely. The top of the sea-cliff is 10.25 feet higher than the Mean Highest-High Water (MHHW). The vegetated part of the property is more than 25 feet higher, above 36 feet above sea level.

Figure 4a Shoreline: Cobble and Gravel Beach Fronting Property, View East

Figure 4b. Shoreline Profile (from Appendix 2)



Where it has not been impacted by the erosive power of storm waves, the ‘a‘a flow underlying the areas is overlain by a normal, rubbly layer of ‘a‘a breccia that characterizes the land inland from the coast. Where it is subject to the power of storm or tsunami waves, however, closer to the ocean, the top of the lava flow has been eroded vertically by waves overtopping the coastal sea cliff, which have washed away this loose material. The “blue rock”, interior core of this ‘a‘a flow is extremely durable, and is not subject to appreciable horizontal erosion.

The offshore boulder bed buffers wave energy much of which is expended before impacting the cliff. These boulders are too big, some of more than five foot diameter, to be lifted up onto the coastal bench. Also, there is no undercutting of the cliff substrate as a result of this submerged, “rip-rap”-like boulder field. Major failures and cliff collapses are unlikely.

Boak and Turner (2005:689) suggest there are two basic proxies for assessing shoreline erosion-accretion trends. These include the use of visually discernible imagery and/or an evaluation of the intersection between a tidal datum with a coastal profile. Hwang (2005:64), which is referred to in HAR §13-5, relies exclusively on the former category of indicator data. Hwang’s method is tailored to the evaluation of situations of far more active beach dynamics including situations influenced by the movement, deposition and removal of sandy sediments and active aeolian dune migrations. He suggests that the vegetation line (shoreline) and beach toe positions be measured relative to a reference point over the course of an entire year. The combined observational and historical data are to be analyzed statistically with linear regression methods, plots, and assessments of variability over time including standard deviations.

Available aerial photographs of the project site show no measurable change in position of the overall coastal sea-cliff or of the vegetation line since the earliest 1954 photos. The large scale of the aerial photographs consulted for the study makes quantitative visual analyses of fine-scale morphological changes of the shoreline impossible. Since an approximation of the erosion rate at this property is not statistically feasible using the methods outlined by Hwang, any shoreline determinations must rely upon alternative indicators. These include, as mentioned above, the quantitative assessment of the intersection between a tidal datum with the coastal profile to inform us of shoreline dynamics (Boak and Turner 2005:690-691).

Long-term geological processes that significantly affect the horizontal position of both the shoreline and sea-cliff are overwhelmingly stochastic in nature (significant storm events, seismic subsidence, tsunami, etc. There is no visible indication that the shoreline vegetation line has changed over the 58 year period since the first aerial photographic record began. Quantitative field-based observations of local topographic and marine elevations and other geomorphological characteristics demonstrate that the sea-cliff is high enough and stable enough to mitigate any concerns of shoreline erosion.

Effects of Subsidence and Sea Level Rise on Shoreline

An overall rise in sea level of 3.3 feet by the end of the 21st century has been proposed by Fletcher (2010) and others. Hwang et al (2007) use a figure of .16 in/yr in their assessments, resulting in an estimate of 13.9 inches of rise in the next 87 years. Relative sea-level rise, of course, is a result of the combined water rise and land fall.

The 1975 Kalapana earthquake on Kilauea's rift caused land in Kapoho to drop 0.8 feet (based on Hawaiian Volcano Observatory data in Hwang et al. 2007:6). This episodic seismic induced subsistence is difficult to anticipate or measure over long periods of time. On the basis of InSAR (Synthetic Aperture Radar Interferometry) remote sensing data, Hwang et al.(ibid.) state that the coastline at Kapoho may be subsiding at a continuous rate of between .31–.67 in/yr. Rates of subsidence at the Yermian property, however, are necessarily much lower as a result of their distance from Kilauea's active rift zone.

Therefore, the combined effects of subsidence and rising ocean levels may cause an overall (relative) drop in the shoreline elevation of between 0.1-0.3 in/yr. The durability and height of the coastal sea cliff (greater than ten feet at even the highest tides) ensures that combined sea level change and land subsidence will not cause significant shoreline transgression (horizontal movement) in this area.

This coastal erosion study resulted in a determination that the horizontal or, lateral, erosion rate is very near zero. A continuous and steady rate of erosion does not characterize this coastline. Future migration of the shoreline will be impacted predominantly by unpredictable and episodic events including subsistence due to volcanic seismicity or accretion due to future eruptions of Kilauea.

A scenario of modest sea level rise would likely not substantially affect the integrity or use of the proposed residence (to be located about 36 feet above sea level, 110 feet from the shoreline) for many decades, if at all. Somewhat larger increases, particularly in a case of sudden onset, could perhaps

eventually affect it. If so, this residence would be among thousands, or perhaps tens of thousands, to be affected in what would be the largest disaster to affect the Hawaiian Islands since human settlement. As sea level rise is gradual, there would probably be an opportunity for the owner to consider relocating or scrapping the structure for re-use of its valuable materials should sea level rise sufficiently to endanger the structure. 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 is adjacent to the sea but the house would be set back 110 feet from the shoreline and no grading activities would occur *makai* of this area. 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. 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 Hawai‘i, October, 1970, and as revised.
(b) Applicable standards and regulations of Chapter 27, "Flood Control," of the Hawai‘i 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 Hawai‘i County Code.
(e) Conditions of an NPDES permit, if required, and 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.

Upon its completion, the home will be similar to dozens of homes on shoreline lots in the area and is not 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 Hawai‘i, 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*), *‘ōhi‘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 on two occasions in April and December of 2012. Special attention was paid in these surveys and subsequent field visits by the author of this EA to the presence of endangered species, particularly *Ischaemum byrone,* a State and federally listed endangered grass known to grow in the general area.

Over most of its extent, the project site is dominated by non-native species, which grow in a dense, shady jungle. Autograph tree (*Clusia rosea*), *Melochia umbellata*, Chinese banyan (*Ficus microcarpa*), octopus tree (*Schefflera actinophylla*), strawberry guava (*Psidium guajava*) and gunpowder tree (*Trema orientalis*) are all common. Just a few remnant *hala* are present as well. The *makai* quarter of the property is dominated by coconut palms (*Cocos nucifera*), with a shrub layer of *naupaka* and/or wedelia vines (*Wedelia trilobata*) and *lau‘ae* ferns (*Phymatosorus grossus*). Aside from *naupaka*, *hala* and two common sedges, all the flora is non-native. 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

Typical expected birds in this part of Puna include Common Myna (*Acridotheres tristis*), Northern Cardinal (*Cardinalis cardinalis*), Spotted Dove (*Streptopelia chinensis*), Japanese White-eye (*Zosterops japonicus*), and House Finch (*Carpodacus mexicanus*). We observed only the Spotted Dove and a flock of Kalij Pheasants (*Lophura leucomelanos*) during site visits. No native birds were identified during site visits, 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. 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. They would be unlikely to make much use of the property itself, which is densely vegetated and offers no habitat for them, but they might be found in the shoreline area *makai* of the property.

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*), and the threatened Newell’s Shearwater (*Puffinus auricularis newelli*).

Table 1. Plant Species Observed on Yermian Property

Scientific Name	Family	Common Name	Life Form	Status
Ageratum conyzoides	Asteraceae	Ageratum	Herb	A
Araucaria columnaris	Araucariaceae	Cook Island pine	Tree	A
Casuarina equisetifolia	Casuarinaceae	Ironwood	Tree	A
Cecropia obtusifolia	Cecropiaceae	Guarumo	Tree	A
Chamaecrista nictitans	Fabaceae	Partridge pea	Herb	A
Clidemia hirta	Melastomataceae	Koster's curse	Herb	A
Clusia rosea	Clusiaceae	Autograph tree	Tree	A
Cocos nucifera	Arecaceae	Coconut	Tree	A
Commelina diffusa	Commelinaceae	Honohono	Herb	A
Cordyline fruticosa	Agavaceae	Ti	Shrub	A
Crassocephalum crepidioides	Asteraceae	Crassocephalum	Herb	A
Cyperus polystachyos	Cyperaceae	Pycreus	Sedge	I
Desmodium spp.	Fabaceae	Desmodium	Vine/Herb	A
Dissotis rotundifolia	Melastomaceae	Dissotis	Herb	A
Dracaena marginata	Agavaceae	Money tree	Tree	A
Emilia fosbergii	Asteraceae	Flora's paintbrush	Herb	A
Epipremnum aureum	Areaceae	Pothos vine	Vine	A
Falcataria moluccana	Fabaceae	Albizia	Tree	A
Ficus microcarpa	Moraceae	Chinese banyan	Tree	A
Fimbristylis cymosa	Cyperaceae	Mau'u akiaki	Sedge	I
Indigofera suffruticosa	Fabaceae	Indigo	Shrub	A
Macaranga mappa	Euphorbiaceae	Bingabing	Shrub	A
Melastoma candidum	Melastomataceae	Asian melastome	Shrub	A
Melochia umbellata	Sterculiaceae	Melochia	Tree	A
Mimosa pudica	Fabaceae	Sensitive plant	Herb	A
Nephrolepis multiflora	Nephrolepidaceae	Sword fern	Fern	A
Paederia foetida	Rubiaceae	Maile pilau	Vine	A
Pandanus tectorius	Pandanaceae	Hala	Tree	I
Paspalum sp.	Poaceae	Paspalum	Grass	A
Pennisetum purpureum	Poaceae	Napier grass	Grass	A
Persea americana	Lauraceae	Avocado	Tree	A
Phymatosorus grossus	Polypodiaceae	Laua'e	Fern	A
Polygala paniculata	Polygalaceae	Milkwort	Herb	A
Psidium cattleianum	Myrtaceae	Strawberry guava	Tree	A
Sacciolepis indica	Poaceae	Glenwood grass	Herb	A
Scaevola taccada	Goodenaceae	Naupaka	Shrub	I
Schefflera actinophylla	Araliaceae	Octopus tree	Tree	A
Spathoglottis plicata	Orchidaceae	Philippine ground orchid	Herb	A
Spermacoce assurgens	Rubiaceae	Buttonweed	Herb	A
Trema orientalis	Ulmaceae	Gunpowder tree	Tree	A
Wedelia trilobata	Asteraceae	Wedelia	Herb	A

E= Endemic, I = Indigenous, A = Alien

Other mammals in the project area are all introduced species, including 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.

Impacts and Mitigation Measures

As discussed in Section 1.1., the lot was cleared several decades ago in connection with a former residence that has since been demolished, and it contains almost entirely non-native vegetation except near the shoreline, where some *naupaka* and *hala* trees are present. The *makai* third of the long narrow property also has a grove of coconut trees and Cook Island Pines. Except where clearing for the residence area and driveway is necessary, the existing vegetation will be left intact, with no need for artificial landscaping. No modification whatsoever to the terrain or vegetation within the minimum 110-foot area between the shoreline and the residence will occur. The very few *hala* on the site can likely be avoided during landclearing. 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 are not likely to cause adverse biological impacts. 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.

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 the months of March and September, inclusive, 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 Hawai‘i County Code § 14 – 50 et seq., to minimize the potential for disorientation of seabirds.

3.1.5 Air Quality, Noise, and Scenic Resources

Environmental Setting

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

The area shares the quality of scenic beauty along with most of the Puna coastline. The County of Hawai‘i

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, but among specific examples of natural beauty does not identify any features or views within several miles of the property. Coastal views from the Government Beach Road are totally obstructed by 950 feet of dense vegetation.

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.

Because all grading and construction except enlargement of the driveway would occur at 110 feet away from the *makai* edge and about 700 feet of the *mauka* edge of the property, with dense intervening vegetation on both sides, construction and occupation of the single-family home would have virtually no visual impacts.

3.1.6 Hazardous Substances, Toxic Waste and Hazardous Conditions

Based on onsite inspection and the lack of any known former use on the property, it appears that the site contains no hazardous or toxic substances and exhibits no other hazardous conditions. Junked cars were present on the mauka edge of property when the owner purchased it, which he has since had removed by a towing company. 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 gradual occupation of lots developed during widespread land subdivision about fifty years ago, the Puna District where the Yermian property is located 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 Hawai‘i 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 of the subdivisions have become essentially bedroom communities for Hilo's workforce, as evidenced by the heavy flow of Hilo-bound traffic during the AM rush hour.

The Yermian property is bordered by the shoreline to the north, by the Government Beach Road to the south, by an occupied lot on the east, and by unoccupied private property on the west. Across the Government Beach Road are three private lots, behind which is land owned by the Department of Hawaiian Home Lands (DHHL). The property is also very close to the Hawaiian Shores and Hawaiian Beaches subdivisions, which contain 3,195 lots 4,280 residents according to the 2010 census (http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml#none). 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 in this area (see Figure 4a). There are no nearby official *mauka-makai* shoreline public accesses from the Government Road according to the County of Hawai‘i (http://www.hawaiicounty.gov/pl-shoreline-access-big-island), but there are several driveways that are informally used. No driveway is present on the Yermian property, and with its dense vegetation, it is very unlikely to be crossed in order to access the shoreline. Lateral access along the

shoreline between Hawaiian Shores and Hawaiian Paradise Park is possible and is practiced by few fishers and gatherers that are occasionally seen here fishing for *papio* or *menpachi* or gathering *opihi*.

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.

It bears repetition that illegal dumping is a severe problem on this portion of Old Government Road. Periodically, the road margins and parts of adjacent properties become covered with hundreds of tons of cars, appliances, household rubbish and even animal waste. This unsightly mess has unpleasant odors and negatively impacts the health of humans and wildlife through creating a breeding environment for mosquitoes, other insects and bacteria, as well as causing a physical safety hazard through jagged metal and glass. The dumping lowers the quality of life and decreases property value for the dozen or so current residents. Hawaiʻi County recently undertook a cleanup at public expense to deal with the issue. During fieldwork for this EA, residents who have driven by have questioned the biologists and archaeologists to ensure they are not dumping, and then have expressed support for the prospect of another resident with another pair of eyes to be watchful and hands to assist in cleanup. Mr. Yermian personally contributed to the road cleanup during a visit to the property earlier this year.

3.2.2 Cultural and Historic Resources

An archaeological assessment 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 and Malama O Puna 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 *'aumakua* (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 (*ko'i*), 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 Hawai'i, this time from Tahiti. Also established during this period was the *ahupua'a*, a land-use concept that incorporated all of the eco-zones from the mountains to the shore and beyond. The usually wedge-shaped *ahupua'a* provided a diverse subsistence resource base (Hommon 1986) and added another component to what was already becoming a well-stratified society (Kirch 2012).

Ahupua'a were ruled by *ali'i 'ai ahupua'a* or lesser chiefs and managed by a *konohiki*. *Ali'i* and *maka'ainana*, or commoners, were not confined to the boundaries of *ahupua'a* as resources were shared when a need was identified. *Ahupua'a* were further divided into smaller sections such as *'ili, mo'o'aina, pauku'aina, kihapai, koele, hakuone* and *kuakua*. The chiefs of these land units have their allegiance to a territorial chief or *mo'i* (literally translated as king) (Hommon 1986). The project site is located within Keonepoko Iki Ahupua'a, a land unit of the District of Puna, one of six major districts on the island of Hawai'i.

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 Kalaniopu'u (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 Hawai'i 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 *'ōhi'a lehua* for which Puna was famous. The inhabitants of Puna were likewise famous for their expertise and skill in *lauhala* weaving.

Traditional life in Hawai'i' took a sharp turn on January 18, 1778 with the arrival of British Capt. James Cook in the islands. On a return trip to Hawai'i ten months later, Kamehameha visited Cook aboard his ship the *Resolution* off the east coast of Maui and helped Cook navigate his way to Hawai'i Island. Cook exchanged gifts with Kalaniopu'u at Kealakekua Bay the following January, and Cook left Hawai'i 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, *ali'i*-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 *'aumakua* 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 Hawai'i 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 Yermian property, though there were hundreds of individuals who lived inland.

In 1846, Chester S. Lyman, "a sometime professor" at Yale University visited Hilo, Hawaiʻi, staying with Titus Coan (Maly 1998). Traveling the almost 100-mile long stretch of the "Diocese" of Mr. Coan, Lyman reported that the district of Puna had somewhere between 3,000 to 4,000 inhabitants (Ibid). Entering Puna from Hilo, and traveling to Keaʻau along the coast, Lyman offered the following observations:

> "The groves of Pandanus were very beautiful, and are the principal tree of the region. There

> is some grass and ferns, and many shrubs; but the soil is very scanty. Potatoes are almost the only vegetable that can be raised, and these seem to flourish well amid heaps of stone where scarcely a particle of soil could be discovered. The natives pick out the stones to the depth often of from 2 to 4 feet, and in the bottom plant the potato–how it can expand in such a place is a wonder.
>
> Nearly all Puna is like this. The people are necessarily poor—a bare subsistence is all they can obtain, and scarcely that. Probably there are not $10 in money in all Puna, and it is thought that not over one in five hundred has a single cent. The sight of some of these potatoe patches would make a discontented N.E. farmer satisfied with his lot. Yet, I have nowhere seen the people apparently more contented & happy" (Maly 1998:35).

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. Keonepoko Iki Ahupuaʻa was retained as Government Land. No Land Commission Award claims were made in Keonepoko Iki Ahupuaʻa (Waihona ʻĀina database). Beginning in 1903 a *mauka* portion of the *ahupuaʻa* (in the vicinity of Pāhoa Town) was commuted as grant parcels and homestead lots. As Keonepoko Iki was retained as government land, it boundaries were not set by the land commission. However, the boundaries of neighboring Keonepoko Nui were surveyed in 1880 for the estate of C. Kanaina, and place names along the common boundary with Keonepoko Iki are shown on a Historic survey map (see Figure 13 of Appendix 4). This map also shows the location of the old Government Road.

By 1873, the Government Road from Hilo through Puna had been completed to at least Makuʻu (Maly 1999). The road likely followed the route of an older pedestrian trail. Cattle ranching got its start in the area around this time. In 1872, Obed B. Spencer, a rancher, leased the massive Keaʻau Ahupuaʻa northwest of Keonepoko from Charles Kanaina and Charles R. Bishop, guardians of William C. Lunalilo for a term of ten years beginning September 1, 1873. Spencer then transferred the lease and sold his personal property to J.O. Dominis and R. A. Lyman. In 1874, the two men expanded into additional *ahupua'a*, including Makuʻu, Hālona, Keoneopoko Iki, Kaʻohe, and Pōpōkī for a term of ten years (Maly 1999). After several more transfers, by 1879 J. Elderts and W.H. Shipman's Keaʻau Ranch included most of the lands between Keaʻau and Kapoho Ahupuaʻa (Cahill 1996).

A survey for a new inland road through Puna District was completed in 1891. Prof. W. D. Alexander, the Surveyor General for this Hawaiian Government Survey, included several interesting notes on the terrain, vegetation, and population distribution of Makuʻu Ahupuaʻa and neighboring lands including Keonepoko in his report on the progress of the survey. He noted the sparse *ʻohiʻa* forests, the numerous *ʻawa* and banana shrubs, the occasional remaining inhabitant, and the ever-worsening state of the coastal road.

Land use in the Puna District changed quickly in the late 19th century. By 1900, the new inland highway had been completed. Between 1894 and 1900, W. H. Shipman, who had by that time acquired sole interest in Keaʻau Ahupuaʻa and neighboring lands, sold nearly 4,000 acres to various individuals for the cultivation of coffee and in 1899 he leased nearly 4,000 acres to the Olaʻa Sugar Company, Ltd. (Maly

1999). In 1901, 1911, and 1912, A. B. Loebstien and T. Cook surveyed the boundaries of Shipman's lands. Many of the informants for the surveys were native residents of Keaʻau, Makuʻu, Keonepoko and nearby areas.

During the early part of the 20th century the Puna District underwent further and even more drastic changes. 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. The Olaa and Puna Sugar Companies operated in Puna from 1900 until the 1980s. 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. The railroad passed through Keonepoko Ahupuaʻa several miles *mauka* of the shore, stopping at the Makuʻu Station house. The railroad ceased operations in 1946. By 1950, most inhabitants of this part of the Puna coast moved away.

Archaeological Investigations and Resources

The property was subject to an archaeological assessment survey conducted by Rechtman Consulting, LLC, which is attached in full as Appendix 3. Given the history of Puna throughout several eras, a coastal property of several acres in Keonepoko without significant disturbance might be expected to contain archaeological remains. An aerial photograph of the area from 1965 showed that the roads in the Hawaiian Beaches and Hawaiian Shores subdivisions had been laid out but there were no residences yet, and the Yermian property site was vacant land. Later imagery from February 1977, however, shows what appears to be a structure on the property. County of Hawaiʻi building permit records list a building permit for a single-family residence in July of 1968. Tax assessor field notes show a 24-foot by 34-foot residence having been constructed by November of that same year. The last permit issued by the County Building Department was in November of 1978, and sometime between then and now the structure were demolished. Today, only a part of the concrete and hollow tile foundation of the former residence is present, and the terrain reveals that the majority of the property was previously mechanically cleared.

On March 29, 2012, Robert B. Rechtman, Ph.D., Dave Nelson, B.A., and Amy L. Ketner, B.A. conducted a thorough on-foot field survey of the property, with fieldworkers maintaining transects with a 5-meter spacing interval. The property corners were marked with property pins and flagging at the time of the survey. No archaeological resources were observed on the surface. Given the history of mechanical clearing and flattening of the lava surface, the likelihood of encountering subsurface resources on the parcel was determined to be very remote. There is no rock wall present along the *makai* edge of the Government Road where it borders the current study area, as it likely was bulldozed away (a rock wall along the *makai* side of the road is visible fronting parcels to the southeast and northwest of the property).

Impacts to Archaeological Resources

Given the absence of archaeological resources on the property, the archaeologist concluded that the proposed development of a single family residence would not significantly impact any known historic

properties. No further historic preservation work was recommended. By letter of November 28, 2012 (see Appendix 1a), the State Historic Preservation concurred with this finding and recommendation.

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 Hawai‘i Administrative Rules 13§13–280.

Consultation

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 part of the cultural impact assessment (see Appendix 4), several individuals were consulted: Mark Lindsey Franklin and William Makanui.

Mark Lindsey Franklin is a 40-year resident of lower and upper Puna. He is of Hawaiian ancestry, and his family roots also extend to Maui, where his *‘ohana* are cultural practitioners involved in the preservation of traditional lands. Mark is well versed in native flora and is currently working on a project to identify and protect remnant stands of *‘iliahi* (sandalwood) on Mauna Kea. He is also an active member of Malama o Puna, a Hawai‘i non-profit corporation and volunteer service organization that is focused on environmental protection, education, and preservation. On April 2, 2013, Mr. Franklin met with the CIA author at the project site and related that he has fished in this area accessing the coastline along an old road located to the northwest of the study property. After walking the entire property, he suggested that given the past disturbances to the property and the widespread growth of invasive species that the proposed development would be a welcome addition as long as the invasive vegetation can be controlled and replaced with a landscape of native species.

