NEIL ABERCROMBIE

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

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AQUATIC RESOURCES
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CONSERVATION AND COASTAL LANDS
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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

File No. CDUA HA-3682

JUL 26 2013

MEMORANDUM

To: Gary Gill, Director
Office of Environmental Quality Control

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

Subject: Draft Environmental Assessment (DEA) for Conservation District Use Application (CDUA) HA-3682 for a single family residence.

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 August 8, 2013 issue of the *Environmental Notice*. We have enclosed one hard copy and one digital copy of the draft EA document, as well as the Conservation District Use Application and an Executive Summary. We will follow this with an electronic copy of the applicant's project summary and the OEQC Bulletin Publication Form.

Please contact Michael Cain of our Office of Conservation and Coastal Lands staff at 587-0048 should you have any questions.

Enclosures: *Draft EA, CDUA, OEQC Pub Form*

Disc: *Draft EA, CDUA, OEQC Pub Form, OCCL Determination Letter*

APPLICANT ACTIONS
SECTION 343-5(C), HRS
PUBLICATION FORM (JANURARY 2013 REVISION)

Project Name: **Magsalin Single Family Residence**
Island: **Hawai`i**
District: **Puna**
TMK: **(3) 1-4-028:007**
Permits: **Conservation District Use Permit (CDUP)**
Approving Agency: **Office of Conservation and Coastal Lands, 1151 Punchbowl Room 131, Honolulu, HI 96816; Michael Cain, 808-587-0048**
Applicant: **Shon Magsalin, Hilo, HI**
Consultant: **Ron Terry, Geometrician Associates, PO Box 396, Hilo, HI 96721; 808-969-7090**

Status (check one only):

X_DEA-AFNSI — Submit the approving agency notice of determination/transmittal on agency letterhead, a hard copy of DEA, a completed OEQC publication form, along with an electronic word processing summary and a PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov; a 30-day comment period ensues upon publication in the periodic bulletin.

__FEA-FONSI — Submit the approving agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and a PDF copy (send both summary and PDF to oeqchawaii@doh.hawaii.gov; no comment period ensues upon publication in the periodic bulletin.

__FEA-EISPN — Submit the approving agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov; a 30-day consultation period ensues upon publication in the periodic bulletin.

__Act 172-12 EISPN — Submit the approving agency notice of determination on agency letterhead, an OEQC publication form, and an electronic word processing summary (you may send the summary to oeqchawaii@doh.hawaii.gov. NO environmental assessment is required and a 30-day consultation period upon publication in the periodic bulletin.

__DEIS — The applicant simultaneously transmits to both the OEQC and the approving agency, a hard copy of the DEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the DEIS (you may send both the summary and PDF to oeqc@doh.hawaii.gov); a 45-day comment period ensues upon publication in the periodic bulletin.

__FEIS — The applicant simultaneously transmits to both the OEQC and the approving agency, a hard copy of the FEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the FEIS (you may send both the summary and PDF to oeqc@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin.

__ Section 11-200-23 Determination — The approving agency simultaneous transmits its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS to both OEQC and the applicant. No comment period ensues upon publication in the periodic bulletin.

__Statutory hammer Acceptance — The approving agency simultaneously transmits its notice to both the applicant and the OEQC that it failed to timely make a determination on the acceptance or nonacceptance of the applicant's FEIS under Section 343-5(c), HRS, and that the applicant's FEIS is deemed accepted as a matter of law.

__Section 11-200-27 Determination — The approving agency simultaneously transmits its notice to both the applicant and the OEQC that it has reviewed (pursuant to Section 11-200-27, HAR) the previously accepted FEIS and determines that a supplemental EIS is not required. No EA is required and no comment period ensues upon publication in the periodic bulletin.

__Withdrawal (explain)

Summary (Provide proposed action and purpose/need in less than 200 words. Please keep the summary brief and on this one page):

The applicant proposes to build a one-story two-bedroom single family residence on post-and-pier with a developed area of 1365 square feet. This total includes a master bedroom, covered lanai, and an at-grade carport. Energy will be provided by a rooftop solar-voltaic system with a generator back-up. Access will be via an existing driveway off of Old Government Road.

The residence will be set back 58 feet from the shoreline, at an elevation of 30 to 35 feet above sea level. It is not in a tsunami or large-wave inundation zone. A parcel owned communally by the Wa`awa`a subdivision owners separates the subject parcel from the pāhoehoe shelf along the coast. Public access to the shoreline is via a State-owned parcel in the Nānāwale Forest Reserve, 500 feet from the subject lot.

The applicant proposes to limit clearing to 5000 square feet. Approximately 80% of the hala trees will remain, and the applicant will clear out the weedy vegetation and plant additional hala fronting the Old Government Road.

An archaeological survey identified a retaining wall of indeterminate age, remnants of a hippy camp, and the base of a memorial erected to Dana Ireland. The monument itself no longer exists.

NEIL ABERCROMBIE

WILLIAM J. AILA, JR.
CHAIRPERSON
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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
Office of Conservation and Coastal Lands
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

REF:OCCL:MC

CDUA: HA-3682
Acceptance Date: July 25, 2013
180-Day Exp. Date: January 21, 2014

JUL 2 6 2013

Ron Terry
Geometrician Associates
PO Box 396
Hilo, HI 96721

Dear Mr. Terry,

NOTICE OF ACCEPTANCE and PRELIMINARY ENVIRONMENTAL DETERMINATION

Conservation District Use Application (CDUA) File No. HA-3682
(BOARD Permit)

This acknowledges the receipt and acceptance for the processing of your client's CDUA for a Single Family Residence (SFR) located in Wa`awa`a, Puna, Hawai`i, TMK (3) 1-4-028:007. This 0.415-acre coastal lot is in the Resource Subzone of the State Land Use Conservation District.