William Makanui was contacted by telephone on April 1, 2013. Mr. Makanui was formerly a Project Manager for the Department of Hawaiian Home Lands responsible for the establishment of farm lots, agricultural lots, and water systems in the inland portions of Maku‘u Ahupua‘a located 4 to 6 miles to the southwest of the project site. Cultural concerns that he was aware of with respect to the general project area was the protection of any identified caves and burial sites. He was not aware of any specific resources in the immediate vicinity of the current project area, and he was not directly involved in planning or development of DHHL land in the coastal regions of Puna.

Other Cultural Resources and Practices

The investigations of the property and its history did not reveal any cultural resources or practices aside from these resources. The consulted individuals with ties to and history with the area did not have any information concerning the specific property, but one did discuss traditional gathering and fishing on the shoreline. Fishing and gathering still occur on the shoreline *makai* of the property in an area. While some users are newcomers simply engaging in recreation and/or collecting food, others have deeper ties and are

undertaking cultural practices as well. The Yermian property does not contain any springs, *pu'u*, or caves that might be important cultural sites. The dense vegetation consists mainly of weedy trees and herbs with no cultural values or associations. A few *hala* trees and a grove of coconuts are present. These resources are very abundant in the general area and there is no indication of use of these particular trees.

Impacts and Mitigation Measures to Other 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 and groups who might have knowledge in order to confirm this finding.

3.3 Public Roads, Services and Utilities

3.3.1 Roads and Access

Existing Environment, Impacts and Mitigation Measures

The sole access to the project site is from the Government Beach Road, an unimproved, narrow, mostly unpaved public roadway extending from Beach Road in Hawaiian Paradise Park to Papio Street in Hawaiian Shores Recreational Estates to Kapoho (see Figure 1a and 1b). The applicant needs to traverse a distance of about 1,500 feet on this unpaved road to access the paved, public road system in the Hawaiian Shores subdivision. No road improvements are planned or needed.

3.3.2 Public Utilities and Services

Environmental Setting, Impacts and Mitigation Measures

Electricity and telephone poles and lines are present on the mauka side of Government Beach Road, ending at the lot just east of the project site. These services would be extended through placing another pole near the road and running poles and lines along the driveway to service the home.

Domestic water supply would be through 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 12,000 gallons to provide both water supply and fire flow in accordance with standards at 18.3.8 of the Hawai'i Fire Code, including sections (1)-(3) and (5)-(6) apply, dealing with minimum tank size, pipe sizes, tank and valve construction and location, and inspection and maintenance. The applicant will provide a minimum 12,000-gallon water tank devoted expressly for firefighting purposes. It should be noted that when water variances to allow the use of water catchment system are issued by the County of Hawai'i Planning Department, the Department – based on input from the Water and Fire Departments – require a minimum 9,000 gallon water storage system, 6,000 gallons of which would be for potable purposes and the remaining 3,000 for firefighting and emergency purposes. Further, the location and capacity of the

emergency water system, including the necessary compatible connector system, has to meet with the approval of the Hawai‘i County Fire Department. The applicant will abide by these standards.

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 seven 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 understand 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. There are a number of single-family homes located on Government Beach Road between Hawaiian Beaches and Hawaiian Paradise Park, and occasionally there are two or more homes under construction. Although the County of Hawai‘i in the past has discussed the possibility of paving and minor widening of the Government Beach Road, at this time there are no plans to do so. There are no other development or land use proposals in the area at this time. 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 Hawai‘i:

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

State of Hawai‘i:

Conservation District Use Permit
National Pollutant Discharge Elimination System Permit (potential)

3.6 Consistency With Government Plans and Policies

3.6.1 Hawai‘i County General Plan

The *General Plan* for the County of Hawai‘i is the document expressing the broad goals and policies for the long-range development of the Island of Hawai‘i. 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 Hawai‘i. 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 assessment survey has properly documented that no historic properties are present, and there are no known or expected cultural uses on the lot, which does not appear to contain any cultural resources.

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 property is within the Zone X, or areas outside of the 500-year Floodplain as determined by detailed methods in the community flood insurance study, according to the Flood Insurance Rate Maps (FIRM). The project will conform to applicable drainage regulations and policies of the County of Hawai‘i.

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 uses of the land and will not cause scenic impacts or impede access.

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 home would be set about 110 feet from the shoreline at an elevation of about 36 feet above sea level, and would not affect shoreline resources or be damaged by waves or tides.

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 Hawai‘i 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, market for services and discouraging illegal dumping, it improves the quality of life and economy. The lot shares the same volcanic and seismic hazard as all of Puna, the by virtue of the home's proposed location on the lot, coastal hazard is avoided. No native vegetation, rare species, coastal resources or historic sites will be affected in any way. The single-family home is not inconsistent with the Puna CDP.

3.6.2 Hawai‘i County Zoning and Special Management Area

The State Land Use District for the area for the area of the property proposed for the single-family home is Conservation. *Mauka* of this coastal portion the property is within the State Land Use Agricultural District. The entire property is zoned by the County of Hawai‘i as within the Agricultural District, minimum lot size of one acre (A-1a), 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 Hawai‘i 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, Hawai‘i 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 towards the project site will not be adversely impacted in any substantial way, as views from the Government Road are totally blocked by trees. 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. No floodplains are present in the area. In terms of beach protection, construction is set back from the shoreline and would not affect any beaches nor adversely affect public use and recreation of the shoreline in this area. No impacts on marine resources are likely to occur. No historic sites are present and there are no known cultural resources or practices.

The Planning Director has been asked 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 Hawai‘i, 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 Yermian property is Conservation. Its subzone is Resource, for which, according to Hawai‘i Administrative Rules (HAR) §13-5-15, a single-family residence is an identified use. The portion of the property proposed for use 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.”* This identified use, which conforms 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. Single-family residences are an identified use in the Resource subzone under HAR 13-5-24, R-8.

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, construction and use of the property for 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 leave the existing landscape in place except where clearing is necessary for the house pad, accessory structures and driveway, which will minimize the visual impact of the structure as seen from adjacent public areas. Additionally, the construction of the proposed residence will allow for the management of the property, including preventing illegal dumping. No effect on any coastal ecosystem will occur, because of the extensive 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 home will have a design of one story with 4,671 square feet total for all features and will be set back 110 feet from the shoreline in an area that will not be visible to the public. 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. Some vegetation, including naupaka and coconut trees will be removed to provide an area for the home, the physical beauty characteristics of the existing lot will be preserved by leaving remaining vegetation in place and promoting the regrowth of *hala* and *naupaka* that volunteer

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 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

The applicant expects that the State of Hawai‘i, 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). This determination will be reviewed based on comments to the Draft EA, and the Final EA will present the final determination.

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. No archaeological sites or other historic properties are present. 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 Hawai‘i.

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 other residences, 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 home is not located in a flood zone. The project site is about 36 feet above sea level and about 110 feet from the shoreline, 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. Coastal views from the Government Beach Road are totally obstructed by 950 feet of dense vegetation. The attractive design of the home and the landscaping, given the existing context in which the home would not be visible from public vantage points, would 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.

REFERENCES

Boak, E. H. and Turner, I. L. 2005. "Shoreline definition and detection – A review." *Journal of Coastal Research* 21:688-703.

Cahill, E. 1996. *The Shipmans of East Hawai'i*. Honolulu: University of Hawai'i Press.

Ellis, W. 1963. *Journal of William Ellis*. Honolulu: Advertiser Publishing Co., Ltd.

Fletcher, C. H., Boyd, R., Neal, W. J., and Tice, V. 2010. *Living on the Shores of Hawaii – Natural Hazards, the Environment, and our Communities.* Honolulu: University of Hawai'i Press.

Fletcher, C. H., Grossman, E. E, Richmond, B. M. and Gibbs, A. E. 2002. *Atlas of Natural Hazards in the Hawaiian Coastal Zone*. U.S. Geological Survey, Geologic Investigations Series Map I-2761, scale 1:50,000.

Fornander, A. 1969. *An Account of the Polynesian Race: Its Origin and Migrations*. Tokyo: Charles E. Tuttle Co., Inc.

Hommon, R. 1986. Social Evolution in Ancient Hawai‘i. IN Kirch, P. (editor), *Island Societies*: *Archaeological Approaches to Evolution and Transformation*:55-88. Cambridge: Cambridge University Press.

Gagne, W., and L. Cuddihy. 1990. “Vegetation,” pp. 45-114 in W.L. Wagner, D.R. Herbst, and S.H. Sohmer, eds., *Manual of the Flowering Plants of* Hawai‘i. 2 vols. Honolulu: University of Hawai‘i Press.

Giambelluca, T.W., Q. Chen, A.G. Frazier, J.P. Price, Y.-L. Chen, P.-S. Chu, J.K. Eischeid, and D.M. Delparte, 2012: Online Rainfall Atlas of Hawai‘i. *Bull. Amer. Meteor. Soc*., doi: 10.1175/BAMS-D-11-00228.1.

Hawai‘i County Planning Department. 2008. *Puna Community Development Plan*. Hilo.

Hwang, D. J., 2005. *Hawaii Coastal Zone Mitigation Handbook: Hawaii Coastal Zone Management Program. DBEDT, State of Hawaii.*

Hwang, D. J. 2007. *Coastal Subsidence at Kapoho, Puna, Island and State of Hawaii*. Private report for Hawaii County Planning Department.

Kirch, P.V. 2012. *A Shark Going Inland Is My Chief: The Island Civilization of Ancient Hawai‘i*. Berkeley, CA.: University of California Press.

Maly, K. 1998. *PUNA, KA ‘ĀINA I KA HIKINA A KA LĀ.” A Cultural Assessment Study–Archival and Historical Documentary Research and Oral History Interviews for the Ahupua‘a of ‘Ahalanui, Laepāo‘o, and Oneloa (with Pohoiki), District of Puna, Island of Hawai‘i (TMK:1-4-02, por.07,13,73,74,75)*. Prep. for D. Matsuura, A & O International Corporation; Oneloa Development, Hilo, Hawai‘i.

_____. 1999. *The Historic Puna Trail—Government Beach Road (Kea‘au Section): Archival-Historical Documentary Research, Oral History and Consultation Study, and Limited Site Preservation Plan, Ahupua‘a of Kea‘au, Puna District, Island of Hawai‘i (TMK:1-6-01 various parcels).* Kumu Pono Associates Report HiAla-17 (011199). Prep. for Na Ala Hele Program, State Division of Forestry and Wildlife.

McEldowney, H. 1979. *Archaeological and Historical Literature Search and Research Design: Lava Flow Control Study. Hilo, Hawai’i*. Department of Anthropology, B.P. Bishop Museum, MS: 050879, Honolulu. Prepared for U.S. Army Engineer Division, Pacific Ocean, Honolulu.

McGregor, D. 2007. *Nā Kua‘āina: Living Hawaiian Culture*. Honolulu: University of Hawai‘i Press.

Pogue, J. 1858 [1978]. *Moolelo Hawaii*. Hale Paipalapala Aupuni, Honolulu (Rev. Ed.).

U.S. Dept. of Commerce, Economics and Statistics Administration, Bureau of the Census, 2011, http://factfinder.census.gov/.

University of Hawai‘i at Hilo, Dept. of Geography. 1998. *Atlas of Hawai‘i*. 3rd ed. Honolulu: University of Hawai‘i Press.

Wolfe, E.W., and J. Morris. 1996. *Geologic Map of the Island of Hawai‘i.* USGS Misc. Investigations Series Map i-2524-A. Washington, D.C.: U.S. Geological Survey.

[This page intentionally left blank]

ENVIRONMENTAL ASSESSMENT

YERMIAN SINGLE-FAMILY RESIDENCE IN THE CONSERVATION DISTRICT AT KEONEPOKO IKI

TMK (3rd): 1-5-009:035
Keonepoko Iki, Puna, County of Hawai‘i, State of Hawai‘i

APPENDIX 1a
Comments in Response to Early Consultation/SHPD Letters

[This page intentionally left blank]

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

LORETTA J. FUDDY, A.C.S.W., M.P.H.
DIRECTOR OF HEALTH

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

In reply, please refer to:
File:

12-201
(3) 1-5-009: 035

October 31, 2012

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

Dear Mr. Terry:

SUBJECT: Early Consultation for Environmental Assessment for Proposed Single-Family Home in the Conservation District at Keonepoko Iki, Puna District, TMK: 1-5-009: 035

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your letter, dated October 29, 2012. Thank you for allowing us to review and comment on the subject document. The document was routed to the various branches of the Environmental Health Administration. We have no comments at this time, but reserve the right to future comments. We strongly recommend that you review all of the Standard Comments on our website: www.hawaii.gov/health/environmental/env-planning/landuse/landuse.html. Any comments specifically applicable to this application should be adhered to.

The United States Environmental Protection Agency (EPA) provides a wealth of information on their website including strategies to help protect our natural environment and build sustainable communities at: http://water.epa.gov/infrastructure/sustain/ . The DOH encourages State and county planning departments, developers, planners, engineers and other interested parties to apply these strategies and environment principles whenever they plan or review new developments or redevelopments projects. We also ask you to share this information with others to increase community awareness on healthy, sustainable community design. If there are any questions about these comments please contact me.

Sincerely,

Laura Leialoha Phillips McIntyre, AICP
Environmental Planning Office Manager
Environmental Health Administration
Department of Heath
919 Ala Moana Blvd., Ste. 312
Honolulu, Hawaii 96814
Phone: 586-4337
laura.mcintyre@doh.hawaii.gov

William P. Kenoi
Mayor

Harry S. Kubojiri
Police Chief

Paul K. Ferreira
Deputy Police Chief

County of Hawai'i

POLICE DEPARTMENT
349 Kapiolani Street • Hilo, Hawai'i 96720-3998
(808) 935-3311 • Fax (808) 961-8865

November 8, 2012

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

Dear Mr. Terry:

Subject: Early Consultation for Environmental Assessment for Proposed Single-Family Home in the Conservation District at Keonepoko Iki, Puna District; TMK: 1-5-009:035

Staff has reviewed the request and does not anticipate any significant impact to traffic and/or other public safety concerns.

Thank you for allowing us the opportunity to comment.

If there are any questions, please contact Acting Captain Reed Mahuna, Commander of the Puna District, at 965-2716.

Acting Captain Reed Mahuna would like to review a copy of the final environmental assessment when it is completed.

Sincerely,

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

RM:lli
120665

William P. Kenoi
Mayor

Darren J. Rosario
Fire Chief

Renwick J. Victorino
Deputy Fire Chief

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

November 9, 2012

Mr. Ron Terry
Geometrician Associates
PO Box 396
Hilo, HI 96721

Dear Mr. Terry,

SUBJECT: SINGLE-FAMILY HOME IN CONSERVATION DISTRICT
AT KEONEPOKO IKI, PUNA DISTRICT
TMK: 1-5-009:035

The Hawai'i Fire Department does not have any comments to offer at this time regarding the Early Consultation for Environmental Assessment for the above-referenced project.

Thank you for the opportunity to comment. A copy or Notice of Availability of Environmental Assessment is not needed when completed.

Sincerely,

DARREN J. ROSARIO
Fire Chief

KT:lc

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

November 23, 2012

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

via email: rterry@hawaii.rr.com

Dear Mr. Terry:

SUBJECT: Early Consultation for Environmental Assessment (EA) for Proposed Single-Family Home in the Conservation District, Geometrician Associates, LLC for David Yermian, Keonepoko-iki, Puna, Hawaii; TMK: (3) 1-5-009:035

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

At this time, enclosed are comments from (i) the Engineering Division, (ii) the Hawaii District Land Office, and (iii) the Office of Conservation and Coastal Lands on the subject matter. Should you have any questions, please feel free to call Kevin Moore at (808) 587-0426. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosure(s)

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

'12 OCT 31 08:10:44 ENGINEERING

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

October 31, 2012

RECEIVED
LAND DIVISION
2012 NOV 15 P 2:28
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

MEMORANDUM

TO: **DLNR Agencies:**
X Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
X Engineering Division
__Div. of Forestry & Wildlife
__Div. of State Parks
__Commission on Water Resource Management
X Office of Conservation & Coastal Lands
X Land Division – Hawaii District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Early Consultation for Environmental Assessment (EA) for Proposed Single-Family Home in the Conservation District
LOCATION: Keonepoko-iki, Puna, Hawaii; TMK: (3) 1-5-009:035
APPLICANT: Geometrician Associates, LLC for David Yermian

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by November 21, 2012.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Kevin Moore at 587-0426. Thank you.

Attachments

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

Signed: _____

Print name: Carty S. Chang, Chief Engineer
Date: 11/14/12

cc: Central Files

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LM/KevinMoore
Ref.: EarlyConsultEASingleFamilyHome
Hawaii.588

COMMENTS

( ) We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Flood Zone ___.

(X) **Please take note that the project site, according to the Flood Insurance Rate Map (FIRM), is located in an area of Minimal Tsunami Inundation. The National Flood Insurance Program does not have any regulations for developments within the Minimal Tsunami Inundation areas.**

( ) Please note that the correct Flood Zone Designation for the project site according to the Flood Insurance Rate Map (FIRM) is ___.

( ) Please note that the project must comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR), whenever development within a Special Flood Hazard Area is undertaken. If there are any questions, please contact the State NFIP Coordinator, Ms. Carol Tyau-Beam, of the Department of Land and Natural Resources, Engineering Division at (808) 587-0267.

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

( ) Mr. Mario Siu Li at (808) 768-8098 or Ms. Ardis Shaw-Kim at (808) 768-8296 of the City and County of Honolulu, Department of Planning and Permitting.

( ) Mr. Frank DeMarco at (808) 961-8042 of the County of Hawaii, Department of Public Works.

( ) Mr. Francis Cerizo at (808) 270-7771 of the County of Maui, Department of Planning.

( ) Ms. Wynne Ushigome at (808) 241-4890 of the County of Kauai, Department of Public Works.

( ) The applicant should include water demands and infrastructure required to meet project needs. Please note that projects within State lands requiring water service from the Honolulu Board of Water Supply system will be required to pay a resource development charge, in addition to Water Facilities Charges for transmission and daily storage.

( ) The applicant should provide the water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update.

( ) Additional comments : _____

( ) Other: _____

Should you have any questions, please call Ms. Suzie S. Agraan of the Planning Branch at 587-0258.

Signed: _____
CARTY S. CHANG, CHIEF ENGINEER

Date: 11/15/12

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

2012 NOV -1 P 4:43

RECEIVED
LAND DIVISION
HILO, HAWAII

October 31, 2012

MEMORANDUM

RECEIVED
LAND DIVISION
2012 NOV 14 A 10:20
DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

TO: **DLNR Agencies:**
X Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
X Engineering Division
__Div. of Forestry & Wildlife
__Div. of State Parks
__Commission on Water Resource Management
X Office of Conservation & Coastal Lands
X Land Division – Hawaii District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Early Consultation for Environmental Assessment (EA) for Proposed Single-Family Home in the Conservation District
LOCATION: Keonepoko-iki, Puna, Hawaii; TMK: (3) 1-5-009:035
APPLICANT: Geometrician Associates, LLC for David Yermian

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by November 21, 2012.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Kevin Moore at 587-0426. Thank you.

Attachments

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

Signed: [signature]

Print name: Gordon C. Heit
Date: 11/09/12

cc: Central Files

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

2012 OCT 31 A 11: 29

October 31, 2012

MEMORANDUM

RECEIVED
LAND DIVISION
2012 NOV 21 P 2: 59
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

TO: **DLNR Agencies:**
X Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
X Engineering Division
__Div. of Forestry & Wildlife
__Div. of State Parks
__Commission on Water Resource Management
X Office of Conservation & Coastal Lands
X Land Division – Hawaii District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Early Consultation for Environmental Assessment (EA) for Proposed Single-Family Home in the Conservation District
LOCATION: Keonepoko-iki, Puna, Hawaii; TMK: (3) 1-5-009:035
APPLICANT: Geometrician Associates, LLC for David Yermian

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by November 21, 2012.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Kevin Moore at 587-0426. Thank you.

Attachments

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

Signed: _____

Print name: ALEX ROY
Date: 11/20/2012

cc: Central Files

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ESTHER KIA'AINA
FIRST DEPUTY

WILLIAM M. TAM
DEPUTY DIRECTOR - WATER

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

OFFICE OF CONSERVATION AND COASTAL LANDS
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

REF: OCCL: AJR

COR: HA-13-45

NOV 21 2012

Ron Terry
c/o Geometrician Associates
P.O. Box 396
Hilo, HI 96721

Re: **Proposed New Single Family Residence (SFR)**
Keonepoko Iki, Puna, Island of Hawaii, Hawaii
TMK: (3) 1-5-009:035

Dear Mr. Terry,

We are in receipt of your correspondence dated *October 30, 2012* concerning a proposal to construct a new Single Family Residence (SFR) at Keonepoko Iki, Puna Distrcit, Island of Hawaii located in the Conservation District Resource Subzone.

Your proposal includes the construction of a two-story SFR and garage with an approximate Maximum Developable Area (MDA) of 4,470 ft^2 and is reported to be designed with a 100-foot shoreline setback. It was also mentioned that you are currently completing an environmental assessment (EA) for the proposed project.

Research shows that the Puna District on the Island of Hawaii is considered one of the most frequently flooded and hardest hit by flash floods on the Big Island and perhaps the entire state. The overall hazard assessment (OHA) for the Nanawale-Maku'u coastal region runs from high (6/7) to moderate-high (5/7); this includes impacts associated with tsunamis, stream flooding, high waves, high winds and volcanic/seismic activity.

The OCCL would like to clarify that the construction of Single Family Residence (SFR) structures in the Conservation District is a discretionary action of the Board of Land and Natural Resources (BLNR). While the construction of a SFR is an identified land use in the conservation district resource subzone we would like to inform you that the OCCL and the BLNR have practiced strong discretion for similar proposals in this area. In certain cases the BLNR denied the proposal outright or approved of the project only after a reduction in scope was proposed.

This office suggests that by moving the structure as far mauka as possible from the shoreline, reducing the Maximum Developable Area (MDA) of the SFR, minimizing the clearing of the parcel and reducing impervious surfaces and hardscaping will prove to be a valuable land planning objective.

REF: OCCL: AJR COR: HA-13-45

A Single Family Residence (SFR) is an identified land use in the Conservation District Resource Subzone pursuant to Hawaii Administrative Rules (HAR) §13-5-24 R-7, **SINGLE FAMILY RESIDENCE** (D-1) *a single family residence that conforms to design standards as outlined in this chapter*. This use will require the filing of a Conservation District Use Application (CDUA) and all required attachments. Please be advised, however, that this finding does not constitute approval of the proposal and all final determinations for approval or denial will be made by the BLNR.

The OCCL is requesting that the applicant address the following in the Draft EA and CDUA, along with a discussion of the comments above:

- The site appears to be included in the County of Hawaii Special Management Area (SMA) and therefore will require a determination of SMA requirements by the County;

- A shoreline certification may be required for the proposed SFR; please review HAR §13-5-31 *Permit applications,* for further information;

- Please review HAR §13-5, Exhibit 4, *Single Family Residence Standards* for our specific SFR guidelines; and

If you require additional information please contact Alex J. Roy of the Office of Conservation and Coastal Lands at 808-587-0316 or via email at alex.j.roy@hawaii.gov

Sincerely,

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

CC: Chairperson
HDLO
Hawaii County – Dept. Planning
Hawaii County – Dept. Public Works

William P. Kenoi
Mayor

BJ Leithead Todd
Director

Margaret K. Masunaga
Deputy

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

November 27, 2012

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

Dear Mr. Terry:

SUBJECT: Pre-Consultation on Environmental Assessment
Landowner: David Yermian
Project: Construction of a Single-Family Dwelling & Related Improvements
Tax Map Key: 1-5-9:35, Puna, Hawai'i

This is in regards to your letter dated October 29, 2012 requesting our comments for an Environmental Assessment on the above referenced project.

We note the following:

1. According to Real Property Tax Records, the parcel consists of 1.181 acres.

2. The General Plan's Land Use Pattern Allocation Guide (LUPAG) Map designation of the subject parcel is Open.

3. It is designated Conservation by the State Land Use Commission. For parcels that are designated Conservation by the State Land Use Commission, there is no County zoning per se.

4. The entire parcel is within the County's Special Management Area and has frontage along the coastline.

5. The Puna Community Development Plan was adopted by the County of Hawaii as Ordinance No. 08-116, effective September 10, 2008. A discussion of the proposed project as it relates to this plan should be included in the Environmental Assessment.

6. A Special Management Area Use Permit Assessment Application will be required to be submitted for the proposed structures and related improvements.

Thank you for the opportunity to provide preliminary comments. Please provide us with a copy of the Draft Environmental Assessment for our review and file.

If you have questions, please contact Esther Imamura of this office at 961-8139.

Sincerely,

for BJ LEITHEAD TODD
Planning Director

ETI:cs
P:\Wpwin60\ETI\Eadraftpre-Consul\Terry Yermian 1-5-9-35.Rtf

cc: Long Range Planning

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ESTHER KIA'AINA
FIRST DEPUTY

WILLIAM M. TAM
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

HISTORIC PRESERVATION DIVISION
DEPARTMENT OF LAND AND NATURAL RESOURCES

601 Kamokila Boulevard, Suite 555
Kapolei, HI 96806

November 28, 2012

Robert B. Rechtman, Ph. D.
Rechtman Consulting, LLC
507-A East Lanikaula Street
Hilo, Hawai`i 96720
(bob@rechtmanconsulting.com)

LOG NO: 2012.1540
DOC NO: 1211SN04

Dear Dr. Rechtman:

SUBJECT: **Chapter 6E-42 Historic Preservation Review –**
Archaeological Assessment Report for a 2.1-Acre Parcel
Keonepoko Iki Ahupua'a, Puna District, Island of Hawai'i
TMK (3) 1-5-09:035

Thank you for the opportunity to review the draft report titled *An Archaeological Assessment Survey for TMK: 3-1-5-09:035 Keonepoko Iki Ahupua'a, Puna District, Island of Hawai'i,* Robert Rechtmen (May 2012). This document was received by our office on May 29, 2012. We apologize for the delayed review and thank you for your patience. The field work for this study consisted of a 100% pedestrian survey of the surface environment. No historic properties were identified. Therefore, no further analysis is indicated. The report documents previous disturbance on this property from mechanical clearing activities. In the *mauka* portion of the project area, there are the remnants of a former residential structure. Additionally, the parcel has numerous scrap automobiles and other household debris.

We concur with your recommendation that no further archaeological work is necessary within this project area. This report meets the requirements of HAR13-284-5 (5) (A) and is accepted by SHPD Please send one hardcopy of the document, clearly marked FINAL, along with a copy of this review letter and a text-searchable PDF version on CD to the Kapolei SHPD office, attention SHPD Library.

Please contact Sean Nāleimaile at (808) 933-7651 or Sean.P.Naleimaile@Hawaii.gov if you have any questions or concerns regarding this letter.

Aloha,

Theresa K. Donham
Archaeology Branch Chief

[This page intentionally left blank]

ENVIRONMENTAL ASSESSMENT

YERMIAN SINGLE-FAMILY RESIDENCE IN THE CONSERVATION DISTRICT AT KEONEPOKO IKI

TMK (3rd): 1-5-009:035
Keonepoko Iki, Puna, County of Hawai‘i, State of Hawai‘i

APPENDIX 2
Coastal Erosion Study

[This page intentionally left blank]

GEOHAZARDS CONSULTANTS INTERNATIONAL, INC.
Appraisal of hazards – reduction of risk

DRAFT
Coastal Erosion Study for the
David Yermian Property
Hawaiian Beaches Subdivision
TMK: (3) 01-05-09:35

T.E. Scheffler, Ph.D.
J.P. Lockwood, Ph.D.

April, 2012

P.O. BOX 479 · VOLCANO, HAWAI`I 96785 · USA
TEL: (808) 967-8579 · FAX: (808) 967-8525 · email: geohaz@hawaii.rr.net

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF PHOTOGRAPHS

Introduction

The Hawaii Administrative Rules concerning Conservation Districts (Title 13, Subtitle 1, Chapter 5, adopted August 12, 2011) state that applicants for Single Family Residential construction in coastal Conservation Districts must consider rates of coastal erosion affecting their properties in order to determine minimum shoreline setbacks for permitting. DLNR established a requirement that Annual Coastal Erosion Rates must be determined, based on formal "Coastal Erosion Studies". This report documents the nature of erosion and shoreline migration at the Yermian property, based on quantitative measurements and observations obtained through field inspection, aerial photography, satellite imagery, and geologic literature.

Field Inspection

The authors of this report visited the property on March 19th, 2012. A total of two-and-a-half hours were spent making observations and measurements with Brunton pocket transit and measuring tape.

The field observations of observed water line (see Fig. 1) were taken as the tide dropped from 1.98 to .54 feet above the tidal datum. The National Oceanic and Atmospheric Administration's tidal datum for Hilo, Hilo Bay, and Kuhio Bay, HI (Station #1617760) is 3.92 feet below MLLW and 6.32 feet below the Mean Higher High Water (MHHW). These sea-level elevations are calculated from historical data collected by the NOAA between 1983 and 2001. During this interval the highest observed water level was 7.69 feet *(http://tidesand currents.noaa.gov)*.

Surf consisted of moderate swells (3-5 feet) from the northwest, with typical brisk on-shore trade winds blowing some white caps on the ocean surface.

Physical Setting and Geological Environment

Lava flow ages along this coast date from 400 – 750 years before present, and belong to unit "f7d12" on Moore and Trusdell's (1991) geologic map of Kilauea's lower east rift zone. This unit contains both pahoehoe and `a`a flows.

The lava flow underlying the subject property and forming the coast is a dense `a`a flow. Its surface displays intense shearing and welding of the breccia. Plagioclase phenocrysts are fine anhedral to sub-hedral in shape, 2mm in diameter and compose perhaps 6%. Other inclusions consist of from 2-3% olivine, also anhedral to sub-hedral in shape, predominantly of 1.5mm size but with rare 4-5mm cystals. The few vesicles within the basalt are angular and elongate, consistent with the internal dynamic forces of a coolong `a`a flow

These flows are geologically young, even for Hawaii Island. For this reason the area around Nanawale Bay to the southeast is characteristically rocky with small cliffs and little reef or sandy beach development.

Photo 1 Property detail and location of profile (A – B).


Photo 2 Cobble and gravel beach fronting property, view east

Photo 3 Eroded boulders in surf zone fronting sea cliff

Findings

The shoreline is defined as "the upper reaches of the wash of the waves, other than storm and seismic waves, at high tide during the season of the year in which the highest wash of the waves occurs, usually evidenced by the edge of vegetation growth, or the upper limit of debris left by the wash of the waves, ..." (HAR §13-5-2).

Shoreline dynamics and historical change must be evaluated with reference to aspects of the larger coastal systems evolution. This includes the consideration of the influence of near-shore topography, sea-cliff configuration and composition, beach configuration and other significant aspects of the local geomorphology.

The elevations and distances between sea level, the shoreline, the coastal bench, back-beach and beach berm are illustrated in Figure 1.

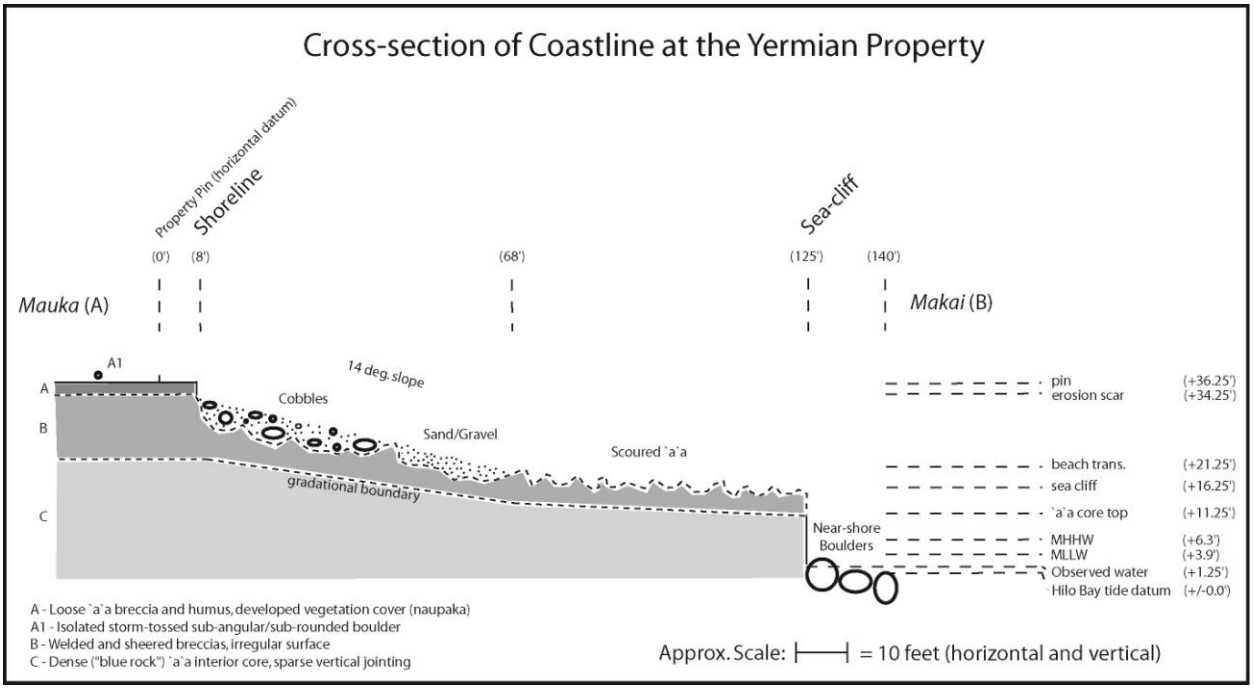


Figure 1 Cross-section of coastline at Yermian property

The shoreline is easily distinguished as a cut bank of about two foot height, eight feet seaward of the property's southeast corner pin (see Photo 4). On top of this bank is dense *naupaka* growth with some large Cook pine trees also standing within twenty feet of this shoreline. The beach, *per se*, is a slightly sloping (14 degrees) accumulation of well-worn cobbles and boulders overlying the basal substrate of `a`a. This `a`a shelf is scoured clean by storm waves and extends another sixty feet (with an almost horizontal slope) to a 10-15 ft high sea cliff. The cliff is very stable as there is little jointing or fracturing of the `a`a interior. This core or blue rock interior is highly resistant to erosion even by powerful marine wave action, forming a stable "toe" for the beach. Major failures are unlikely. The top of the sea-cliff is 10.25 ft higher than the Mean Highest-High Water (MHHW). The shoreline is 27.95 ft higher than this mark.

Photo 4 Shoreline edge

Erosion Rate

Where it has not been impacted by the erosive power of storm waves, the ‘a’a flow underlying the subject property is overlain by a normal, rubbly layer of ‘a’a breccia that characterizes the land inland from the coast. Where it subject to the power of storm or tsunami waves, however, closer to the coastline, the top of the lava flow has been eroded vertically by waves overtopping the coastal sea cliff and has washed away this loose material (see Photo 5). The “blue rock”, interior core of this ‘a’a flow (see Photo 6) is extremely durable, and is not subject to appreciable horizontal erosion.

The off-shore boulder bed buffers wave energy much of which is expended before impacting the cliff. These boulders are too big, some of more than five foot diameter, to be lifted up onto the coastal bench. Also, there is no undercutting of the cliff substrate as a result of this submerged, “rip-rap”-like boulder field. Major failures and cliff collapses are unlikely.

Date	Agency	Flight Line	Frames
1954	USN-USGS	017	116, 117
1965	USDA	EKL-12CC	30, 31
1977	USGS	GS-VEEC 6	121, 122
2012	Google Earth		

Table 1 Historical images

Photo 5 Scoured ‘a’a flow bench, view southwest

Photo 6 Sea cliff, note solid interior core of ‘a’a flow at base

Boak and Turner (2005:689) suggest there are two basic proxies for assessing shoreline erosion-accretion trends. These include the use of visually discernible imagery and/or an evaluation of the intersection between a tidal datum with a coastal profile.

Hwang (2005:64) as referred to in HAR §13-5, relies exclusively on the former category of indicator data. They are tailored to the evaluation of situations of far more active beach dynamics including situations influenced by the movement, deposition and removal of sandy sediments and active aeolian dune migrations. He suggests that the vegetation line (shoreline) and beach toe positions be

measured relative to a reference point over the course of an entire year. The combined observational and historical data are to be analyzed statistically with linear regression methods, plots, and assessments of variability over time including standard deviations.

Available aerial photographs show no measurable change in position of the overall coastal sea-cliff or of the vegetation line since the earliest 1954 photos. The large-scale of the aerial photographs consulted for the study (Table 1) makes quantitative visual analyses of fine-scale morphological changes of the shoreline impossible. Since an approximation of the erosion rate at this property is not statistically feasible using the methods outlined by Hwang, any shoreline determinations must rely upon alternative indicators. These include, as mentioned above, the quantitative assessment of the intersection between a tidal datum with the coastal profile to inform us of shoreline dynamics (Boak and Turner 2005:690-691).

Long-term geological processes that significantly affect the horizontal position of both the shoreline and sea-cliff are overwhelmingly stochastic in nature (significant storm events, seismic subsidence, tsunami, etc… (see below for a discussion of these potential hazards).

There is no visible indication that the shoreline vegetation line has changed over the 58 year period since the first aerial photographic record began.

Quantitative field-based observations of local topographic and marine elevations and other geomorphological characteristics demonstrate that the sea-cliff is high enough and stable enough to mitigate any concerns of shoreline erosion (see Figure 1, and discussion of elevations relative to mean tides, above).

It is true that the same conditions that mitigate erosion preclude the possibility of accretion or progradation of the shoreline at this site. That is, until a future eruption of Kilauea inundates the area.

General Coastal Zone Hazards

Hwang (2005) recommends that all hazards facing coastal areas should be considered when planning for land-use zoning in Hawaii, and not just erosion. Fletcher *et al.* (2002) portray generalized hazards assessments for long areas of Hawaii's coastlines; they rate the specific hazards for this area of Puna as shown in the following Table:

Hazard Type	**Relative Threat**	**Scale (1-4)**
Tsunami	High	4
Stream Flooding	Medium-high	3
High Waves	Medium-high	3
Storms	Medium-high	3
Erosion	Medium-low	2
Sea Level Change	Medium-high	3
Volcanic/Seismic	High	4

Table 2 Natural hazards in Hawaii's coastal zone (from Fletcher et al., 2002:150)

Effects of Subsidence and Sea Level Rise on Shoreline

An overall rise in sea level of 3.3 feet by the end of the 21st century has been proposed by Fletcher (2010) and others. Hwang et al (2007) use a figure of .16 in/yr in their assessments, resulting in an estimate of 13.9 inches of rise in the next 87 years.

Relative sea-level rise, of course, is a result of the combined water rise and land fall.

The 1975 Kalapana earthquake on Kilauea's rift caused land in Kapoho to drop .8ft. (based on Hawaii Volcano Observatory (USGS) data in Hwang *et al.* 2007:6). This *episodic* seismic induced subsistence is difficult to anticipate or measure over long periods of time. On the basis of InSAR (Synthetic Aperture Radar Interferometry) remote sensing data, Hwang et al.(*ibid.*) state that the coastline at Kapoho may be subsiding at a *continuous* rate of between .31 – .67 in/yr. Rates of subsidence at the Yermian property, however, are necessarily much lower as a result of their distance from Kilauea's active rift zone.

Therefore, the combined effects of subsidence and rising ocean levels may cause an overall (relative) drop in the shoreline elevation of between .1 - .3 in/yr. The durability and height of the coastal sea cliff (greater than ten feet at even the highest tides) ensures that combined sea level change and land subsidence will not cause significant shoreline transgression (horizontal movement) in this area.

Summary

The shoreline, beach and sea-cliff in front of the Yermian property were mapped and inspected by a qualified geologist in order to assess the dynamic nature of geologic and marine processes operating there. In an attempt to establish an erosion rate for the area historic aerial photos were evaluated. Quantitative measurements could not be derived from these photos. An alternate method relying on the quantitative assessment of the tidal datum and coastal profile intersection was utilized. This coastal erosion study resulted in a determination that the horizontal or, lateral, erosion rate is very near zero. A continuous and steady rate of erosion does not characterize this coastline. Future migration of the shoreline will be impacted predominantly by unpredictable and episodic events including subsistence due to volcanic seismicity or accretion due to future eruptions of Kilauea.

References

Fletcher, C. H., Boyd, R., Neal, W. J., and Tice, V., 2010, Living on the Shores of Hawaii – Natural Hazards, the Environment, and our Communities: University of Hawaii Press, 371 pp.

Fletcher, C. H., , Grossman, E. E, Richmond, B. M. and Gibbs, A. E., 2002, Atlas of Natural Hazards in the Hawaiian Coastal Zone: U.S. Geological Survey, Geologic Investigations Series Map I-2761, scale 1:50,000.

Hwang, D. J., 2005, Hawaii Coastal Zone Mitigation Handbook: Hawaii Coastal Zone Management Program, DBED, State of Hawaii, 216 pp.

Hwang, D. J., 2007, Coastal Subsidence at Kapoho, Puna, Island and State of Hawaii: Private report for Hawaii County Planning Department, 82 pp.

Lipman, P. W., Lockwood, J. P., Okamura, R. T., Swanson, D. A., and Yamashita, K. M., 1985, Ground deformation associated with the 1975 magnitude 7.2 earthquake and resulting changes in activity of Kilauea volcano, Hawaii: U. S. Geological Survey Professional Paper 1276, 45 pp.

Moore, J. G., 1970, Relationship between subsidence and volcanic load, Hawaii: Bulletin of Volcanology, V. 34, pp. 562-576.

Moore, J. G. and Fornari, D. J., 1984, Drowned reefs as indicators of the rate of subsidence of the Island of Hawaii: Journal of Geology, v. 92, p. 752-759.

Moore, R. B. and Trusdell, F. A., 1991,Geologic Map of the Lower East Rift Zone of Kilauea Volcano, Hawaii: U. S. Geological Survey Misc. Investigations Series, Map I-2225, Scale:1:24,000.

Wright,,T L., Chun, J.Y.F., Esposo, Joan, Heliker, C., Hodge, J., Lockwood, J. P., and Vogt, S. M., 1992, Map showing Lava-flow Hazard Zones, Island of Hawaii: U.S. Geological Survey, Misc. Field Studies Map MF-2193, 1:250,000.

[This page intentionally left blank]

ENVIRONMENTAL ASSESSMENT

YERMIAN SINGLE-FAMILY RESIDENCE IN THE CONSERVATION DISTRICT AT KEONEPOKO IKI

TMK (3rd): 1-5-009:035
Keonepoko Iki, Puna, County of Hawai‘i, State of Hawai‘i

APPENDIX 3
Archaeological Assessment Survey

[This page intentionally left blank]

RC-0786

An Archaeological Assessment Survey of TMK: 3-1-5-09:035

Keonepoko Iki Ahupuaʻa
Puna District
Island of Hawaiʻi

FINAL VERSION

PREPARED BY:

Robert B. Rechtman, Ph.D.

PREPARED FOR:

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

May 2012

RECHTMAN CONSULTING, LLC
507-A E. Lanikaula St. Hilo, Hawaii 96720
phone: (808) 969-6066 fax: (808) 443-0065
e-mail: bob@rechtmanconsulting.com
ARCHAEOLOGICAL, CULTURAL, AND HISTORICAL STUDIES

An Archaeological Assessment Survey of TMK: 3-1-5-09:035

Keonepoko Iki Ahupuaʻa
Puna District
Island of Hawaiʻi

RECHTMAN CONSULTING

MANAGEMENT SUMMARY

At the request of Ron Terry, Ph.D. of Geometrician Associates, LLC., on behalf of his client, David Yermian (landowner), Rechtman Consulting, LLC conducted an archaeological assessment survey of a roughly 2.1 acre parcel (TMK:3-1-5-09:035) in Keonepoko Iki Ahupuaʻa, Puna District, Island of Hawaiʻi. The landowner intends to obtain a State Conservation District Use Permit as well as County of Hawaiʻi SMA and grubbing and grading permit to develop a single-family residence on the parcel. The current study was undertaken in accordance with Hawaiʻi Administrative Rules 13§13–284, and was performed in compliance with the Rules Governing Minimal Standards for Archaeological Inventory Surveys and Reports as contained in Hawaiʻi Administrative Rules 13§13–276. According to 13§13-284-5 when no archaeological resources are discovered during an archaeological survey the production of an Archaeological Assessment report is appropriate. Compliance with the above standards is sufficient for meeting the historic preservation review process requirements of both the Department of Land and Natural Resources–State Historic Preservation Division (DLNR–SHPD) and the County of Hawaiʻi Planning Department. The entire project area was surveyed on-foot employing transects with fieldworkers maintaining a 5-meter spacing interval. The boundaries of the project area were clearly visible and no historic properties were identified as a result of the fieldwork. Given the negative findings of the current study, it is concluded that the proposed development of a single-family residence will not significantly impact any known historic properties. No further historic preservation work is recommended. In the unlikely event that any unanticipated resources are unearthed during development activities, DLNR-SHPD should be contacted as outlined in Hawaiʻi Administrative Rules 13§13–280.

CONTENTS

FIGURES

INTRODUCTION

At the request of Ron Terry, Ph.D. of Geometrician Associates, LLC., on behalf of his client, David Yermian (landowner), Rechtman Consulting, LLC conducted an archaeological assessment survey of a roughly 2.1 acre parcel (TMK: 3-1-5-09:035) in Keonepoko Iki Ahupuaʻa, Puna District, Island of Hawaiʻi (Figures 1 and 2). The landowner intends to obtain a State Conservation District Use Permit as well as County of Hawaiʻi SMA and grubbing and grading permit to develop a single-family residence on the parcel.

The current study was undertaken in accordance with Hawaiʻi Administrative Rules 13§13–284, and was performed in compliance with the Rules Governing Minimal Standards for Archaeological Inventory Surveys and Reports as contained in Hawaiʻi Administrative Rules 13§13–276. According to 13§13-284-5 when no archaeological resources are discovered during an archaeological survey the production of an Archaeological Assessment report is appropriate. Compliance with the above standards is sufficient for meeting the historic preservation review process requirements of both the Department of Land and Natural Resources–State Historic Preservation Division (DLNR–SHPD) and the County of Hawaiʻi Planning Department.

This report contains background information outlining the project area's physical and cultural contexts, a presentation of previous archaeological work in the area and current survey expectations based on that previous work, along with an explanation of the project methods.