The applicant proposes to build a one-story two-bedroom single family residence on post-and-pier with a developed area of 1365 square feet. This total includes a master bedroom, covered lanai, and an at-grade carport. Energy will be provided by a rooftop solar-voltaic system with a generator back-up. Access will be via an existing driveway off of Old Government Road.

The residence will be set back 58 feet from the shoreline, at an elevation of 30 to 35 feet above sea level. It is not in a tsunami or large-wave inundation zone. A parcel owned communally by the Wa`awa`a subdivision owners separates the subject parcel from the pāhoehoe shelf along the coast. The shoreline for the Beach Lot Reserve was certified on September 11, 2009. A coastal erosion study completed in January 2013 concluded that there has been no measurable change in the location of the vegetation line or sea-cliff since 1954.

The coastal area of Wa`awa`a consists of pockets of older lava substrate surrounded by younger lava flows. The area is a littoral lowland native forest dominated by hala (*Pandanus tectorius)* and naupaka. The federally-listed Hilo beach grass (*Ischaemum byrone*) may be present throughout this coastal area. Several endangered native terrestrial vertebrates may be present in the general area and may fly over, roost, nest, or utilize resources of the property, including the endangered Hawaiian Hawk, the endangered Hawaiian Hoary Bat, the endangered Hawaiian Petrel and the threatened Newell's Shearwater. The continual removal of forest cover in Wa`awa`a threatens the natural and cultural resources of the area.

The applicant proposes to limit clearing to 5000 square feet. Approximately 80% of the hala trees will remain, and the applicant will clear out the weedy vegetation and plant additional hala fronting the Old Government Road.

An archaeological survey identified five features of potential interest: a retaining wall of indeterminate age, remnants of a hippy camp, and the base of a memorial erected to Dana Ireland. The monument itself no longer exists. No significant archaeological features were uncovered.

No known cultural and traditional uses occur on the property, although community members have used it to access the coast. There is an official public access to the shoreline on a State-owned parcel in the Nānāwale Forest Reserve, 500 feet from the subject lot. Development of the subject lot is unlikely to impede access rights.

After reviewing the application, the Department finds that:

1. The proposed use is an identified land use in the Resource subzone of the Conservation District, pursuant to §13-5-24, Hawaii Administrative Rules (HAR), R-8, SINGLE FAMILY RESIDENCE (D-1), *A single family residence that conforms to design standards as outlined in this chapter.* This use requires a permit from the Board of Land and Natural Resources, who have the final authority to grant, modify, or deny any permit.

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

3. Pursuant to HAR §13-5-31 *Permit applications,* the permit requires that an environmental assessment be carried out. A Finding of No Significant Impact (FONSI) to the environment is anticipated for the proposed project. The draft environmental assessment (DEA) for the project will be submitted to the Office of Environmental Quality Control (OEQC) to be published in the *Environmental Notice.*

4. It is the applicant's responsibility to comply with the provisions of Hawaii's Coastal Zone Management law (HRS Chapter 205A) pertaining to the Special Management Area (SMA) requirements administered by the various counties.

Upon completion of the application review process, your client's CDUA will be placed on the agenda of the Board of Land and Natural Resources for their consideration. Should you have any questions regarding this application, please contact Michael Cain of our Office of Conservation and Coastal Lands Staff at 587-0048.

Sincerely,

William J. Aila, Chairperson
Department of Land and Natural Resources

c: *Hawai`i Board Member*
Office of Hawaiian Affairs
OEQC / DOH
DLNR – Land Division, Historic Preservation, DOFAW, DOCARE, ~~DAR~~
County of Hawai`i Department of Planning
Hawai`i State Library; Keaau Public Library

DRAFT ENVIRONMENTAL ASSESSMENT
MAGSALIN SINGLE-FAMILY RESIDENCE IN THE CONSERVATION DISTRICT AT WA'AWA'A

July 2013

TMK (3rd): 1-4-028:007
Wa'awa'a, Puna, County of Hawai'i, State of Hawai'i

APPLICANT:

Maria Shon Magsalin
PO Box 172
Ninole, HI 96773

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
MAGSALIN SINGLE-FAMILY RESIDENCE IN THE CONSERVATION DISTRICT AT WA'AWA'A

TMK (3rd): 1-4-028:007
Wa'awa'a, Puna, County of Hawai'i, State of Hawai'i

APPLICANTS:

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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).

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TABLE OF CONTENTS

SUMMARY OF PROJECT, ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Maria Shon Magsalin (the applicant) seeks a Conservation District Use Permit (CDUP) to build a single-family residence and related improvements on a 0.415-acre lot located *mauka* of a shoreline reserve lot at Wa'awa'a in the Puna District. The proposed one-story home will be 1,365 square feet (sf), with 757 sf of living area and 608 sf open lanai/carport area, with one bedroom, one bath, a den, a kitchen, and a living room. The house would be set back 58 feet from the shoreline at an elevation of about 30 to 35 feet above sea level, situated mostly on a portion of the lot that appears to have been hand-cleared several decades ago prior to her ownership of the lot. Other features include an individual wastewater system, a water well, a water tank for fire protection, a photovoltaic solar system with propane generator backup, a driveway, and landscaping retaining the native or Polynesian species found in the area between the home and the shoreline. No modifications within the shoreline setback area would occur.