BACKGROUND

To generate expectations regarding the nature of the historic properties that might exist within the study area, and to provide an appropriate background to assess any resources that are encountered, the specific as well as general physical and cultural contexts are presented along with prior archaeological studies relevant to the project area.

Study Area Description

The study area is located approximately 500 meters northwest of the Hawaiian Shores Subdivision. The parcel consists of a narrow (approximately 30 meters across) swath of land that stretches between the coast and the Old Government Road (approximately 275 meters inland) (Figure 3). The entire parcel, except for perhaps the area within 30 meters from the coastal bluff, appears to have been bulldozed in the past. Vegetation throughout the bulldozed portion of the parcel consists of introduced weedy species (Figures 4 and 5). Vegetation in the narrow strand along the coast (Figure 6) that has not been bulldozed consists primarily of *naupaka* (*Scaevola guadichaudiana*), coconut palms (*Cocos nucifera*), with an occasional *hala* (*Pandanus* sp.) (Figure 7). Prior to the bulldozing, the ground surface within the stuyd area likely consisted of *pāhoehoe* bedrock dating from between 200 to 750 year old (Wolfe and Morris 1996). In the *mauka* portion of the parcel is a hollow tile and concrete foundation (Figure 8) of a former residential structure that appears to have burned down. Household debris (Figure 9) and numerous (at least ten) scrap automobiles (Figures 10 and 11) litter the parcel. The current proposed development plans call for the construction of a new single-family dwelling on the parcel.

Figure 1. Study area location.

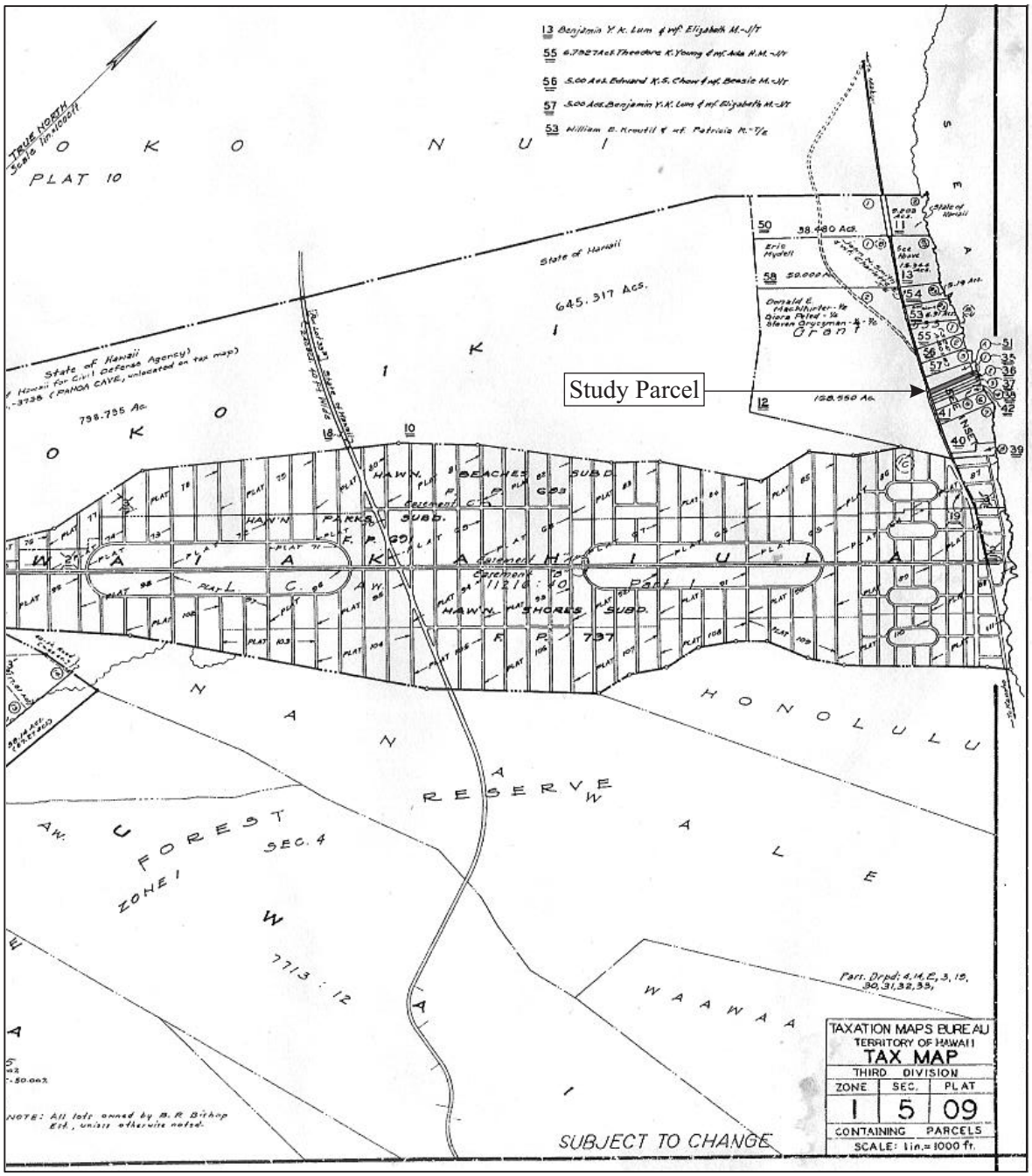


Figure 2. Portion of Tax Map 3-1-5-09 showing study parcel (056).

Figure 2. Google™ earth image showing the current study parcel.

Figure 4. Typical vegetation in the *mauka* portion of the study parcel.

Figure 5. Typical vegetation in central portion of the study parcel.

Figure 6. Extreme coastal vegetation within the study parcel.

Figure 7. One of two observed *hala* within the study parcel.

Figure 8. Concrete and hollow tile foundation of former residential structure.

Figure 9. Household debris scattered around the foundation area.

Figure 10. Several of the rusted cars in the mauka portion of the study parcel.

Figure 11. Rusted car in the central portion of the study parcel.

Culture-Historical Context

A generalized Cultural-Historical context for Hawai‘i Island, Puna District, and the specific study *ahupua‘a*, along with the expected settlement patterns for the area are presented in order to assess the current project area expectations.

The question of the timing of the first settlement of Hawai‘i by Polynesians remains unanswered. Several theories have been offered derived from various sources of information (i.e., genealogical, oral-historical, mythological, radiometric), but none of these theories is today universally accepted (c.f., Kirch 2011). The three most popular theories place the first settlement at around A.D. 300, A.D. 600. and A.D. 1000, respectively. What is more widely accepted is the answer to the question of where Hawaiian populations came from and the transformations they went through on their way to establish a uniquely Hawaiian culture.

For generations following initial settlement, communities were clustered along the watered, windward (*ko‘olau*) shores of the Hawaiian Islands. Along the *ko‘olau* shores, streams flowed and rainfall was abundant, and agricultural production became established. The *ko‘olau* region also offered sheltered bays from which deep sea fisheries could be easily accessed, and near shore fisheries, enriched by nutrients carried in the fresh water, could be maintained in fishponds and coastal waters. It was around these bays that clusters of houses where families lived could be found (McEldowney 1979:15). In these early times, Hawai‘i’s inhabitants were primarily engaged in subsistence level agriculture and fishing (Handy et al. 1972:287).

Over a period of several centuries, areas with the richest natural resources became populated and perhaps crowded, and by about A.D. 1200, the population began expanding to the *kona* (leeward side) and more remote regions of the island (Cordy 2000:130). In Kona, communities were initially established along sheltered bays with access to fresh water and rich marine resources. The primary “chiefly” centers were established at several locations—the Kailua (Kaiakeakua) vicinity, Kahalu‘u-Keauhou, Ka‘awaloa-Kealakekua, and Hōnaunau. The communities shared extended familial relations, and there was an occupational focus on the collection of marine resources. By the fourteenth century, inland elevations to around the 3,000-foot level were being turned into a complex and rich system of dryland agricultural fields (today referred to as the Kona Field System). By the fifteenth century, residency in the uplands was becoming permanent, and there was an increasing separation of the chiefly class from the common people. In the sixteenth century the population stabilized and the *ahupua‘a* land management system was established as a socioeconomic unit (see Ellis 1963; Handy et al. 1972; Kamakau 1992; Kelly 1983; and Tomonari-Tuggle 1985).

Over the generations, the ancient Hawaiians developed a sophisticated system of land and resources management. By the time ‘Umi-a-Līloa rose to rule the island of Hawai‘i in ca. 1525, the island (*moku-puni*) was divided into six districts or *moku-o-loko* (cf. Fornander 1973–Vol. II:100-102). On Hawai‘i, the district of Puna is one of six major *moku-o-loko* within the island.

Puna like other large districts on Hawai‘i, was subdivided into *‘okana* or *kalana* (regions of land smaller than the *moku-o-loko*, yet comprising a number of smaller units of land. The *moku-o-loko* and *‘okana* or *kalana* were further divided into manageable units of land, and were tended to by the *maka‘āinana* (people of the land) (cf. Malo 1951:63-67). Of all the land divisions, perhaps the most significant management unit was the *ahupua‘a*. *Ahupua‘a* are subdivisions of land that were usually marked by an altar with an image or representation of a pig placed upon it (thus the name *ahu-pua‘a* or pig altar). In their configuration, the *ahupua‘a* may be compared to wedge-shaped pieces of land that radiate out from the center of the island, extending to the ocean fisheries fronting the land unit. Their boundaries are generally defined by topography and geological features such as *pu‘u* (hills), ridges, gullies, valleys, craters, or areas of a particular vegetation growth.

The *ahupua‘a* were also divided into smaller individual parcels of land (such as the *‘ili*, *kō‘ele*, *māla*, and *kīhāpai*, etc.), generally oriented in a *mauka-makai* direction, and often marked by stone alignments (*kuaiwi*). In these smaller land parcels the native tenants tended fields and cultivated crops necessary to sustain their families, and the chiefly communities with which they were associated. As long as sufficient tribute was offered and *kapu* (restrictions) were observed, the common people, who lived in a given *ahupua‘a* had access to most of the resources from mountain slopes to the ocean. These access rights were

almost uniformly tied to residency on a particular land, and earned as a result of taking responsibility for stewardship of the natural environment, and supplying the needs of the *ali‘i* (see Kamakau 1992:372-377 and Malo 1951:63-67).

Entire *ahupua‘a*, or portions of the land were generally under the jurisdiction of appointed *konohiki* or lesser chief-landlords, who answered to an *ali‘i-‘ai-ahupua‘a* (chief who controlled the *ahupua‘a* resources). The *ali‘i-‘ai-ahupua‘a* in turn answered to an *ali‘i ‘ai moku* (chief who claimed the abundance of the entire district). Thus, *ahupua‘a* resources supported not only the *maka‘āinana* and *‘ohana* who lived on the land, but also contributed to the support of the royal community of regional and/or island kingdoms. This form of district subdividing was integral to Hawaiian life and was the product of strictly adhered to resources management planning. In this system, the land provided fruits and vegetables and some meat in the diet, and the ocean provided a wealth of protein resources.

The current study area is located within Keonepoko Iki Ahupua‘a, a land unit of the District of Puna, one of six major districts on the island of Hawai‘i. As McGregor relates, “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 small settlements along the coast where they subsisted on marine resources and agricultural products. According to McEldowney (1979), six coastal villages were present along the Puna coast between Hilo and Cape Kumakahi (Kea‘au or Haena, Maku‘u, Waiakahiula, Honolulu, Kahuwai, and Kula or Koa‘e. Each of the villages, McEldowney notes:

> …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]

Barrère (1959) summarized the Precontact geopolitics of the Puna District as follows:

> Puna, as a political unit, played an insignificant part in shaping the course of history of Hawaii Island. Unlike the other districts of Hawaii, no great family arose upon whose support one or another of the chiefs seeking power had to depend for his success. Puna lands were desirable, and were eagerly sought, but their control did not rest upon conquering Puna itself, but rather upon control of the adjacent districts, Kau and Hilo. (Barrère 1959:15)

Despite the perceived lack of importance with respect to the emerging political history of Hawaiian leadership, Puna was a region famed in legendary history for its associations with the goddess Pele and god Kāne (Maly 1998). Because of the relatively young geological history and persistent volcanic activity the region’s association with Pele has been a strong one. However, the association with Kāne is perhaps more ancient. Kāne, ancestor to both chiefs and commoners, is the god of sunlight, fresh water, verdant growth, and forests (Pukui 1983). It is said that before Pele migrated to Hawai‘i from Kahiki, there was “no place in the islands . . . more beautiful than Puna” (Pukui 1983:11). Contributing to that beauty were the groves of fragrant *hala* and forests of *‘ōhi‘a lehua* for which Puna was famous:

> *Puna pāia ‘ala i ka hala* (Puna, with walls fragrant with pandanus blossoms).
> Puna, Hawai‘i, is a place of *hala* and *lehua* forests. In olden days the people would stick the bracts of *hala* into the thatching of their houses to bring some of the fragrance indoors. (Pukui 1983:301)

Following the death of Kamehameha I in 1819, the Hawaiian religious and political systems began a radical transformation; Ka‘ahumanu proclaimed herself "*Kuhina nui*" (Prime Minister), and within six months the ancient *kapu* system was overthrown. Within a year, Protestant missionaries arrived from America (Fornander 1973; I‘i 1959; Kamakau 1992). In 1823, British missionary William Ellis and members of the American Board of Commissioners for Foreign Missions (ABCFM) toured the island of Hawai‘i seeking out 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 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 [‘Ōla‘a] 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)

One year after Ellis' tour, the ABCFM established a base church in Hilo. From that church (Hāili), the missionaries traveled to the more remote areas of the Hilo and Puna Districts. David Lyman who came to Hawai‘i 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 are recorded as residing in the district of Puna (Schmitt 1973); the smallest total district Population on the island of Hawai‘i. In 1841, Titus Coan recorded that most of the 4,371 recorded residents of Puna, lived near the shore, though there were hundreds of individuals who lived inland (Holmes 1985). In that same year, Commander Charles Wilkes of the United States Exploring Expedition, toured the Hawaiian Islands (Wilkes 1845). His expedition traveled through lower Puna not far from the current study area:

> Almost all of the hills or craters of any note have some tradition connected with them; but I found that the natives were now generally unwilling to narrate these tales, calling them "foolishness." After leaving the *pahoihoi* [pāhoehoe] plain, we passed along the line of cone-craters towards Point Kapoho, the Southeast part of the island.
>
> Of these cone-craters we made out altogether, large and small, fifteen, trending about east-northeast. The names of the seven last are Pupukai, Poholuaokahowele [Pu‘u-hōlua-o-Kahawali], Punomakalua, Kapoho, Puukea, Puuku, and Keala. On some of these the natives pointed out where there had formerly been slides, an amusement or game somewhat similar to the sport of boys riding down hill on sleds. These they termed *kolua* [*hōlua*].

> This game does not appear to be practiced now, and I suppose that the chiefs consider themselves above such boyish amusements. The manner in which an old native described the velocity with which they passed down these slides was, by suddenly blowing a puff; according to him, these amusements were periodical, and the slides were usually filled with dried grass.
>
> As we approached the seashore, the soil improved very much, and was under good cultivation, in taro, sweet potatoes, sugar cane, and a great variety of fruit and vegetables. At about four o'clock, we arrived at the house of our guide, Kekahunanui, who was the "head man." I was amused to find that none of the natives knew him by this name, and were obliged to ask him . . .the view from the guide's house was quite pretty, the eye passing over well-cultivated fields to the ocean, whose roar could be distinctly heard. (Wilkes 1845 Vol. IV:186)
>
> During the night, one of the heaviest rains I had experienced in the island, fell; but the morning was bright and clear—every thing seemed to be rejoicing around, particularly the singing-birds, for the variety and sweetness of whose notes Hawaii is distinguished.
>
> Previous to our departure, all the tenantry, if so I may call them, came to pay their respects, or rather to take a look at us. We had many kind wishes, and a long line of attendants, as we wended our way among the numerous taro patches of the low grounds, towards Puna; and thence along the sea-coast where the lava entered the sea, at Nanavalie [Nānāwale]. The whole population of this section of the country was by the wayside, which gave me an opportunity of judging of their number; this is much larger than might be expected from the condition of the country, for with the exception of the point at Kapoho, very little ground that can be cultivated is to be seen. The country, however, is considered fruitful by those who are acquainted with it, notwithstanding its barren appearance on the roadsides. The inhabitants seemed to have an abundance if bread-fruit, bananas, sugar-cane, taro, and sweet-potatoes. The latter, however, are seen to be growing literally among heaps of stones and pieces of lava, with scarcely soil enough to cover them; yet they are, I am informed, the finest on the island…
>
> In some places they have taken great pains to secure a good road or walking path; thus, there is a part of the road from Nanavalie to Hilo which is built of pieces of lava, about four feet high and three feet wide on the top; but not withstanding this, the road is exceedingly fatiguing to the stranger, as the lumps are so arranged that he is obliged to take a long and short step alternately; but this the natives do not seem to mind, and they pass over the road with great facility, even when heavy laden…(Wilkes 1970, Vol. IV:188-193)

In 1846, Chester S. Lyman, "a sometime professor" at Yale University visited Hilo, Hawai'i, and stayed with Titus Coan (Maly 1998). Traveling the almost 100 mile long stretch of the "Diocese" of Mr. Coan, Lyman reported that the district of Puna had somewhere between 3,000-4,000 inhabitants (Maly 1998). Entering Puna from Hilo, and traveling to Kea'au along the coast, Lyman offered the following observations:

> …The groves of Pandanus were very beautiful, and are the principal tree of the region. There is some grass and ferns, and many shrubs; but the soil is very scanty. Potatoes are almost the only vegetable that can be raised, and these seem to flourish well amid heaps of stone where scarcely a particle of soil could be discovered. The natives pick out the stones to the depth often of from 2 to 4 feet, and in the bottom plant the potato–how it can expand in such a place is a wonder.
>
> Nearly all Puna is like this. The people are necessarily poor—a bare subsistence is all they can obtain, and scarcely that. Probably there are not $10 in money in all Puna, and it is thought that not over one in five hundred has a single cent. The sight of some of these potatoe patches would make a discontented N.E. farmer satisfied with his lot. Yet, I have nowhere seen the people apparently more contented & happy. (Maly 1998:35)

In Precontact Hawai‘i, all land and natural resources were held in trust by the high chiefs (*ali‘i ‘ai ahupua‘a* or *ali‘i ‘ai moku*). The use of lands and resources were given to the *hoa‘āina* (native tenants), at the prerogative of the *ali‘i* and their representatives or land agents (*konohiki*), who were generally lesser chiefs as well. In 1848, the Hawaiian system of land tenure was radically altered by the *Māhele ‘Āina*. This change in land tenure was promoted by the missionaries and the growing Western population and business interests in the island kingdom. Generally these individuals were hesitant to enter business deals on leasehold land.

By the middle of the nineteenth century the ever-growing population of Westerners forced socioeconomic and demographic changes that promoted the establishment of a Euro-American style of land ownership, and the *Māhele* became the vehicle for determining ownership of native lands. The *Māhele* defined the land interests of Kamehameha III (the King), the high-ranking chiefs, and the *konohiki*. As a result of the *Māhele*, all land in the Kingdom of Hawai‘i came to be placed in one of three categories: (1) Crown Lands (for the occupant of the throne); (2) Government Lands; and (3) Konohiki Lands (Chinen 1958:vii, Chinen 1961:13). The chiefs and *konohiki* were required to present their claims to the Land Commission to receive awards for lands provided to them by Kamehameha III. They were also required to provide commutations to the government in order to receive royal patents on their awards. The lands were identified by name only, with the understanding that the ancient boundaries would prevail until the land could be surveyed. This process expedited the work of the Land Commission (Chinen 1961:13).

The “Enabling” or “*Kuleana* Act” (December 21,1849) laid out the frame work by which native tenants could apply for, and be granted fee-simple interest in “*kuleana*” lands, and their rights to access and collection of resources necessary to their life upon the land in their given *ahupua‘a*. The lands awarded to the *hoa‘āina* (native tenants) became known as “*Kuleana* Lands.” All of the claims and awards (the Land Commission Awards or LCA) were numbered, and the LCA numbers remain in use today to identify the original owners of lands in Hawai‘i.

As a result of the *Māhele*, Keonepoko Iki Ahupua‘a was retained as Government Land. No Land Commission Award claims were made in Keonepoko Iki Ahupua‘a (Waihona ‘Āina database). Beginning in 1903 a *mauka* portion of the *ahupua‘a* (in the vicinity of Pāhoa Town) was commuted as grant parcels and homestead lots (Figure 12).

In 1862, the Commission of Boundaries (Boundary Commission) was established in the Kingdom of Hawai‘i to legally set the boundaries of all the *ahupua‘a* that had been awarded as a part of the *Māhele*. Subsequently, in 1874, the Commissioners of Boundaries were authorized to certify the boundaries for lands brought before them. The primary informants for the boundary descriptions were old native residents of the lands, many of which had also been claimants for *kuleana* during the *Māhele*. This information was collected primarily between A.D. 1873 and 1885 and was usually given in Hawaiian and transcribed in English as they occurred. As Keonepoko Iki was retained as government land, it boundaries were not set by the land commission. However, the boundaries of neighboring Keonepoko Nui were survey in 1880 for the estate of C. Kanaina, and place names along the common boundary with Keonepoko Iki are shown on a survey map (Figure 13). This map also shows the location of the old Government Road.

The population of Puna declined during the early nineteenth century and Hawaiians maintained marginalized communities outside of the central population centers. These communities were located in “out-of-the-way” places. In the aftermath of the *Māhele*, economic interests in the region swiftly changed from the traditional Hawaiian land tenure system of subsistence farming and regional trading networks to the more European based cash crops including coffee, tobacco, sugar, and pineapple, and emphasized dairy and cattle ranching. While large tracts of land in lower Puna were used for cattle grazing and sugarcane cultivation, the current project area does not appear to have been used for either purpose.

A review of aerial photographs of the area shows that in 1965 the Hawaiian Beaches and Hawaiian Shores subdivisions were in their infancy and that the current study parcel was vacant land (Figure 14). An aerial photograph dated February 19, 1977 (Figure 15) shows what appears to be a structure on the current study parcel. County of Hawai‘i building permit records support this observation, listing a building permit for a single-family residence in July of 1968, and tax assessor field notes show a 24 foot by 34 foot residence having been constructed by November of that same year. The last permit issued by the County Building Department was in November of 1978. Only the concrete and hollow tile foundation of the former residence is currently present.

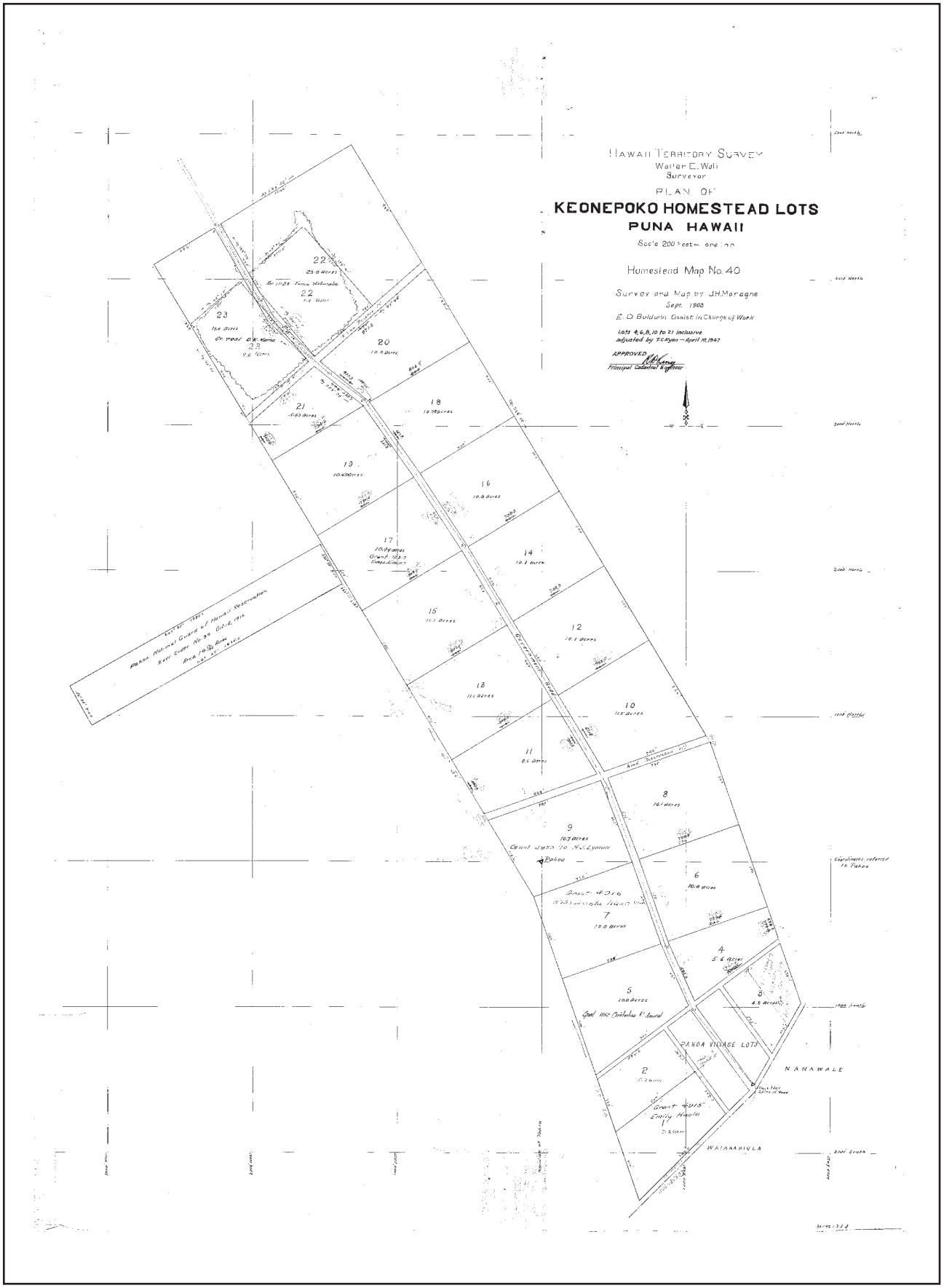


Figure 12. Hawai'i Registered Map 2084 originally prepared in 1903 and updated in 1947.

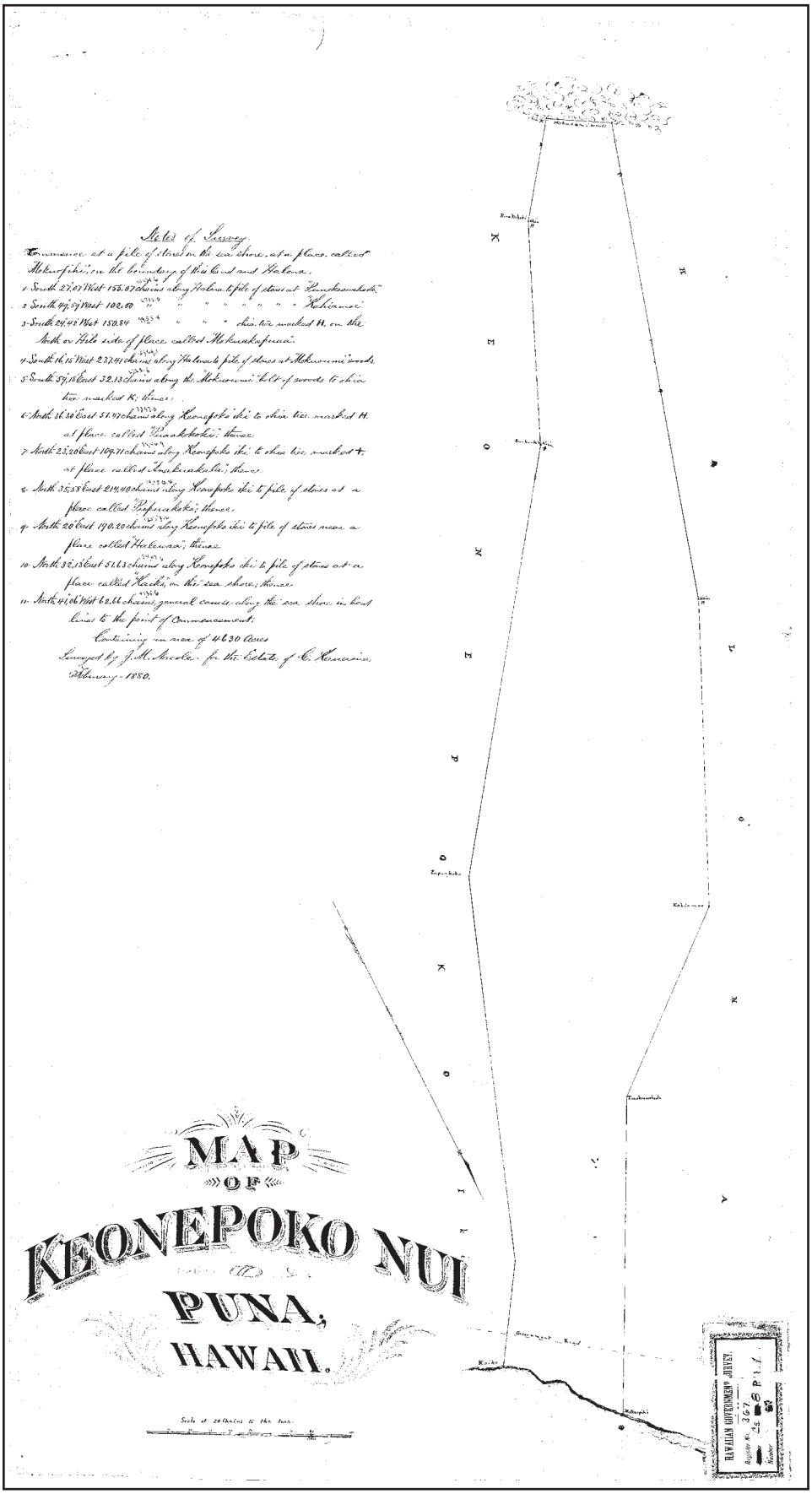


Figure 13. Hawai'i Registered Map 367 prepared in 1880.

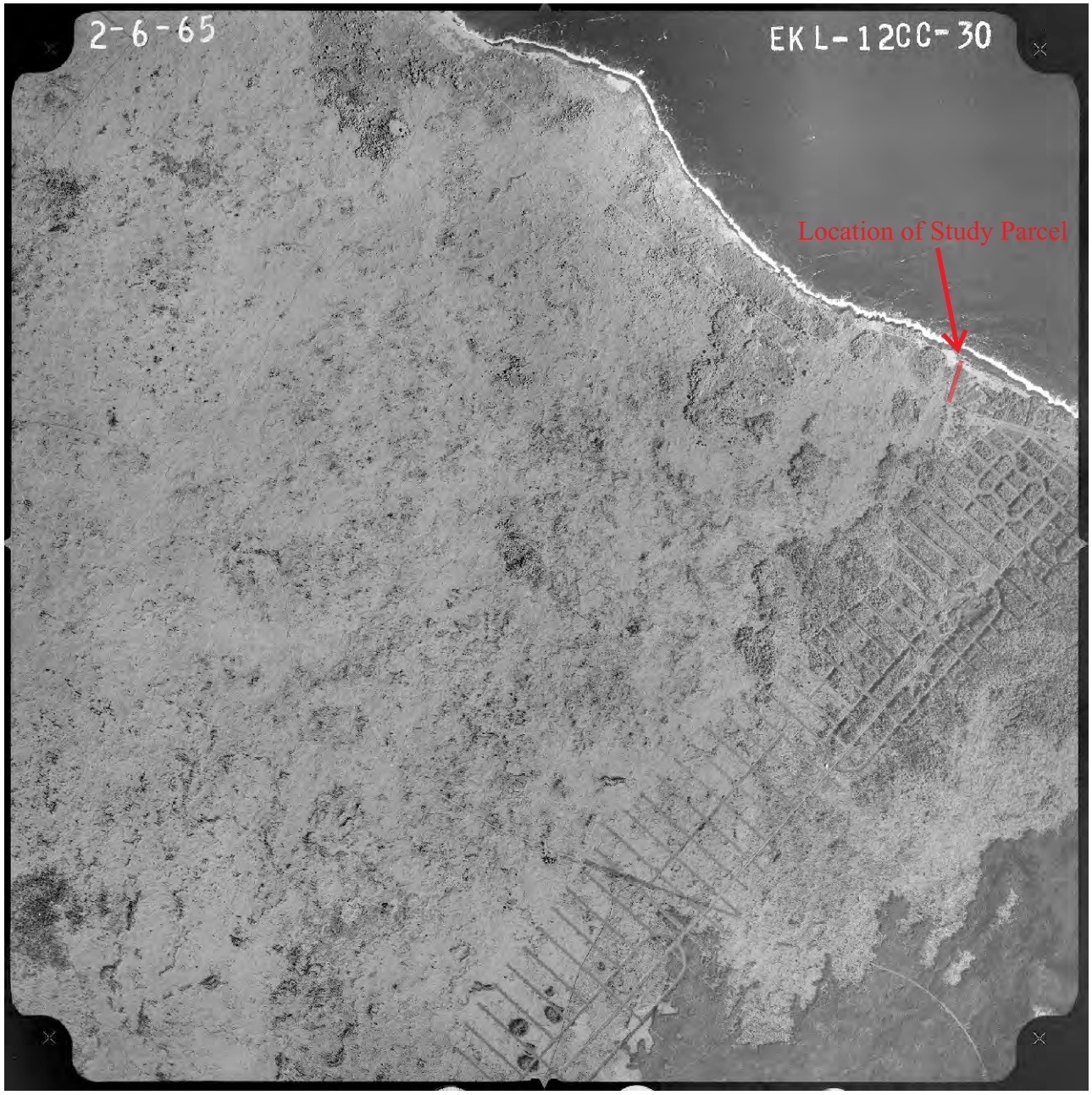


Figure 14. Aerial photograph dated February 6, 1965 showing the general study area.

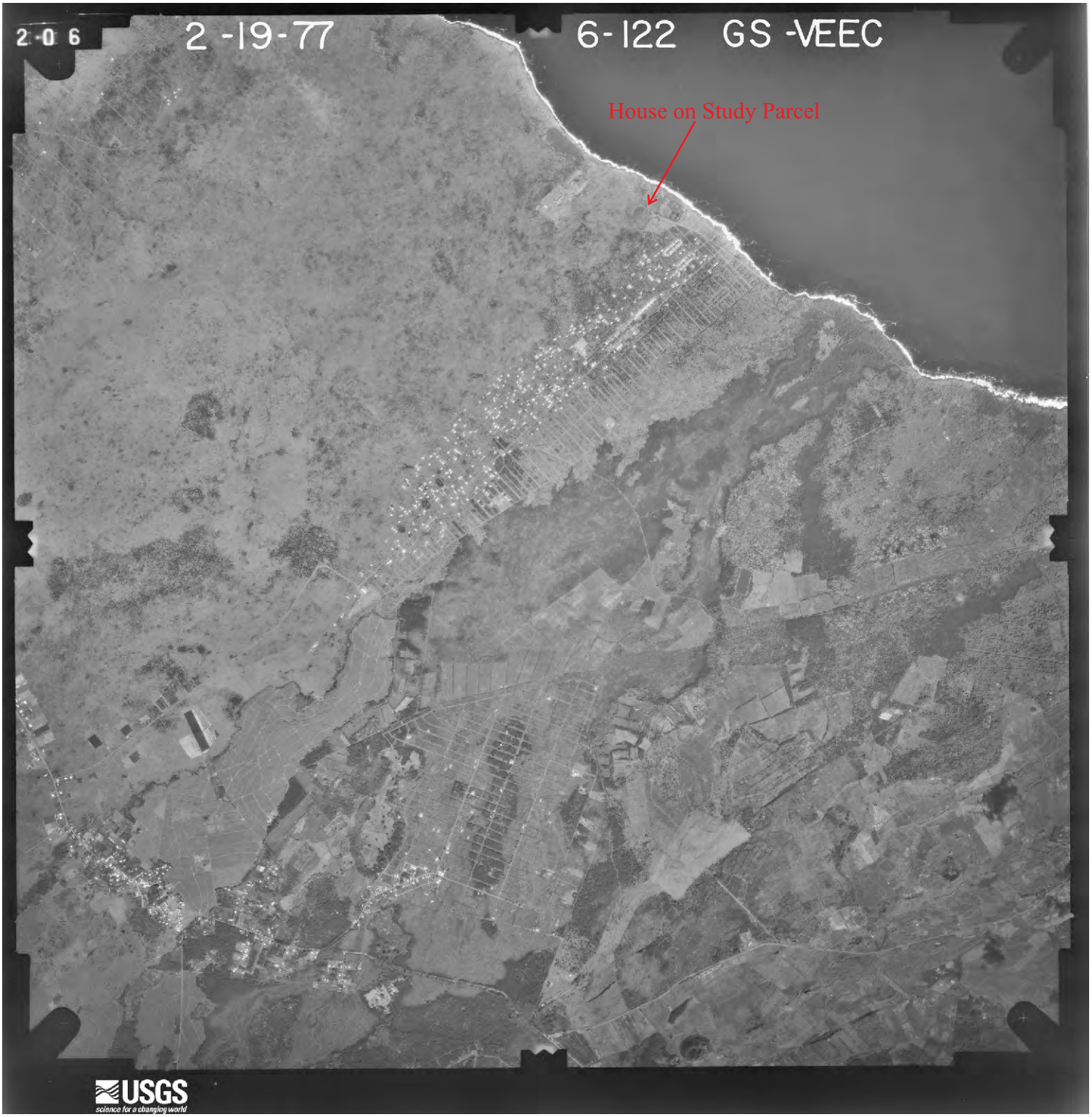


Figure 15. Aerial photograph dated February 19, 1977 showing the general study area.

Prior Archaeological Studies

Records on file at the Department of Land and Natural Resources-State Historic Preservation Division indicate that the subject parcel has never been surveyed for historic properties. However, the Old Government Road, which runs along the *mauka* edge of the current study parcel, is considered a historic property (Site 21273). The Old Government Road (also referred to as the Puna Trail) was previously studied by Lass (1997) and Maly (1999) within the *ahupuaʻa* of Keaʻau, well to the northwest of the current project area. Currently, this road is dirt covered and maintained for vehicular access. Maly (1999) relates that the current alignment of the Old Government Road, which evolved from earlier trail routes, was under construction by the 1840s. The road remained the preferred route of travel between Hilo and the outlying areas of Puna until 1895, when the Keaʻau-Pāhoa Road (Highway 130) was established to access the growing inland population centers and agricultural areas (Maly 1999:6). Only two other archaeological studies (Rechtman 2005; Rechtman and Henry 1998) have been conducted nearby the current study area. In 2005, Rechtman (2005) prepared a "no historic properties affected" request report for TMK: 3-1-5-09:056, which is located three parcels to the northwest of the current study parcel (see Figure 2). That property had been significantly mechanical altered, and no archaeological resources were discovered.

The Rechtman and Henry (1998) study was conducted at two sites originally identified during the 1973 Statewide Inventory of Historic Places (Sites 19013 and 19014) on two adjoining parcels (TMKs:3-1-5-63:042 and 043; see Figure 2) located along the *mauka* edge of the Old Government Road in Waiakahiula Ahupuaʻa within the Hawaiian Shores Subdivision. Site 19013 included two collections of stone rimmed depressions and two terraces that were interpreted as agricultural features, and Site 19014 consisted of a vaulted burial chamber within a stone platform (Rechtman and Henry 1998). One other study (Rechtman 2004) was conducted within both of the Keonepoko *ahupuaʻa* well inland of the current project area along Highway 130. No historic properties were identified during that study.

CURRENT SURVEY EXPECTATIONS

Given the culture-historical background and the results of previous archaeological work conducted in the vicinity of the current study area, the archaeological expectations for the current study include possible coastal trail alignment, stacked stone and excavated pit agricultural features, and habitation and burial features both Precontact and Historic. It is also known that this parcel witnessed construction activity beginning in 1968, and this activity could have impacted any prior existing cultural resources.

FIELDWORK

On March 29, 2012, Robert B. Rechtman, Ph.D., Dave Nelson, B.A., and Amy L. Ketner, B.A. conducted a thorough on-foot field survey of the study parcel, employing transects with fieldworkers maintaining a 5-meter spacing interval. The property corners were marked with property pins and flagging at the time of the survey. As the majority of the study parcel had been previously mechanically cleared and built upon, no archaeological resources were observed on the surface, and given the local substrate the likelihood of encountering subsurface resources on the parcel is very remote. Surface features were observed on the adjacent parcel to the northwest; however that parcel had not been previously mechanically cleared. There is no rock wall present along the *makai* edge of the Government Road (Site 21273) where it borders the current study area, as it likely was bulldozed away (a rock wall along the *makai* side of the road is visible fronting parcels to the southeast and northwest of the current study area).

CONCLUSION AND RECOMMENDATIONS

Given the negative findings of the current study, it is concluded that the proposed development of a single-family residence will not significantly impact any known historic properties. No further historic preservation work is recommended. In the unlikely event that any unanticipated resources are unearthed during development activities, DLNR-SHPD should be contacted as outlined in Hawaiʻi Administrative Rules 13§13–280.

REFERENCES CITED

Barrère, D.
1959 Political History of Puna. IN: Natural and Cultural History Report on the Kalapana Extension of the Hawai‘i Volcanoes National Park: Vol. I, pp. 15-65. Compiled by Emory, K.P., W.J. Bonk, Y.H. Sinoto, D.B. Barrere, Department of Anthropology, B.P. Bishop Museum, Honolulu.

Chinen, J.
1961 *Original Land Titles in Hawaii*. Honolulu: privately published.

Cordy, R.
2000 *Exalted Sits the Chief. The Ancient History of Hawai‘i Island*. Mutual Publishing: Honolulu, Hawai‘i.

Ellis, W.
1963 *Journal of William Ellis*. Honolulu: Advertiser Publishing Co., Ltd.

Fornander, A.
l973 An Account of the Polynesian Race: Its Origin and Migrations. Tokyo: Charles E. Tuttle Co., Inc.

Handy, E. S. C., E. G. Handy, and M. Pukui
1972 *Native Planters in Old Hawai‘i.* B.P. Bishop Museum Bulletin 233. Bishop Museum Press, Honolulu.

Holmes, T.
1985 A Preliminary Report on the Early History and Archaeology of the Puna Forest Reserve/Wao Kele o Puna Natural Area Reserve. Prepared for True/Mid Pacific Geothermal, Inc.

I‘i, J.P.
1959 *Fragment of Hawaiian History*. Bishop Museum Special Publication 70. Bishop Museum Press, Honolulu.Jurvik, S. and J. Jurvik (editors).

Kamakau, S.M.
1992 *Ruling Chiefs of Hawaii*. The Kamehameha Schools Press, Honolulu (Revised Edition).

Kelly, M.
1983 Na Mala O Kona: Gardens of Kona. A History of Land Use in Kona, Hawai‘i. Departmental Report Series 83-2. Department of Anthropology, B.P. Bishop Museum, Honolulu. Prepared for the Department of Transportation, State of Hawaii.

Kirch, P.
2011 When did the Polynesians Settle Hawai‘i? A Review of 150 Years of Scholarly Inquiry and a Tentative Answer. *Hawaiian Archaeology* Vol. 12:3-26.

Lass, B.
1997 Reconnaissance Survey Along the Old Government Road, Kea‘au, Puna, Island of Hawai‘i. Department of Anthropology University of Hawai‘i-Hilo. Prepared for DLNR-DOFAW—Na Ala Hele.

Malo, D.
1951 *Hawaiian Antiquities*. B.P. Bishop Museum Special Publication 2. B.P. Bishop Museum Press, Honolulu (second edition Translated by N. Emerson).

Maly, K.
1998 "*PUNA, KA ʻĀINA I KA HIKINA A KA LĀ*." A Cultural Assessment Study–Archival and Historical Documentary Research and Oral History Interviews for the *Ahupuaʻa* of ʻAhalanui, Laepāoʻo, and Oneloa (with Pohoiki), District of Puna, Island of Hawaiʻi (TMK:1-4-02, por.07,13,73,74,75). Prepared for David Matsuura, A & O International Corporation; Oneloa Development, Hilo, Hawaiʻi.

1999 The Historic Puna Trail—Old Government Road (Keaʻau Section) Archival-Historical Documentary Research, Oral History and Consultation Study, and Limited Site Preservation Plan. *Ahupuaʻa* of Keaʻau, Puna District, Island of Hawaiʻi. Kumu Pono Associates, Report HiAla-17 (011199), Hilo, Hawaiʻi. Prepared for Na Ala Hele Program Manager, Hilo, Hawaiʻi.

McGregor, D.
2007 *Nā Kuaʻāina: Living Hawaiian Culture*. University of Hawaiʻi Press, Honolulu.

McEldowney, H.
1979 Archaeological and Historical Literature Search and Research Design: Lava Flow Control Study. Hilo, Hawai'i. Department of Anthropology, B.P. Bishop Museum, MS: 050879, Honolulu. Prepared for U.S. Army Engineer Division, Pacific Ocean, Honolulu, Hawaiʻi.

Pukui, M.
1983 ʻOlelo Noeau, Hawaiian Proverbs & Poetical Sayings. *B.P. Bishop Museum Special Publication 71*. Bishop Museum Press, Honolulu

Rechtman, R
2004 Request for SHPO Concurrence with a Determination of No Historic Properties Affected Pursuant to the National Environmental Policy Act and in Compliance with Section 106 of the National Historic Preservation Act (TMK:3-1-5-07:17), Keonepoko Nui and Keonepoko Iki *ahupuaʻa*, Puna District, Island of Hawaiʻi. Rechtman Consulting Letter Report RC-0277. Prepared for Brian Nishimura, Hilo, Hawaiʻi.

2005 Request for DLNR-SHPD Issuance of a No Historic Properties Affected Determination (TMK:3-1-5-09:056), Keonepoko Iki Ahupuaʻa, Puna District, Island of Hawaiʻi. Rechtman Consulting Letter Report RC-0332. Prepared for Yukie Ohashi, Volcano, Hawaiʻi.