Landclearing and construction activities would occur over less than 5,000 square feet, producing minor short-term impacts to noise, air and water quality and scenery. These would be mitigated by Best Management Practices that are expected to be required as conditions of the CDUP. The applicant will ensure that her contractor performs all earthwork and grading in conformance with applicable laws, regulations and standards. The project has been fully surveyed for threatened and endangered plants and none are present. The site has been designed to minimize the need to cut or trim *hala* trees, which will remain over most of the lot. 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 archaeological sites other sensitive cultural resources or practices are present. 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

Maria Shon Magsalin (the applicant and successor of the Kurt E. Nelson Trust, the landowner) seeks a Conservation District Use Permit (CDUP) to build a single-family residence and related improvements on a 0.415-acre lot (TMK 1-4-028:007) located *mauka* of a shoreline reserve lot (TMK 1-4-028:051) at Wa'awa'a in the Puna District, at 14-3533 Government Beach Road (Figures 1-2). The proposed one-story home will be 1,365 square feet (sf), with 757 sf of living area and 608 sf open lanai/carport area, with one bedroom, one bath, a den, a kitchen, and living room (Figure 3). The house would be set back 58 feet from the shoreline at an elevation of about 30 to 35 feet above sea level, situated mostly on a portion of the lot that appears to have been hand-cleared several decades ago prior to her ownership of the lot. Other features include an individual wastewater system (IWS), a water well, a water tank for fire protection (270 sf), a photovoltaic solar system and a driveway.

The water well requires a permit from the Commission on Water Resources Management. The 9,000-gallon water tank is for fire protection and will have a connector useable by the Hawai'i Fire Department. The IWS will include a septic tank and leach field that comply with State Department of Health regulations. Electricity will be provided via photovoltaic solar roof panels with a propane generator backup, which is common in this area of Puna. Landclearing and construction activities would occur over less than 5,000 square feet, and no modifications within the shoreline setback would occur. Landscaping will retain the native or Polynesian species already present in the area between the home and the shoreline. Twenty to thirty native *hala* trees (*Pandanus tectorius*) would require removal, leaving more than 200 individuals on the property, which would be left undisturbed. New *hala* would be planted near the road. This tree, which is not endangered and is distributed throughout the Indo-Pacific region, is common in the coastal Puna District and particularly the Wa'awa'a area.

Construction will commence after all necessary permits are received and should be completed within one year from start-up. It should be noted that in 2010, the applicant began the EA/CDUA process with a consultation letter to various agencies specifying a larger and slightly different design for the home; that process was terminated and this EA evaluates the current design.

1.2 Environmental Assessment Process

This Environmental Assessment (EA) process is being conducted in accordance with Chapter 343 of the Hawai'i Revised Statutes (HRS). This law, along with its implementing regulations, Title 11, Chapter 200, of the Hawai'i Administrative Rules (HAR), is the basis for the environmental impact assessment process in the State of Hawai'i. According to Chapter 343, an EA is prepared to determine impacts associated with an action, to develop mitigation measures for adverse impacts, and to determine whether any of the impacts are significant according to thirteen specific criteria. Part 4 of this document states the anticipated finding that no significant impacts are expected to occur, based on the preliminary findings for each criterion made by the consultant in consultation with the Hawai'i State Department of Land and Natural Resources, the approving agency. If, after considering comments to the Draft EA, DLNR