Rechtman, R and J. Henry
1998 Site Inspection and Limited Subsurface Testing at Two Parcels (TMK: 3-1-5-63:42,43) Hawaiian Beaches Estates, Land of Waiakahiula, Puna District, Island of Hawaii. Paul H. Rosendahl, Ph.D., Inc., Report 1889-072398, Hilo, Hawaii. Prepared for Mr. David Lomas, Honolulu, Hawaiʻi.

Schmitt, R.
1973 The Missionary Census of Hawaii. *Pacific Anthropological Records No. 20*, Department of Anthropology B.P. Bishop Museum, Honolulu.

Tomonari-Tuggle, M.
1985 Cultural Resource Management Plan, Cultural Resource Management at the Keauhou Resort. PHRI Report 89-060185. Prepared for Kamehameha Investment Corp.

Wilkes, C.
1845 Narrative of the United States Exploring Expedition During the Years 1838-1842, Under the Command of C. Wilkes, U.S.N., Volume 4. Philadelphia: Loa and Blanchard.

Wolfe E., and J. Morris.
1996 *Geologic Map of the Island of Hawaiʻi.* Geologic Investigations Series Map 1-2524-A. U.S. Department of the Interior, U.S. Geological Survey.

ENVIRONMENTAL ASSESSMENT

YERMIAN SINGLE-FAMILY RESIDENCE IN THE CONSERVATION DISTRICT AT KEONEPOKO IKI

TMK (3rd): 1-5-009:035
Keonepoko Iki, Puna, County of Hawai‘i, State of Hawai‘i

APPENDIX 4
Cultural Impact Assessment

[This page intentionally left blank]

RC-0831

A Cultural Impact Assessment for the Single-Family Development of TMK: 3-1-5-09:035

Keonepoko Iki Ahupuaʻa
Puna District
Island of Hawaiʻi

PREPARED BY:

Robert B. Rechtman, Ph.D.

PREPARED FOR:

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

April 2013

RECHTMAN CONSULTING, LLC
507-A E. Lanikaula St. Hilo, Hawaii 96720
phone: (808) 969-6066 fax: (808) 443-0065
e-mail: bob@rechtmanconsulting.com
ARCHAEOLOGICAL, CULTURAL, AND HISTORICAL STUDIES

A Cultural Impact Assessment for the Single-Family Development of TMK: 3-1-5-09:035

Keonepoko Iki Ahupuaʻa
Puna District
Island of Hawaiʻi

RECHTMAN CONSULTING

CONTENTS

FIGURES

INTRODUCTION

At the request of Ron Terry, Ph.D. of Geometrician Associates, LLC., on behalf of his client, David Yermian (landowner), Rechtman Consulting, LLC has prepared this cultural impact assessment to accompany an Environmental Assessment and Conservation District Use Application associated with the proposed construction of a single-family dwelling on a roughly 2.1 acre parcel (TMK: 3-1-5-09:035) in Keonepoko Iki Ahupuaʻa, Puna District, Island of Hawaiʻi (Figures 1 and 2). The landowner intends to construct a two-story house and garage (total of 4,470 square feet). The home will have three bedrooms and two baths, and will be set back a minimum of 100 feet from the shoreline (Figure 3). A wastewater system (septic tank) in compliance with State Department of Health regulations will be built. Other features include a driveway, poles and lines for utilities, and a 12,000 gallon catchment water tank. No modification to the terrain or vegetation within the minimum110-foot area between the shoreline and the residence will occur. A recent archaeological study (Rechtman 2012) of the parcel has determined that no historic properties are present. It appears as though the entire parcel, except for perhaps the area within 30 meters from the coastal bluff, appears to have been bulldozed in the past.

The study area is located approximately 500 meters northwest of the Hawaiian Shores Subdivision. The parcel consists of a narrow (approximately 30 meters across) swath of land that stretches between the coast and the Old Government Road (approximately 275 meters inland) (Figure 4). Vegetation throughout the bulldozed portion of the parcel consists of introduced weedy species (Figures 5 and 6). Vegetation in the narrow strand along the coast (Figure 7) that has not been bulldozed consists primarily of *naupaka* (*Scaevola guadichaudiana*), coconut palms (*Cocos nucifera*), with an occasional *hala* (*Pandanus* sp.) (Figure 8). Prior to the bulldozing, the ground surface within the study area likely consisted of *pāhoehoe* bedrock dating between 200 to 750 year old (Wolfe and Morris 1996). In the *mauka* portion of the parcel is a hollow tile and concrete foundation (Figure 9) of a former residential structure that appears to have burned down. Household debris (Figure 10) and numerous (at least ten) scrap automobiles formerly littered the parcel; the automobiles have been recently removed.

The current study was prepared pursuant to Act 50, approved by the Governor on April 26, 2000; and in accordance with the Office of Environmental Quality Control (OEQC) *Guidelines for Assessing Cultural Impact*, adopted by the Environmental Council, State of Hawaiʻi, on November 19, 1997. Below is a detailed cultural and historical background, and a presentation of prior studies; all of which combine to provide a physical and cultural setting and context for the parcel. A summary of consultation is provided, followed by a discussion of potential cultural impacts and the appropriate actions and strategies to mitigate any potential impacts.

Figure 1. Study area location.

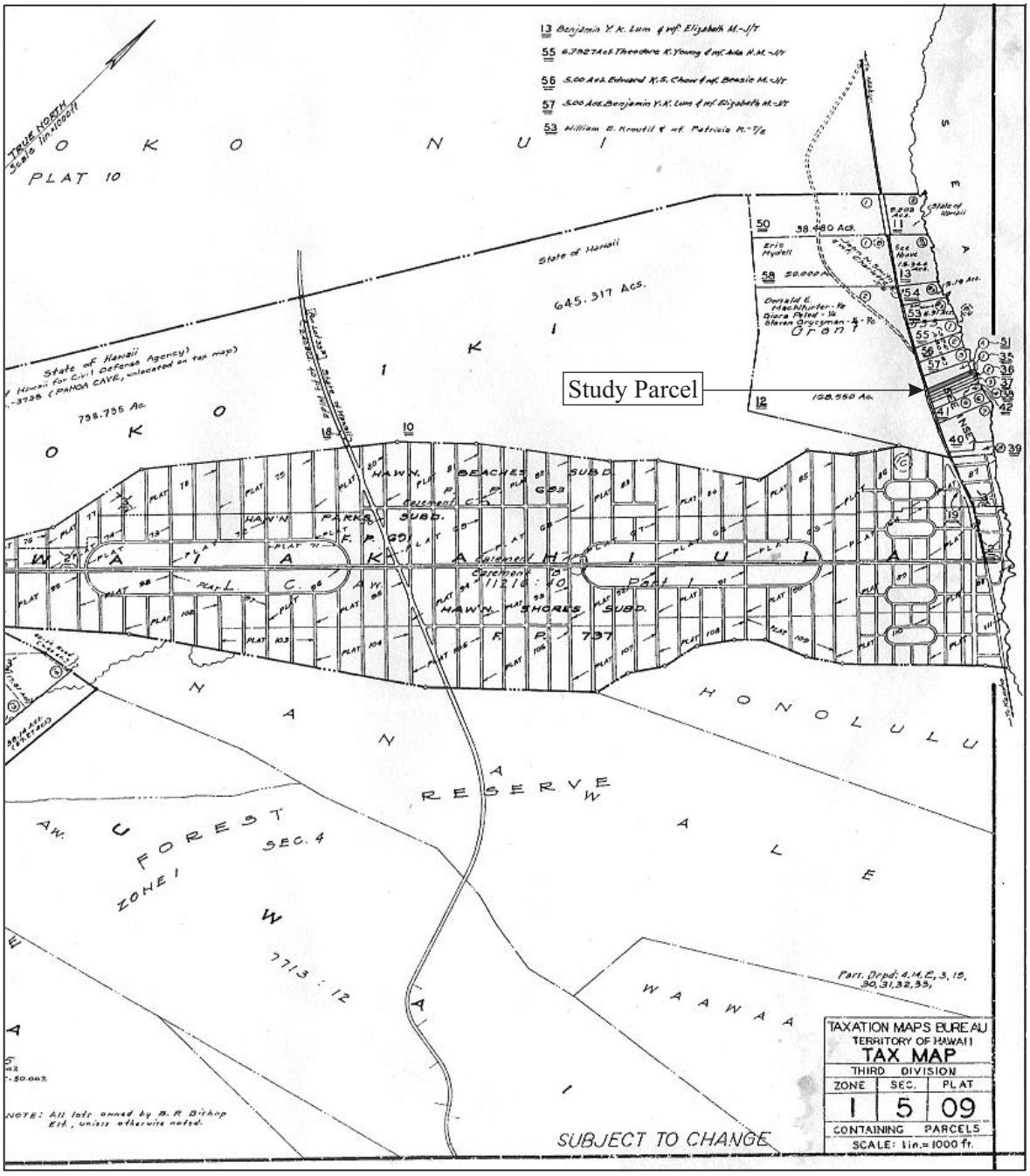


Figure 2. Portion of Tax Map 3-1-5-09 showing study parcel (035).

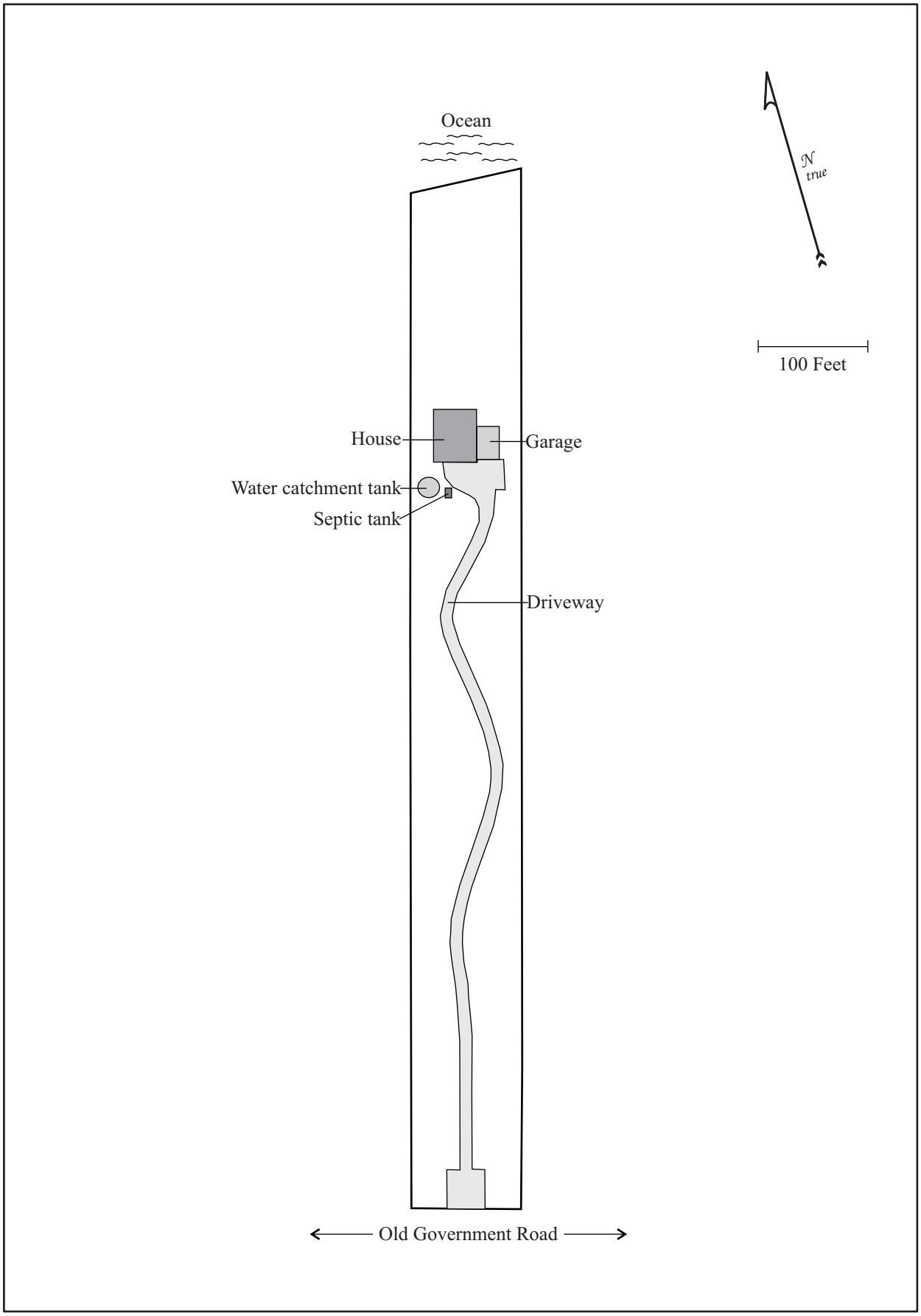


Figure 3. Proposed development plan.

Figure 4. Google™ earth image showing the current study parcel.

Figure 5. Typical vegetation in the *mauka* portion of the study parcel.

Figure 6. Typical vegetation in central portion of the study parcel.

Figure 7. Extreme coastal vegetation within the study parcel.

Figure 8. One of two observed *hala* within the study parcel.

Figure 9. Concrete and hollow tile foundation of former residential structure.

Figure 10. Household debris scattered around the foundation area.

CULTURE-HISTORICAL BACKGROUND

Archaeologists and historians describe the inhabiting of Hawai‘i in the context of settlement that resulted from voyages taken 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 Hawai‘i were underway by A.D. 300, with long distance voyages occurring fairly regularly through at least the thirteenth century. It has been generally reported that the sources of the early Hawaiian population—the Hawaiian Kahiki—were the Marquesas and Society Islands (Cordy 2000; Emory in Tatar 1982:16-18).

The question of the timing of the first settlement of Hawai‘i by Polynesians remains unanswered. Several theories have been offered derived from various sources of information (i.e., genealogical, oral-historical, mythological, radiometric), but none of these theories is today universally accepted (c.f., Kirch 2011; Wilmshurst et al. 2011). The three most popular theories place the first settlement at around A.D. 300, A.D. 600, and A.D. 1000, respectively. What is more widely accepted is the answer to the question of where Hawaiian populations came from and the transformations they went through on their way to establish a uniquely Hawaiian culture.

For generations following initial settlement, communities were clustered along the watered, windward (*ko‘olau*) shores of the Hawaiian Islands. Along the *ko‘olau* shores, streams flowed and rainfall was abundant, and agricultural production became established. The *ko‘olau* region also offered sheltered bays from which deep sea fisheries could be easily accessed, and near shore fisheries, enriched by nutrients carried in the fresh water, could be maintained in fishponds and coastal waters. It was around these bays that clusters of houses where families lived could be found (McEldowney 1979:15). In these early times, Hawai‘i’s inhabitants were primarily engaged in subsistence level agriculture and fishing (Handy and Handy 1972:287).

Over a period of several centuries, areas with the richest natural resources became populated and perhaps crowded, and by about A.D. 1200, the population began expanding to the *kona* (leeward side) and more remote regions of the island (Cordy 2000:130). Over the generations, the ancient Hawaiians developed a sophisticated system of land and resources management. By the time ‘Umi-a-Līloa rose to rule the island of Hawai‘i in ca. 1525, the island (*moku-puni*) was divided into six districts or *moku-o-loko* (cf. Fornander 1973–Vol. II:100-102). On Hawai‘i, the district of Puna is one of six major *moku-o-loko* within the island.

Puna like other large districts on Hawai‘i, was subdivided into *‘okana* or *kalana* (regions of land smaller than the *moku-o-loko*, yet comprising a number of smaller units of land. The *moku-o-loko* and *‘okana* or *kalana* were further divided into manageable units of land, and were tended to by the *maka‘āinana* (people of the land) (cf. Malo 1951:63-67). Of all the land divisions, perhaps the most significant management unit was the *ahupua‘a*. *Ahupua‘a* are subdivisions of land that were usually marked by an altar with an image or representation of a pig placed upon it (thus the name *ahu-pua‘a* or pig altar). In their configuration, the *ahupua‘a* may be compared to wedge-shaped pieces of land that radiate out from the center of the island, extending to the ocean fisheries fronting the land unit. Their boundaries are generally defined by topography and geological features such as *pu‘u* (hills), ridges, gullies, valleys, craters, or areas of a particular vegetation growth.

The *ahupua‘a* were also divided into smaller individual parcels of land (such as the *‘ili*, *kō‘ele*, *māla*, and *kīhāpai*, etc.), generally oriented in a *mauka-makai* direction, and often marked by stone alignments (*kuaiwi*). In these smaller land parcels the native tenants tended fields and cultivated crops necessary to sustain their families, and the chiefly communities with which they were associated. As long as sufficient tribute was offered and *kapu* (restrictions) were observed, the common people, who lived in a given *ahupua‘a* had access to most of the resources from mountain slopes to the ocean. These access rights were almost uniformly tied to residency on a particular land, and earned as a result of taking responsibility for stewardship of the natural environment, and supplying the needs of the *ali‘i* (see Kamakau 1992:372-377; Malo 1951:63-67).

Entire *ahupuaʻa*, or portions of the land were generally under the jurisdiction of appointed *konohiki* or lesser chief-landlords, who answered to an *aliʻi-ʻai-ahupuaʻa* (chief who controlled the *ahupuaʻa* resources). The *aliʻi-ʻai-ahupuaʻa* in turn answered to an *aliʻi ʻai moku* (chief who claimed the abundance of the entire district). Thus, *ahupuaʻa* resources supported not only the *makaʻāinana* and *ʻohana* who lived on the land, but also contributed to the support of the royal community of regional and/or island kingdoms. This form of district subdividing was integral to Hawaiian life and was the product of strictly adhered to resources management planning. In this system, the land provided fruits and vegetables and some meat in the diet, and the ocean provided a wealth of protein resources.

The current study area is located within Keonepoko Iki Ahupuaʻa, a land unit of the District of Puna, one of six major districts on the island of Hawaiʻi. As McGregor relates, "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). During Precontact and early historic times the people lived in small settlements along the coast where they subsisted on marine resources and agricultural products. According to McEldowney (1979), six coastal villages were present along the Puna coast between Hilo and Cape Kumakahi (Keaʻau or Haena, Makuʻu, Waiakahiula, Honolulu, Kahuwai, and Kula or Koaʻe. Each of the villages, McEldowney notes:

> …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 adjacent to Hilo Bay. (McEldowney 1979:16-17)

Barrère (1959) summarized the Precontact geopolitics of the Puna District as follows:

> Puna, as a political unit, played an insignificant part in shaping the course of history of Hawaii Island. Unlike the other districts of Hawaii, no great family arose upon whose support one or another of the chiefs seeking power had to depend for his success. Puna lands were desirable, and were eagerly sought, but their control did not rest upon conquering Puna itself, but rather upon control of the adjacent districts, Kau and Hilo. (Barrère 1959:15)

Despite the perceived lack of importance with respect to the emerging political history of Hawaiian leadership, Puna was a region famed in legendary history for its associations with the goddess Pele and god Kāne (Maly 1998). Because of the relatively young geological history and persistent volcanic activity the region's association with Pele has been a strong one. However, the association with Kāne is perhaps more ancient. Kāne, ancestor to both chiefs and commoners, is the god of sunlight, fresh water, verdant growth, and forests (Pukui 1983). It is said that before Pele migrated to Hawaiʻi from Kahiki, there was "no place in the islands . . . more beautiful than Puna" (Pukui 1983:11). Contributing to that beauty were the groves of fragrant *hala* and forests of *ʻōhiʻa lehua* for which Puna was famous:

> *Puna pāia ʻala i ka hala* (Puna, with walls fragrant with pandanus blossoms).
> Puna, Hawaiʻi, is a place of *hala* and *lehua* forests. In olden days the people would stick the bracts of *hala* into the thatching of their houses to bring some of the fragrance indoors. (Pukui 1983:301)

Hawaiians introduction to the Western world was an abrupt one, on January 18, 1778 Captain James Cook landed in the Hawaiian Islands. Ten months later, on a return trip to Hawaiian waters, a young Kamehameha (not yet Monarch) visited Cook on board the *Resolution* off the East coast of Maui while

Kalaniopu‘u was at war with Kahekili (Kamakau 1992). The following January [1779], Cook and Kalaniopu‘u met in Kealakekua Bay and exchanged gifts. In February, Cook set sail; however, a severe storm off the Kohala coast damaged a mast and they had to return to Kealakekua Bay. Cook’s return occurred at an inopportune time, and this misfortune cost him his life (Kuykendall and Day 1976).

Around A.D. 1780 Kalani‘ōpu‘u proclaimed that his son Kiwalao would be his successor, and he gave the guardianship of the war god Kū‘kā‘ilimoku to Kamehameha. Kamehameha and a few other chiefs were concerned about their land claims, which Kiwalao did not seem to honor, so after usurping Kiwalao’s authority with a sacrificial ritual, Kamehameha retreated to his district of Kohala. While in Kohala, Kamehameha farmed the land, growing taro and sweet potatoes (Handy and Handy 1972). After Kalani‘ōpu‘u died in A.D. 1782 civil war broke out, Kiwalao was killed, and Kamehameha began his reign.

In 1790 two Western ships, the *Eleanora* and *Fair American*, were trading in Hawaiian waters. As retribution for the theft of a skiff and the murder of one of the sailors, the crew of the *Eleanora* massacred more than 100 natives at Olowalu [Maui]. The *Eleanora* then sailed to Hawai‘i Island, and one of its crew, John Young, went ashore, where he was detained by Kamehameha. The other vessel, the *Fair American*, was captured by the forces of Kamehameha off the Kekaha coast and its crew was killed except for one member, Isaac Davis. Kame’eiamoku, who resided in Ka‘ūpulehu at the time, played a lead role in this incident. He and his followers recovered several foreign arms from the *Fair American*, including a cannon that they called “Lopaka”, all of which were turned over to Kamehameha (Kamakau 1992). Kamehameha made Young and Davis his advisors. He also kept the vessel as part of his fleet. With the aid of his new advisors, new ship, and foreign arms Kamehameha conquered Maui, and by 1796 he had conquered all the island kingdoms except Kauai. It wasn’t until 1810, when Kaumuali‘i of Kauai gave his allegiance to Kamehameha, that the Hawaiian Islands were unified under one ruler (Kuykendall and Day 1976).

Demographic trends during this period indicate population reduction in some areas, due to war and disease, yet increases in others, with relatively little change in material culture. However, there was a continued trend toward craft and status specialization, intensification of agriculture, *ali‘i* controlled aquaculture, upland residential sites, and the enhancement of traditional oral history. The Kū cult, *luakini heiau*, and the *kapu* system were at their peaks, although western influence was already altering the cultural fabric of the Islands (Kirch 1985; Kent 1983). Foreigners had introduced the concept of trade for profit, and by the time Kamehameha I had conquered O‘ahu, Maui and Moloka‘i, in 1795, Hawai‘i saw the beginnings of a market system economy (Kent 1983). This marked the end of an era of uniquely Hawaiian culture.