Figure 1 Project Location Map

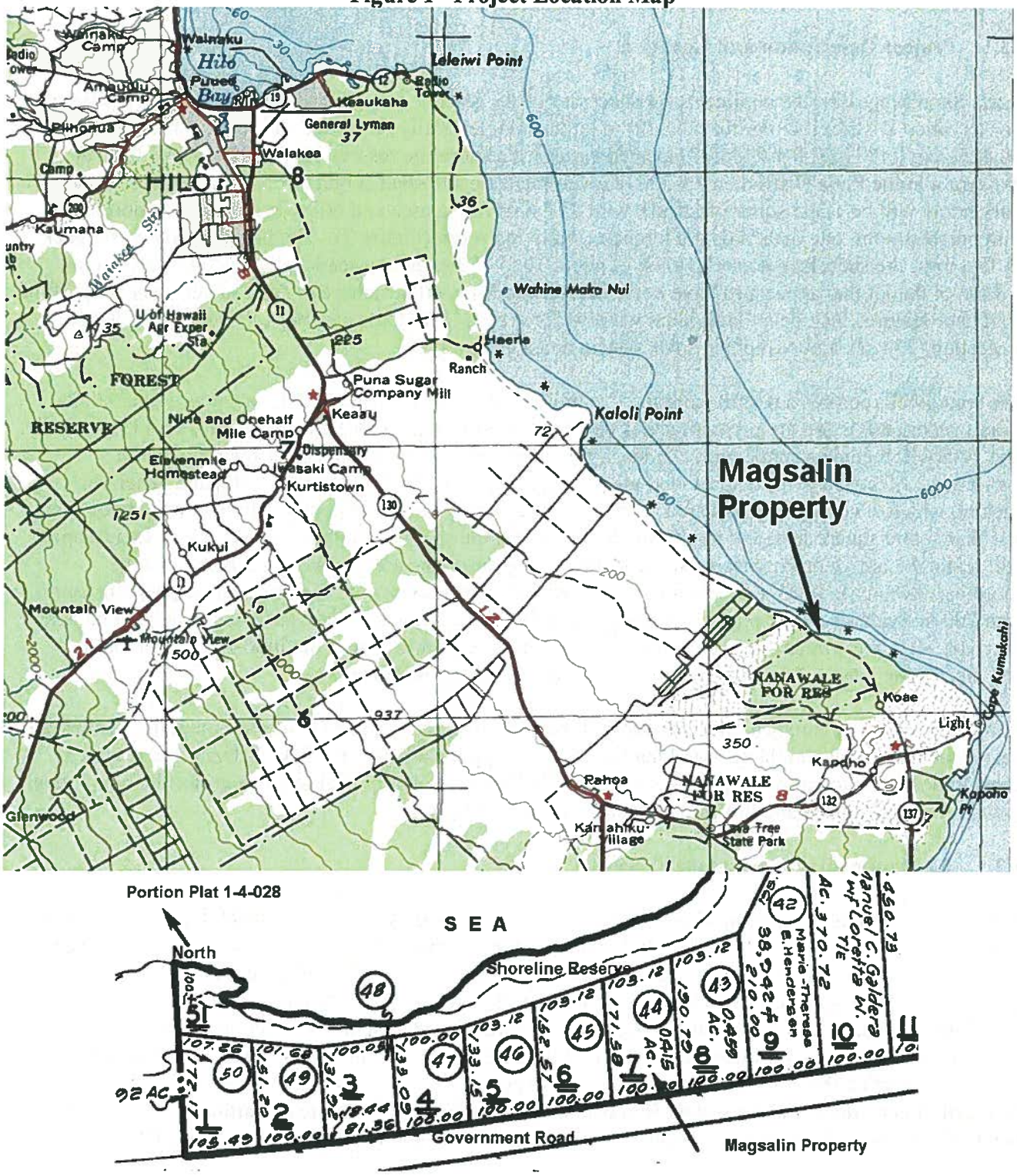


Figure 2 Project Site Photos

Driveway Entrance on Government Road ▲ ▼ Vegetation East of Driveway

Figure 2 Project Site Photos, continued

Driveway ▲ ▼ Northeast Area of Lot

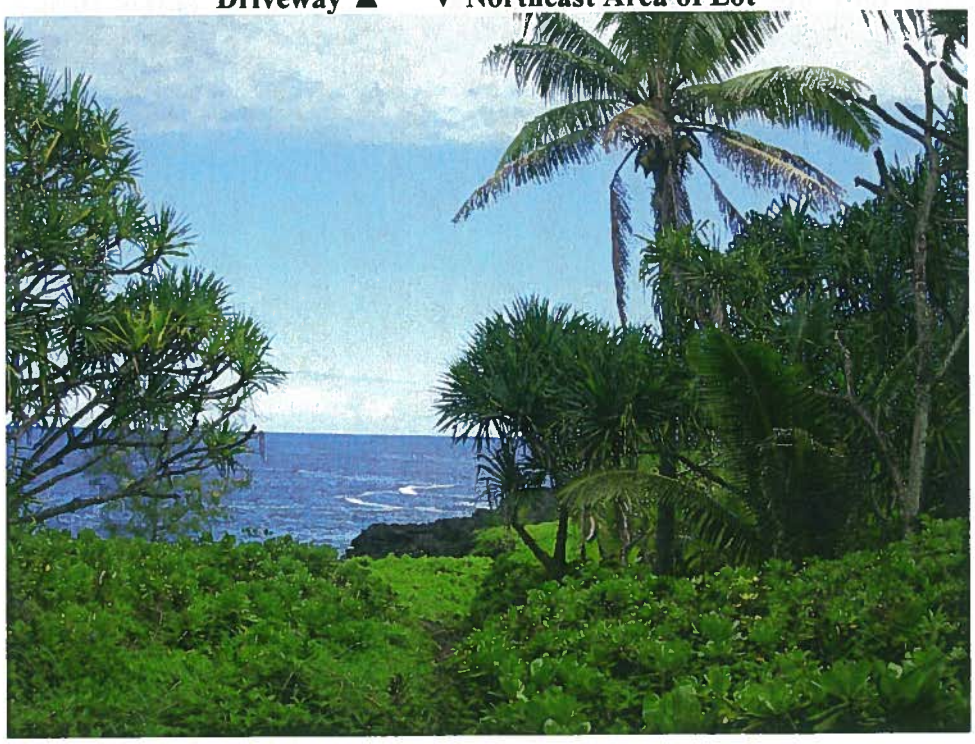
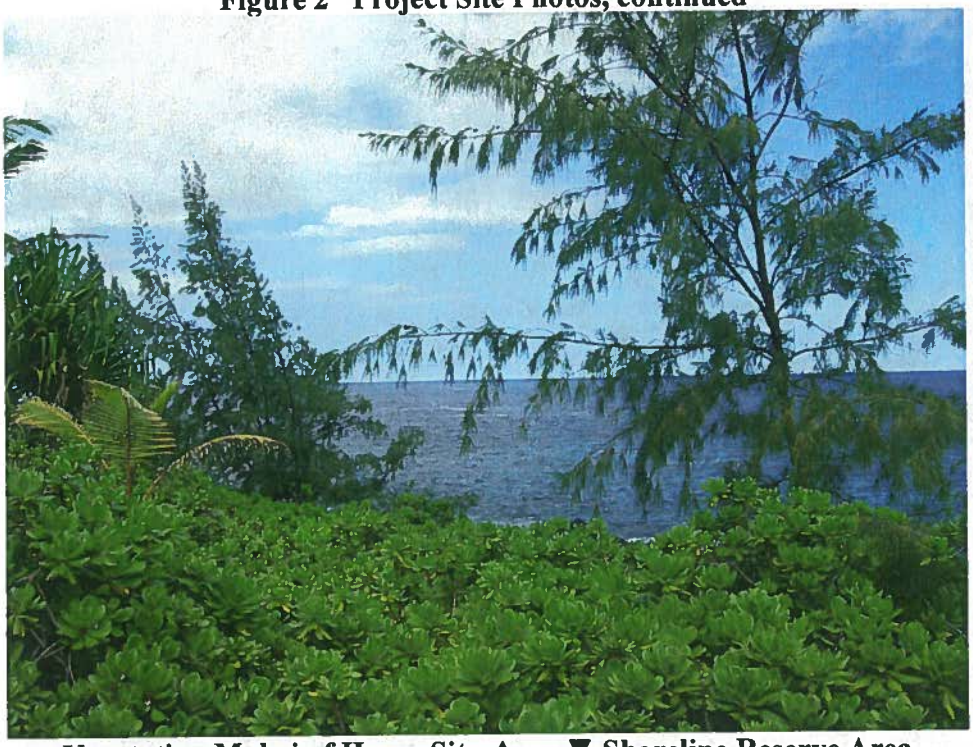


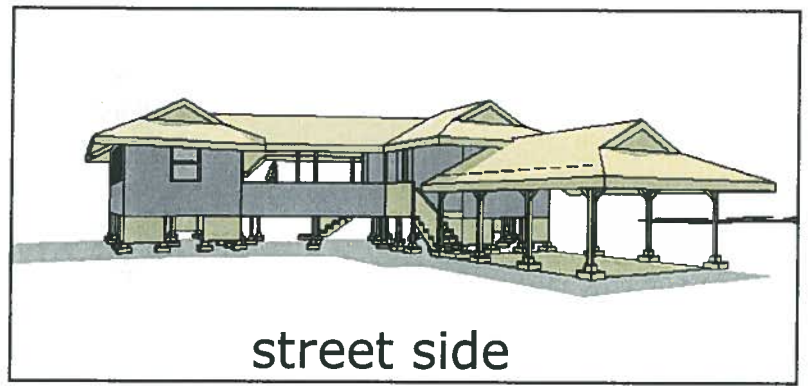
Figure 2 Project Site Photos, continued

Access from Driveway to House Site ▲ ▼ Vegetation Makai of House Site

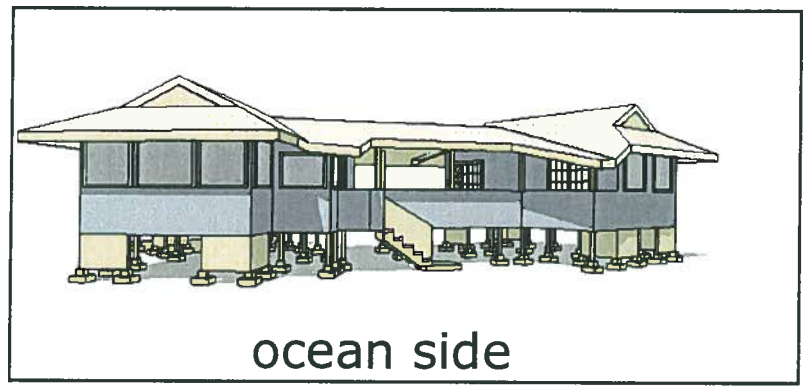
Figure 2 Project Site Photos, continued



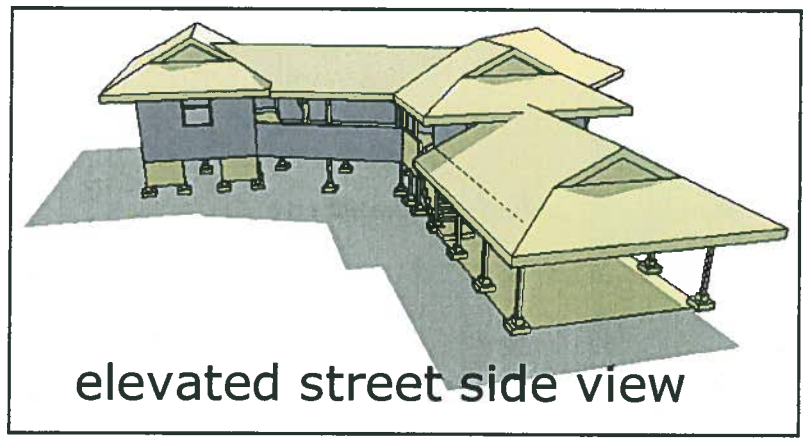
Vegetation Makai of House Site ▲ ▼ Shoreline Reserve Area