Hawai‘i’s culture and economy continued to change drastically as capitalism and industry established a firm foothold. The sandalwood (*Santalum ellipticum*) trade, established by Euro-Americans in 1790 and turned into a viable commercial enterprise by 1805 (Oliver 1961), was flourishing by 1810. This added to the breakdown of the traditional subsistence system, as farmers and fishermen were ordered to spend most of their time logging, resulting in food shortages and famine that led to a population decline. The lack of control of the sandalwood trade led to the first Hawaiian national debt as promissory notes and levies were initiated by American traders and enforced by American warships (Oliver 1961). As Osorio explains, it was foreign economic interests that ultimately infiltrated beliefs, ideas, and institutions; and as he put it, “literally and figuratively dismembered the *lāhui* (the people) from their traditions, their land and ultimately their government” (2002:5). Hawaiian culture was well on its way towards Western assimilation, although not without resistance (Silva 2004).

Kamehameha I died on May 8, 1819 at Kamakahonu in Kailua-Kona, and once again the culture of Hawai‘i was to change radically. Following the death of a prominent chief, it was customary to remove all of the regular *kapu* that maintained social order and the separation of men and women and elite and commoner. Thus, following Kamehameha’s death a period of *‘ai noa* (free eating) was observed along with the relaxation of other traditional *kapu*. It was for the new ruler and *kahuna* to re-establish *kapu* and restore social order, but at this point in history traditional customs saw a change:

> The death of Kamehameha was the first step in the ending of the tabus; the second was the modifying of the mourning ceremonies; the third, the ending of the tabu of the chief; the fourth, the ending of carrying the tabu chiefs in the arms and feeding them; the fifth, the ruling chief's decision to introduce free eating (*‘ainoa*) after the death of Kamehameha; the sixth, the cooperation of his aunts, Ka-ahu-manu and Ka-heihei-malie; the seventh, the joint action of the chiefs in eating together at the suggestion of the ruling chief, so that free eating became an established fact and the credit of establishing the custom went to the ruling chief. This custom was not so much of an innovation as might be supposed. In old days the period of mourning at the death of a ruling chief who had been greatly beloved was a time of license. The women were allowed to enter the heiau, to eat bananas, coconuts, and pork, and to climb over the sacred places. You will find record of this in the history of Ka-ula-hea-nui-o-ka-moku, in that of Ku-ali‘i, and in most of the histories of ancient rulers. Free eating followed the death of the ruling chief; after the period of mourning was over the new ruler placed the land under a new tabu following old lines. (Kamakau 1992:222)

Immediately upon the death of Kamehameha I, Liholiho (his son and to be successor) was sent away to Kawaihae to keep him safe from the impurities of Kamakahonu brought about from the death of Kamehameha. After purification ceremonies Liholiho returned to Kamakahonu:

> Then Liholiho on this first night of his arrival ate some of the tabu dog meat free only to the chiefesses; he entered the *lauhala* house free only to them; whatever he desired he reached out for; everything was supplied, even those things generally to be found only in a tabu house. The people saw the men drinking rum with the women *kahu* and smoking tobacco, and thought it was to mark the ending of the tabu of a chief. The chiefs saw with satisfaction the ending of the chief’s tabu and the freeing of the eating tabu. The *kahu* said to the chief, “Make eating free over the whole kingdom from Hawaii to Oahu and let it be extended to Kauai!” and Liholiho consented. Then pork to be eaten free was taken to the country districts and given to commoners, both men and women, and free eating was introduced all over the group. Messengers were sent to Maui, Molokai, Oahu and all the way to Kauai, Ka-umu-ali‘i consented to the free eating and it was accepted on Kauai. (Kamakau 1992: 225)

When Liholiho, Kamehameha II, ate the *kapu* dog meat, entered the *lauhala* house and did whatever he desired it was still during a time when he had not reinstituted the eating *kapu* but others appear to have thought otherwise. With an indefinite period of free-eating and the lack of the reinstatement of other *kapu* extending from Hawai‘i to Kaua‘i, and the arrival of the Christian missionaries shortly thereafter, the traditional religion had been officially replaced by Christianity within a year following the death of Kamehameha I (see Kame‘eleihiwa (1992) for an alternative explanation suggesting an intentioned overthrow of the *‘ai kapu*).

“*Ali‘i Nui* received their political power from Kū; therefore, an *Ali‘i* must be religious and proclaim the *‘Aikapu* upon his ascent to the office of *Mō‘i*. If he did not his people would reject him as irreligious and other *Ali‘i Nui* would be tempted to usurp his position.” (Kame‘eleihiwa 1992:39). Liholiho’s cousin, Kekuaokalani, caretaker of the war god Kū‘kā‘ilimoku, was one such *Ali‘i Nui* and he revolted. However, by December of 1819 the revolution was quelled. Kamehameha II sent edicts throughout the kingdom renouncing the ancient state religion, ordering the destruction of the *heiau* images, and ordering that the *heiau* structures be destroyed or abandoned and left to deteriorate. He did, however, allow the personal family religion, the *‘aumakua* worship, to continue (Oliver 1961; Kamakau 1992).

Within a year following the death of Kamehameha I, Protestant missionaries arrived from America (Fornander 1973; I‘i 1959; Kamakau 1992). In 1823, the Reverend William Ellis and members of the American Board of Commissioners for Foreign Missions (ABCFM) toured the island of Hawai‘i seeking out 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 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)

One year after Ellis' tour, the ABCFM established a base church in Hilo. From that church (Hāili), 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 are recorded as residing in the district of Puna (Schmitt 1973); 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, though there were hundreds of individuals who lived inland (Holmes 1985). In that same year, Commander Charles Wilkes of the United States Exploring Expedition, toured the Hawaiian Islands (Wilkes 1845). His expedition traveled through lower Puna not far from the current study area:

> Almost all of the hills or craters of any note have some tradition connected with them; but I found that the natives were now generally unwilling to narrate these tales, calling them "foolishness." After leaving the *pahoihoi* [pāhoehoe] plain, we passed along the line of cone-craters towards Point Kapoho, the Southeast part of the island.
>
> Of these cone-craters we made out altogether, large and small, fifteen, trending about east-northeast. The names of the seven last are Pupukai, Poholuaokahowele [Puʻu-hōlua-o-Kahawali], Punomakalua, Kapoho, Puukea, Puuku, and Keala. On some of these the natives pointed out where there had formerly been slides, an amusement or game somewhat similar to the sport of boys riding down hill on sleds. These they termed *kolua* [*hōlua*].
>
> This game does not appear to be practiced now, and I suppose that the chiefs consider themselves above such boyish amusements. The manner in which an old native described the velocity with which they passed down these slides was, by suddenly blowing a puff; according to him, these amusements were periodical, and the slides were usually filled with dried grass.
>
> As we approached the seashore, the soil improved very much, and was under good cultivation, in taro, sweet potatoes, sugar cane, and a great variety of fruit and vegetables.

> At about four o'clock, we arrived at the house of our guide, Kekahunanui, who was the "head man." I was amused to find that none of the natives knew him by this name, and were obliged to ask him . . .the view from the guide's house was quite pretty, the eye passing over well-cultivated fields to the ocean, whose roar could be distinctly heard. (Wilkes 1845 Vol. IV:186)
>
> During the night, one of the heaviest rains I had experienced in the island, fell; but the morning was bright and clear—every thing seemed to be rejoicing around, particularly the singing-birds, for the variety and sweetness of whose notes Hawaii is distinguished.
>
> Previous to our departure, all the tenantry, if so I may call them, came to pay their respects, or rather to take a look at us. We had many kind wishes, and a long line of attendants, as we wended our way among the numerous taro patches of the low grounds, towards Puna; and thence along the sea-coast where the lava entered the sea, at Nanavalie [Nānāwale]. The whole population of this section of the country was by the wayside, which gave me an opportunity of judging of their number; this is much larger than might be expected from the condition of the country, for with the exception of the point at Kapoho, very little ground that can be cultivated is to be seen. The country, however, is considered fruitful by those who are acquainted with it, notwithstanding its barren appearance on the roadsides. The inhabitants seemed to have an abundance if bread-fruit, bananas, sugar-cane, taro, and sweet-potatoes. The latter, however, are seen to be growing literally among heaps of stones and pieces of lava, with scarcely soil enough to cover them; yet they are, I am informed, the finest on the island…
>
> In some places they have taken great pains to secure a good road or walking path; thus, there is a part of the road from Nanavalie to Hilo which is built of pieces of lava, about four feet high and three feet wide on the top; but not withstanding this, the road is exceedingly fatiguing to the stranger, as the lumps are so arranged that he is obliged to take a long and short step alternately; but this the natives do not seem to mind, and they pass over the road with great facility, even when heavy laden…(Wilkes 1845, Vol. IV:188-193)

In 1846, Chester S. Lyman, "a sometime professor" at Yale University visited Hilo, Hawai'i, and stayed with Titus Coan (Maly 1998). Traveling the almost 100 mile long stretch of the "Diocese" of Mr. Coan, Lyman reported that the district of Puna had somewhere between 3,000-4,000 inhabitants (Maly 1998). Entering Puna from Hilo, and traveling to Kea'au along the coast, Lyman offered the following observations:

> …The groves of Pandanus were very beautiful, and are the principal tree of the region. There is some grass and ferns, and many shrubs; but the soil is very scanty. Potatoes are almost the only vegetable that can be raised, and these seem to flourish well amid heaps of stone where scarcely a particle of soil could be discovered. The natives pick out the stones to the depth often of from 2 to 4 feet, and in the bottom plant the potato–how it can expand in such a place is a wonder.
>
> Nearly all Puna is like this. The people are necessarily poor—a bare subsistence is all they can obtain, and scarcely that. Probably there are not $10 in money in all Puna, and it is thought that not over one in five hundred has a single cent. The sight of some of these potato patches would make a discontented N.E. farmer satisfied with his lot. Yet, I have nowhere seen the people apparently more contented & happy. (Maly 1998:35)

In Precontact Hawai'i, all land and natural resources were held in trust by the high chiefs (*ali'i 'ai ahupua'a* or *ali'i 'ai moku*). The use of lands and resources were given to the *hoa'āina* (native tenants), at the prerogative of the *ali'i* and their representatives or land agents (*konohiki*), who were generally lesser chiefs as well. In 1848, the Hawaiian system of land tenure was radically altered by the *Māhele 'Āina*. This change in land tenure was promoted by the missionaries and the growing Western population and business interests in the island kingdom. Generally these individuals were hesitant to enter business deals on leasehold land.

By the middle of the nineteenth century the ever-growing population of Westerners forced socioeconomic and demographic changes that promoted the establishment of a Euro-American style of land ownership, and the *Māhele* became the vehicle for determining ownership of native lands. The *Māhele* defined the land interests of Kamehameha III (the King), the high-ranking chiefs, and the *konohiki*. As a result of the *Māhele*, all land in the Kingdom of Hawaiʻi came to be placed in one of three categories: (1) Crown Lands (for the occupant of the throne); (2) Government Lands; and (3) Konohiki Lands (Chinen 1958:vii, Chinen 1961:13). The chiefs and *konohiki* were required to present their claims to the Land Commission to receive awards for lands provided to them by Kamehameha III. They were also required to provide commutations to the government in order to receive royal patents on their awards. The lands were identified by name only, with the understanding that the ancient boundaries would prevail until the land could be surveyed. This process expedited the work of the Land Commission (Chinen 1961:13).

The "Enabling" or "*Kuleana* Act" (December 21,1849) laid out the frame work by which native tenants could apply for, and be granted fee-simple interest in "*kuleana*" lands, and their rights to access and collection of resources necessary to their life upon the land in their given *ahupuaʻa*. The lands awarded to the *hoaʻāina* (native tenants) became known as "*Kuleana* Lands." All of the claims and awards (the Land Commission Awards or LCA) were numbered, and the LCA numbers remain in use today to identify the original owners of lands in Hawaiʻi.

As a result of the *Māhele*, Keonepoko Iki Ahupuaʻa was retained as Government Land. No Land Commission Award claims were made in Keonepoko Iki Ahupuaʻa (Waihona ʻĀina database). Beginning in 1903 a *mauka* portion of the *ahupuaʻa* (in the vicinity of Pāhoa Town) was commuted as grant parcels and homestead lots (Figure 13).

In 1862, the Commission of Boundaries (Boundary Commission) was established in the Kingdom of Hawaiʻi to legally set the boundaries of all the *ahupuaʻa* that had been awarded as a part of the *Māhele*. Subsequently, in 1874, the Commissioners of Boundaries were authorized to certify the boundaries for lands brought before them. The primary informants for the boundary descriptions were old native residents of the lands, many of which had also been claimants for *kuleana* during the *Māhele*. This information was collected primarily between A.D. 1873 and 1885 and was usually given in Hawaiian and transcribed in English as they occurred. As Keonepoko Iki was retained as government land, it boundaries were not set by the land commission. However, the boundaries of neighboring Keonepoko Nui were survey in 1880 for the estate of C. Kanaina, and place names along the common boundary with Keonepoko Iki are shown on a survey map (Figure 14). This map also shows the location of the old Government Road.

The population of Puna declined during the early nineteenth century and Hawaiians maintained marginalized communities outside of the central population centers. These communities were located in "out-of-the-way" places. In the aftermath of the *Māhele*, economic interests in the region swiftly changed from the traditional Hawaiian land tenure system of subsistence farming and regional trading networks to the more European based cash crops including coffee, tobacco, sugar, and pineapple, and emphasized dairy and cattle ranching. While large tracts of land in lower Puna were used for cattle grazing and sugarcane cultivation, the current project area does not appear to have been used for either purpose.

A review of aerial photographs of the area shows that in 1965 the Hawaiian Beaches and Hawaiian Shores subdivisions were in their infancy and that the current study parcel was vacant land (Figure 15). An aerial photograph dated February 19, 1977 (Figure 16) shows what appears to be a structure on the current study parcel. County of Hawaiʻi building permit records support this observation, listing a building permit for a single-family residence in July of 1968, and tax assessor field notes show a 24 foot by 34 foot residence having been constructed by November of that same year. The last permit issued by the County Building Department was in November of 1978. Only the concrete and hollow tile foundation of the former residence is currently present.

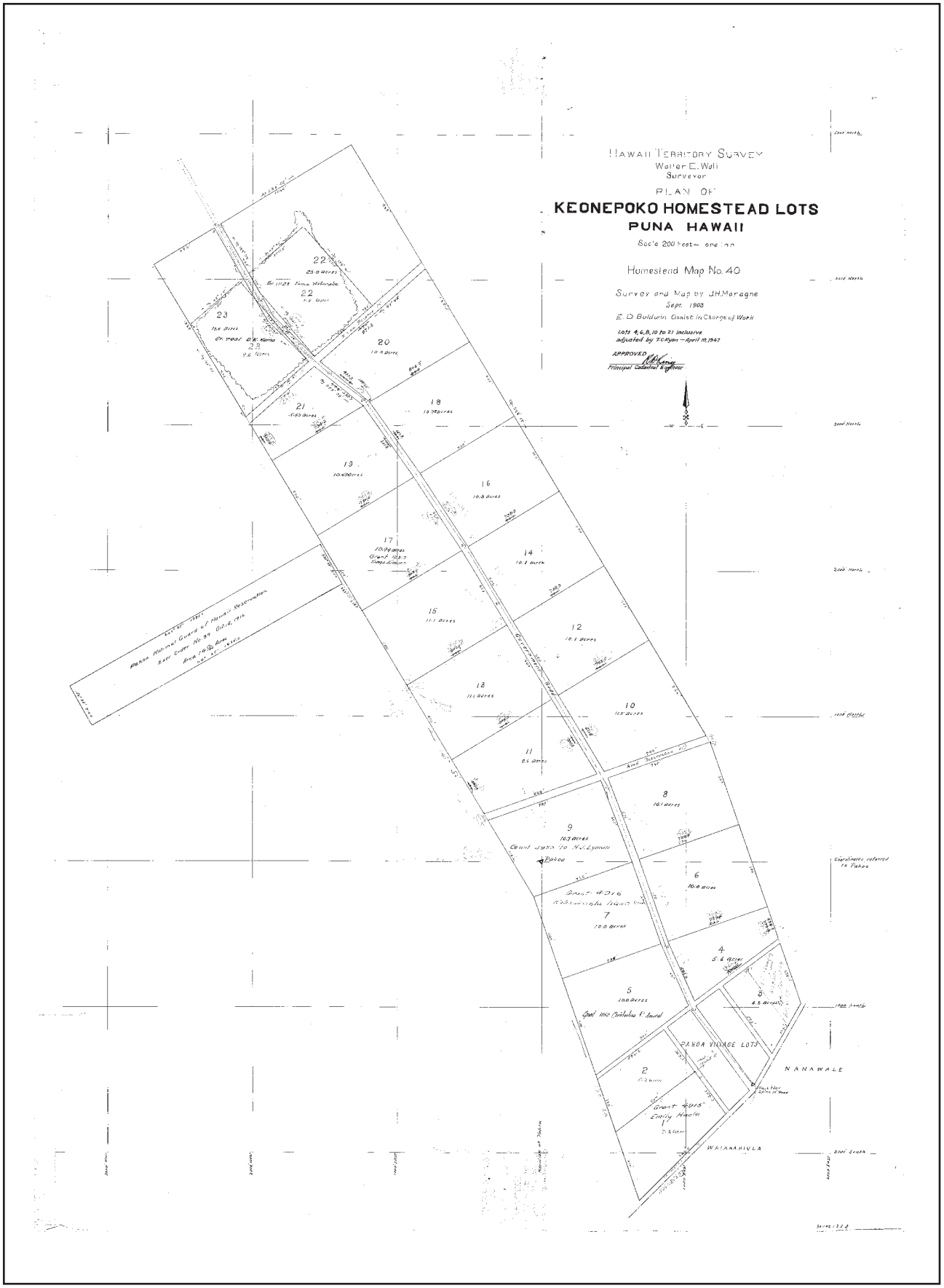


Figure 11. Hawai'i Registered Map 2084 originally prepared in 1903 and updated in 1947.

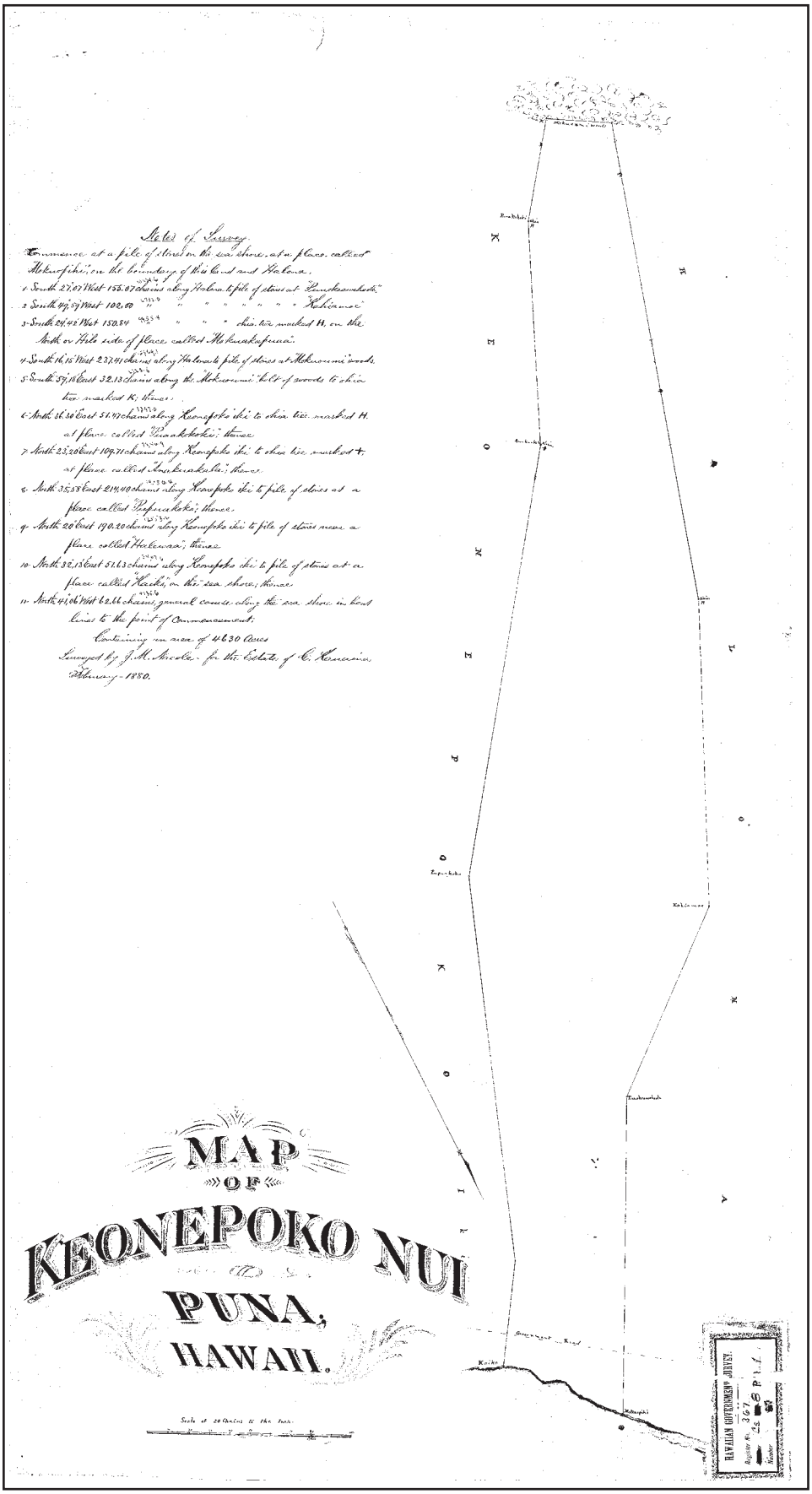


Figure 12. Hawai'i Registered Map 367 prepared in 1880.