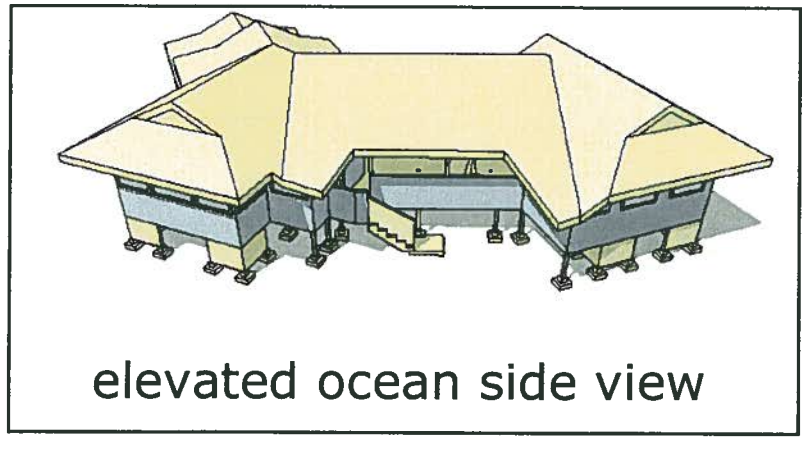
street side



ocean side



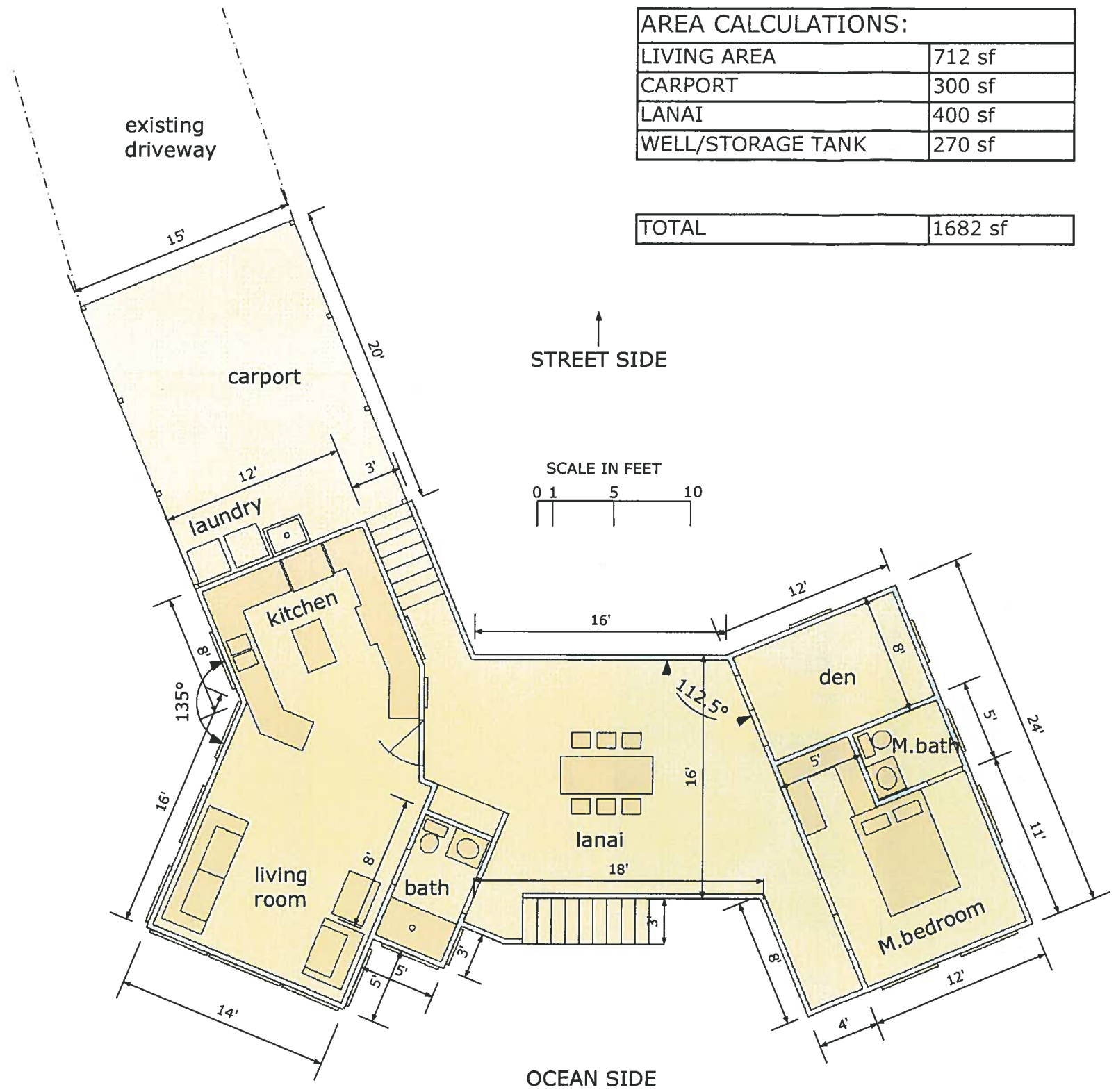
elevated street side view



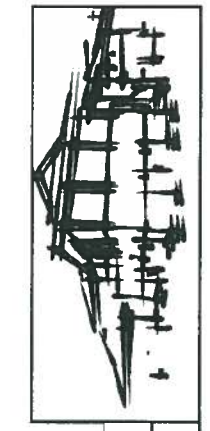
elevated ocean side view

AREA CALCULATIONS:	
LIVING AREA	712 sf
CARPORT	300 sf
LANAI	400 sf
WELL/STORAGE TANK	270 sf

TOTAL	1682 sf

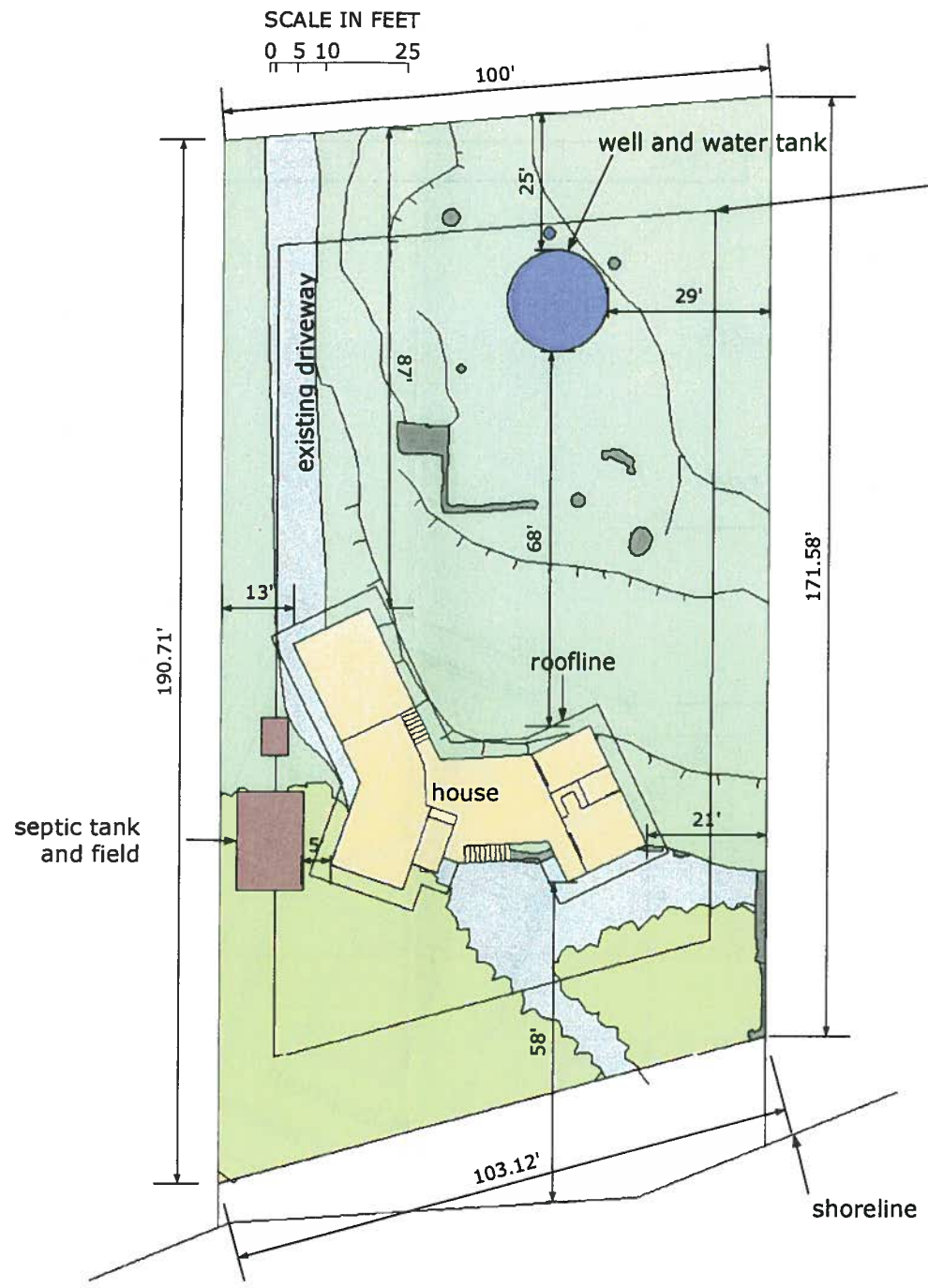


FLOOR PLAN

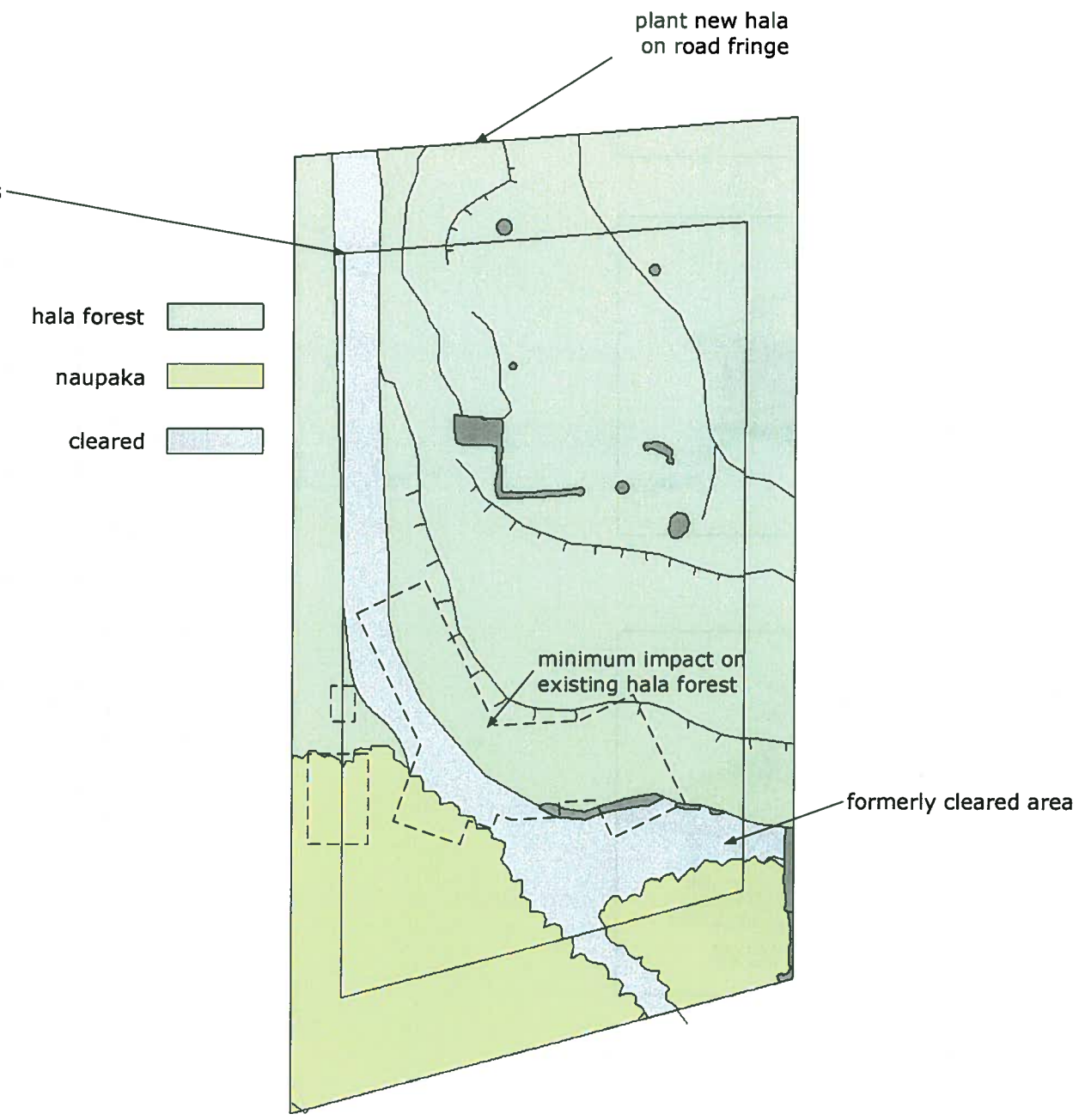


NEW RESIDENCE for Shon Magsalin, TMK # 3-1-4-028-007

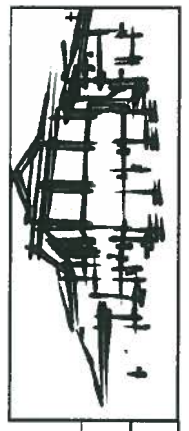
page 1 | Drawn by Matt Purvis, 808-960-4555, mattpurvis@gmail.com



SITE PLAN
sc. 1"=30'



LANDSCAPING PLAN
sc. 1"=30'