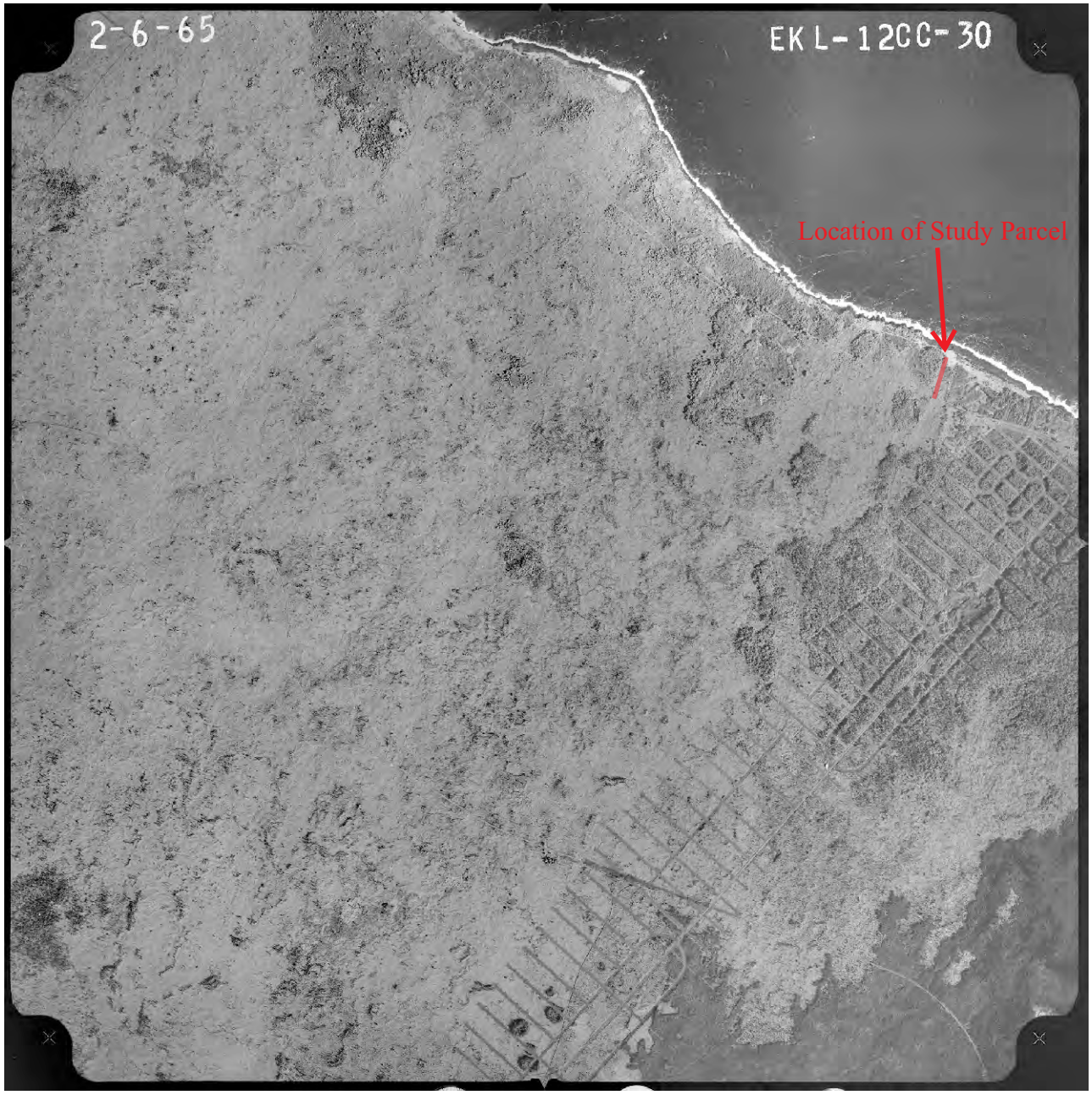


Figure 13. Aerial photograph dated February 6, 1965 showing the general study area.

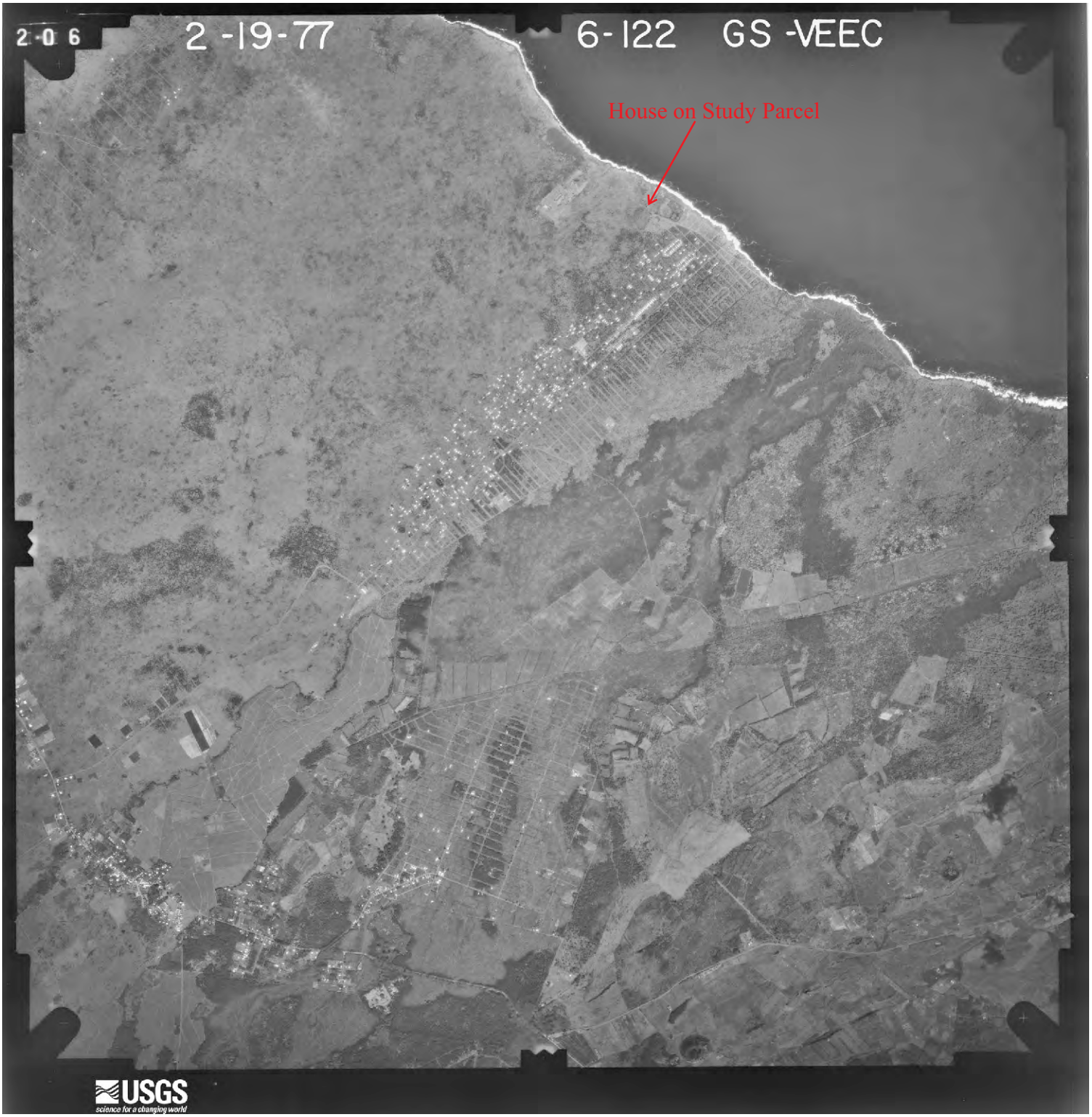


Figure 14. Aerial photograph dated February 19, 1977 showing the general study area.

PRIOR STUDIES

Aside from a recent archaeological study (Rechtman 2012) records on file at the Department of Land and Natural Resources-State Historic Preservation Division's Archaeology and Culture-History Branches indicate that the study parcel has not been the specific subject of any cultural studies. However, there have been several prior studies conducted for nearby parcels and within neighboring *ahupua'a*, these are discussed below.

Rechtman Consulting, LLC recently completed an archaeological survey (Rechtman 2012) of the current study parcel. As the majority of the study parcel had been previously mechanically cleared and built upon, no archaeological resources were observed on the surface, and given the local substrate the likelihood of encountering subsurface resources on the parcel was considered very remote. Surface features were observed on the adjacent parcel to the northwest; however that parcel had not been previously mechanically cleared. It was also reported (Rechtman 2012) that the rock wall typically present along the *makai* edge of the Old Government Road (Site 21273) where it borders the current study parcel, was likely bulldozed away (a rock wall along the *makai* side of Site 21273 is present fronting parcels to the southeast and northwest of the current study parcel).

The Old Government Road (Site 21273), which runs along the *mauka* edge of the current study parcel, is considered a historic property. The Old Government Road (also referred to as the Puna Trail) was previously studied by Lass (1997) and Maly (1999) within the *ahupuaʻa* of Keaʻau, well to the northwest of the current project area. Currently, this road is dirt covered and maintained for vehicular access. Maly (1999) relates that the current alignment of the Old Government Road, which evolved from earlier trail routes, was under construction by the 1840s. The road remained the preferred route of travel between Hilo and the out-lying areas of Puna until 1895, when the Keaʻau-Pāhoa Road (Highway 130) was established to access the growing inland population centers and agricultural areas (Maly 1999:6).

Only two other archaeological studies (Rechtman 2005; Rechtman and Henry 1998) have been conducted nearby the current study area. In 2005, Rechtman (2005) prepared a "no historic properties affected" request for TMK: 3-1-5-09:056, which is located three parcels to the northwest of the current study parcel (see Figure 2). That property had been significantly mechanical altered, and no archaeological resources were discovered. The Rechtman and Henry (1998) study was conducted at two sites originally identified during the 1973 Statewide Inventory of Historic Places (Sites 19013 and 19014) on two adjoining parcels (TMKs:3-1-5-63:042 and 043; see Figure 2) located along the *mauka* edge of the Old Government Road in Waiakahiula Ahupuaʻa within the Hawaiian Shores Subdivision. Site 19013 included two collections of stone rimmed depressions and two terraces that were interpreted as agricultural features, and Site 19014 consisted of a vaulted burial chamber within a stone platform (Rechtman and Henry 1998).

Three other archaeological studies (Rechtman 2004; Rechtman 2013; Rechtman and Zenobi 2013) were conducted within both of the Keonepoko *ahupuaʻa* well inland of the current project area along Highway 130. No historic properties were identified during those studies.

Additionally, there have been a few cultural impact studies conducted for coastal parcels between Makuʻu and Pohoiki (Ketner and Rechtman 2011; Maly 1998; Rechtman 2011; Rechtman and Bautista 2010) that collectively highlight the "cultural attachment" felt by native families of the area, who still maintain a close relationship with the environment. It is that relationship that provides individuals with a sense of place. Specific issues raised in the prior studies concern the protection of floral resources including the shoreline groves of *hala*, the continued access to the coast for both recreational and subsistence activities, and the preservation and protection of burial sites and other archaeological resources.

CONSULTATION

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 to these individuals for whom meaning and value are ascribed 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 part of the current assessment the following individuals were consulted: Mark Lindsey Franklin and William Makanui.

Mark Lindsey Franklin is a 40 year resident of lower and upper Puna. He is of Hawaiian ancestry, and his family roots also extend to Maui, where his *ʻohana* are cultural practitioners involved in the preservation of traditional lands. Mark is well versed in native flora and is currently working on a project to identify and protect remnant stands of *ʻiliahi* (sandalwood) on Mauna Kea. He is also an active member of *Malama o Puna*, a Hawaiʻi non-profit corporation and volunteer service organization that is focused on environmental protection, education, and preservation. On April 2, 2013, Mr. Franklin met with the current author at the study parcel, and related that he has fished in this area accessing the coastline along an old road located to the northwest of the study property. After walking the entire property, he suggested that given the past disturbances to the property and the widespread growth of invasive species that the proposed development would be a welcome addition as long as the invasive vegetation can be controlled and replaced with a landscape of native species.

William Makanui was contacted by telephone on April 1, 2013. Mr. Makanui was formerly a Project Manager for the Department of Hawaiian Home Lands responsible for the establishment of farm lots, agricultural lots, and water systems in the inland portions of Makuʻu Ahupuaʻa located 4-6 miles to the southwest of the current study parcel. Cultural concerns that he was aware of with respect to the general project area was the protection of any identified caves and burial sites. He was not aware of any specific resources in the immediate vicinity of the current project area, and he was not directly involved in planning or development of DHHL land in the coastal regions of Puna.

POTENTIAL CULTURAL IMPACTS

The Office of Environmental Quality Control (OEQC) guidelines identify several possible types of cultural practices and beliefs that are subject to assessment. These include subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs. The guidelines also identify the types of potential cultural resources, associated with cultural practices and beliefs that are subject to assessment. Essentially these are natural features of the landscape and historic sites, including traditional cultural properties. A working definition of traditional cultural property is:

> "Traditional cultural property" means any historic property associated with the traditional practices and beliefs of an ethnic community or members of that community for more than fifty years. These traditions shall be founded in an ethnic community's history and contribute to maintaining the ethnic community's cultural identity. Traditional associations are those demonstrating a continuity of practice or belief until present or those documented in historical source materials, or both.

The origin of the concept of traditional cultural property is found in National Register Bulletin 38 published by the U.S. Department of Interior-National Park Service. "Traditional" as it is used, implies a time depth of at least 50 years, and a generalized mode of transmission of information from one generation to the next, either orally or by act. "Cultural" refers to the beliefs, practices, lifeways, and social institutions of a given community. The use of the term "Property" defines this category of resource as an identifiable place. Traditional cultural properties are not intangible, they must have some kind of boundary; and are subject to the same kind of evaluation as any other historic resource, with one very important exception. By definition, the significance of traditional cultural properties should be determined by the community that values them.

It is however with the definition of "Property" wherein there lies an inherent contradiction, and corresponding difficulty in the process of identification and evaluation of potential Hawaiian traditional cultural properties, because it is precisely the concept of boundaries that runs counter to the traditional Hawaiian belief system. The sacredness of a particular landscape feature is often times cosmologically tied to the rest of the landscape as well as to other features on it. To limit a property to a specifically defined area may actually partition it from what makes it significant in the first place. A further analytical framework for addressing the preservation and protection of customary and traditional native practices specific to Hawaiian communities resulted from the *Ka Paʻakai O Kaʻāina* v. Land Use Commission court case. The court decision established a three-part process relative to evaluating such potential impacts: first, to identify whether any valued cultural, historical, or natural resources are present; and identify the extent to which any traditional and customary native Hawaiian rights are exercised; second, to identify the extent to which those resources and rights will be affected or impaired; and third, specify any mitigation actions to be taken to reasonably protect native Hawaiian rights if they are found to exist.

It is recognized that shoreline areas of Puna are regularly accessed for recreation and fishing in both traditional and non-traditional contexts. With respect to the current project area, the proposed residence will be set back a minimum of 100 feet from the shoreline and the residential development and use of the property will in no way inhibit any existing or future traditional use of the shoreline area fronting the study parcel. Additionally, the redevelopment of this property can result in a benefit to the floral environment, as much of the invasive vegetation will be removed and all new plantings will following Conservation District rules and involve only the use of locationally appropriate native species.

There were no traditional cultural practices identified specific to the current study property based on the archival research or oral consultations, and there was nothing observed in the field to suggest that any such practices are taking place or have occurred on the study parcel in the past. Similarly, there were no archaeological resources observed on the study parcel (Rechtman 2012). Given the negative findings of the current study with respect to the identification of any traditional practices and properties, and those of the archaeological study, it is concluded that the proposed development of a single-family residence will not have a significant cultural impact.

REFERENCES CITED

Barrère, D.
1959 Political History of Puna. IN: *Natural and Cultural History Report on the Kalapana Extension of the Hawai‘i Volcanoes National Park*: Vol. I, pp. 15-65. Compiled by Emory, K.P., W.J. Bonk, Y.H. Sinoto, D.B. Barrere, Department of Anthropology, B.P. Bishop Museum, Honolulu.

Chinen, J.
1961 *Original Land Titles in Hawaii*. Honolulu: privately published.

Cordy, R.
2000 *Exalted Sits the Chief. The Ancient History of Hawai‘i Island*. Mutual Publishing: Honolulu, Hawai‘i.

Ellis, W.
1963 *Journal of William Ellis*. Honolulu: Advertiser Publishing Co., Ltd.

Fornander, A.
1973 *An Account of the Polynesian Race: Its Origin and Migrations.* Tokyo: Charles E. Tuttle Co., Inc.

Handy, E.S.C., and E.G. Handy
1972 *Native Planters in Old Hawaii: Their Life, Lore and Environment.* B.P. Bishop Museum Bulletin 223. Bishop Museum Press, Honolulu. (with M.K. Pukui)

Holmes, T.
1985 A Preliminary Report on the Early History and Archaeology of the Puna Forest Reserve/*Wao Kele o Puna* Natural Area Reserve. Prepared for True/Mid Pacific Geothermal, Inc.

I‘i, J.P.
1959 *Fragment of Hawaiian History*. Bishop Museum Special Publication 70. Bishop Museum Press, Honolulu.Jurvik, S. and J. Jurvik (editors).

Kamakau, S.
1992 *Ruling Chiefs of Hawaii*. The Kamehameha Schools Press, Honolulu (Revised Edition).

Kame‘eleihiwa, L.
1992 *Native Land and Foreign Desires: Pahea Lā E Pono Ai*? Bishop Museum Press, Honolulu.

Kent, N.
1983 *Hawaii: Islands Under the Influence*. University of Hawai‘i Press, Honolulu.

Ketner, A., and R. Rechtman
2011 Cultural Impact Assessment for Proposed Development Activities on TMK 3-1-5-010:032 Maku‘u Ahupua‘a, Puna District, Island of Hawai‘i. Rechtman Consulting Report RC-0723. Prepared for John and Maureen Gapp, Pāhoa, Hawai‘i.

Kirch, P.
1985 *Feathered Gods and Fishhooks: An Introduction to Hawaiian Archaeology and Prehistory.* Honolulu: University of Hawaii Press.

2011 When did the Polynesians Settle Hawai‘i? A Review of 150 Years of Scholarly Inquiry and a Tentative Answer. *Hawaiian Archaeology* Vol. 12:3-26.

Kuykendall, R., and A. Day
1976 *Hawaii: A History From Polynesian Kingdom to American Statehood.* Prentice-Hall, Inc., Englewood Cliffs.

Lass, B.
1997 Reconnaissance Survey Along the Old Government Road, Keaʻau, Puna, Island of Hawaiʻi. Department of Anthropology University of Hawaiʻi-Hilo. Prepared for DLNR-DOFAW—Na Ala Hele.

Malo, D.
1951 *Hawaiian Antiquities*. B.P. Bishop Museum Special Publication 2. B.P. Bishop Museum Press, Honolulu (second edition Translated by N. Emerson).

Maly, K.
1998 "*PUNA, KA ʻĀINA I KA HIKINA A KA LĀ*." A Cultural Assessment Study–Archival and Historical Documentary Research and Oral History Interviews for the *Ahupuaʻa* of ʻAhalanui, Laepāoʻo, and Oneloa (with Pohoiki), District of Puna, Island of Hawaiʻi (TMK:1-4-02, por.07,13,73,74,75). Prepared for David Matsuura, A & O International Corporation; Oneloa Development, Hilo, Hawaiʻi.

1999 The Historic Puna Trail—Old Government Road (Keaʻau Section) Archival-Historical Documentary Research, Oral History and Consultation Study, and Limited Site Preservation Plan. *Ahupuaʻa* of Keaʻau, Puna District, Island of Hawaiʻi. Kumu Pono Associates, Report HiAla-17 (011199), Hilo, Hawaiʻi. Prepared for Na Ala Hele Program Manager, Hilo, Hawaiʻi.

McGregor, D.
2007 *Nā Kuaʻāina: Living Hawaiian Culture*. University of Hawaiʻi Press, Honolulu.

McEldowney, H.
1979 Archaeological and Historical Literature Search and Research Design: Lava Flow Control Study. Hilo, Hawai'i. Department of Anthropology, B.P. Bishop Museum, MS: 050879, Honolulu. Prepared for U.S. Army Engineer Division, Pacific Ocean, Honolulu, Hawaiʻi.

Oliver, D.
1961 *The Pacific Islands*. University of Hawaii Press, Honolulu.

Osorio, J.
2002 *Dismembering Lāhui: A History of the Hawaiian Nation to 1887*. University of Hawaii Press, Honolulu.

Pukui, M.
1983 ʻOlelo Noeau, Hawaiian Proverbs & Poetical Sayings. *B.P. Bishop Museum Special Publication 71*. Bishop Museum Press, Honolulu

Rechtman, R
2004 Request for SHPO Concurrence with a Determination of No Historic Properties Affected Pursuant to the National Environmental Policy Act and in Compliance with Section 106 of the National Historic Preservation Act (TMK:3-1-5-07:17), Keonepoko Nui and Keonepoko Iki *ahupuaʻa*, Puna District, Island of Hawaiʻi. Rechtman Consulting Letter Report RC-0277. Prepared for Brian Nishimura, Hilo, Hawaiʻi.

2005 Request for DLNR-SHPD Issuance of a No Historic Properties Affected Determination (TMK:3-1-5-09:056), Keonepoko Iki Ahupuaʻa, Puna District, Island of Hawaiʻi. Rechtman Consulting Letter Report RC-0332. Prepared for Yukie Ohashi, Volcano, Hawaiʻi.

2011 Cultural Impact Assessment Associated with the Proposed Construction of a Single-Family Dwelling in the Waʻawaʻwa Subdivision (TMK: 3-1-4-028:007), Waʻawaʻa Ahupuaʻa, Puna District, Island of Hawaiʻi. Rechtman Consulting report RC-0710. Prepared for Shon Magsalin, Ninole, HI.

2012 An Archaeological Assessment Survey of TMK: 3-1-5-09:035, Keonepoko Iki Ahupuaʻa, Puna District, Island of Hawaiʻi. Rechtman Consulting Report RC-0786. Prepared for Ron Terry, Hilo, Hawaiʻi.

2013 Request for DLNR-SHPD Issuance of a No Historic Properties Affected Determination (TMK:3-1-5-07:055), Keonepoko Iki Ahupuaʻa, Puna District, Island of Hawaiʻi. Rechtman Consulting Letter Report RC-0830. Prepared for Bryson Kuwahara, Pahoa, Hawaiʻi.

Rechtman, R., and O. Bautista
2010 Cultural Impact Assessment Associated with the Proposed Construction of a Single-Family Dwelling in the Waʻawaʻwa Subdivision (TMK: 3-1-4-028:001), Waʻawaʻa Ahupuaʻa, Puna District, Island of Hawaiʻi. Rechtman Consulting report RC-0654. Prepared for Joan Shafer, Maggie Valley, NC.

Rechtman, R and J. Henry
1998 Site Inspection and Limited Subsurface Testing at Two Parcels (TMK: 3-1-5-63:42,43) Hawaiian Beaches Estates, Land of Waiakahiula, Puna District, Island of Hawaii. Paul H. Rosendahl, Ph.D., Inc., Report 1889-072398, Hilo, Hawaii. Prepared for Mr. David Lomas, Honolulu, Hawaiʻi.

Rechtman, R and L. Zenobi
2013 An Archaeological Assessment Survey for the Proposed Puna Community Medical Center (TMK: 3-1-5-008:005), Keonepoko Nui Ahupuaʻa, Puna District, Island of Hawaiʻi. Prepared for Rene Siracusa, Pahoa, Hawai'i.

Schmitt, R.
1973 The Missionary Census of Hawaii. *Pacific Anthropological Records No. 20*, Department of Anthropology B.P. Bishop Museum, Honolulu.

Silva, N.
2004 *Aloha Betrayed: Native Hawaiian Resistance to American Colonialism*. Duke University Press, Durham.

Tatar, E.
1982 Nineteenth Century Hawaiian Chant. *Pacific Anthropological Records* 33. Department of Anthropology, B.P. Bishop Museum, Honolulu.

Wilmshurst, J., Hunt, T., Lipoc, C., and A. Anderson
2011 High-precision radiocarbon dating shows recent and rapid initial human colonization of East Polynesia. *Proceedings of the National Academy of Science* 108:1815–1820.

Wilkes, C.
1845 *Narrative of the United States Exploring Expedition During the Years 1838-1842, Under the Command of C. Wilkes, U.S.N.*, Volume 4. Philadelphia: Loa and Blanchard.

Wolfe E., and J. Morris.
1996 *Geologic Map of the Island of Hawaiʻi*. Geologic Investigations Series Map 1-2524-A. U.S. Department of the Interior, U.S. Geological Survey.