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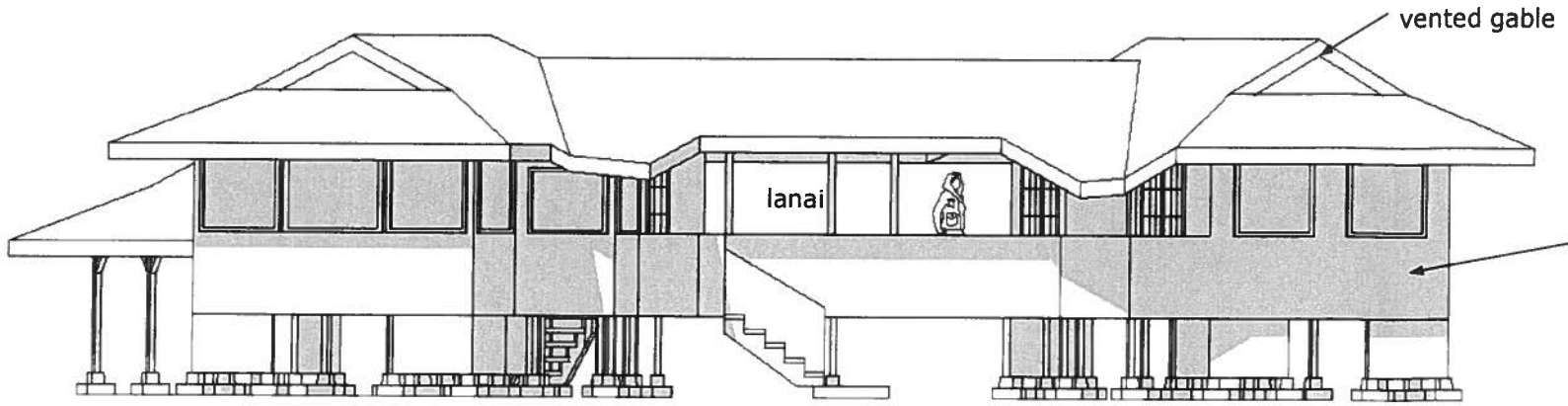
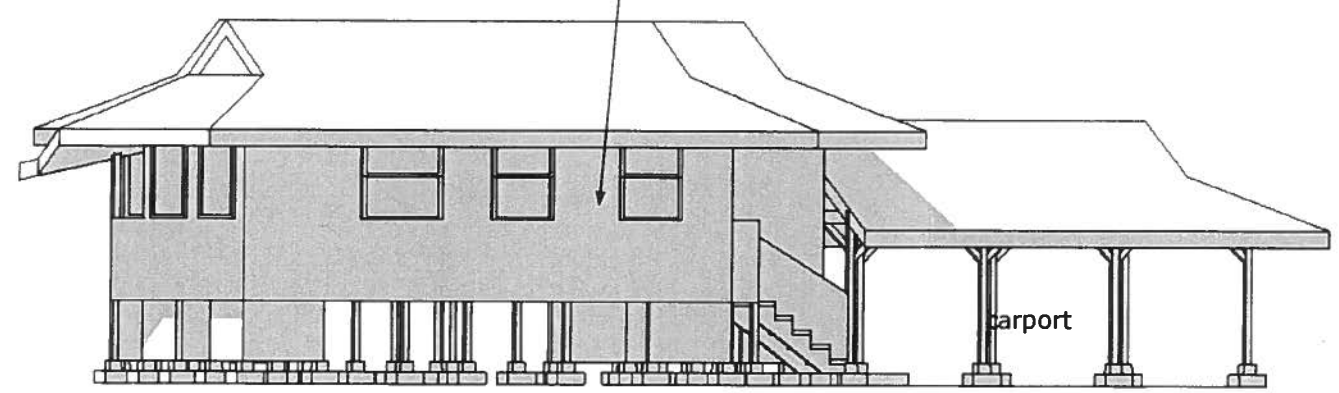
Drawn by Matt Purvis, 808-960-4555, mattpurvis@gmail.com

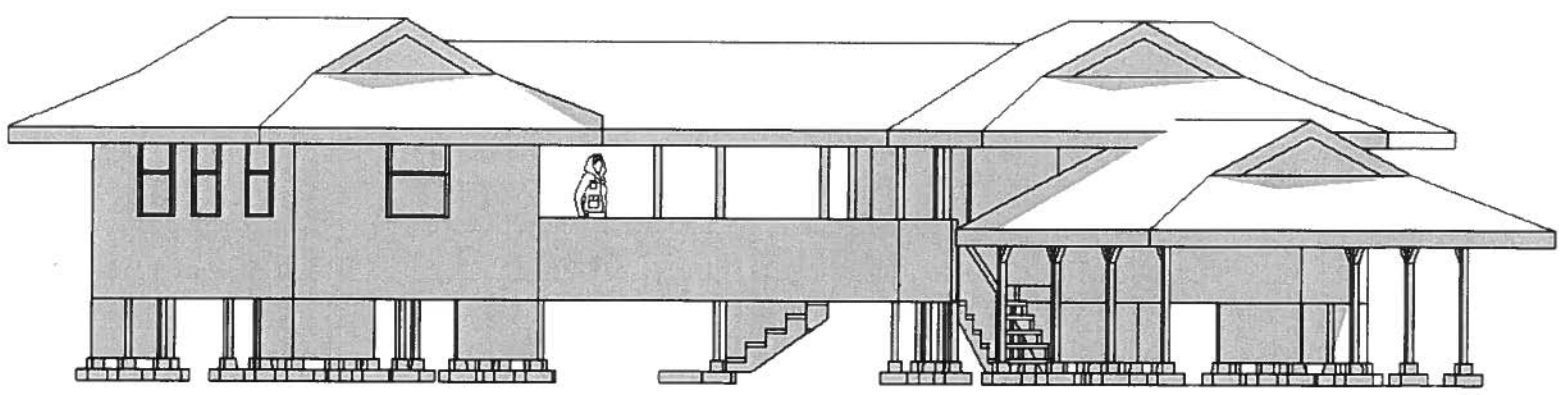


ELEVATION FRONT(OCEAN SIDE)

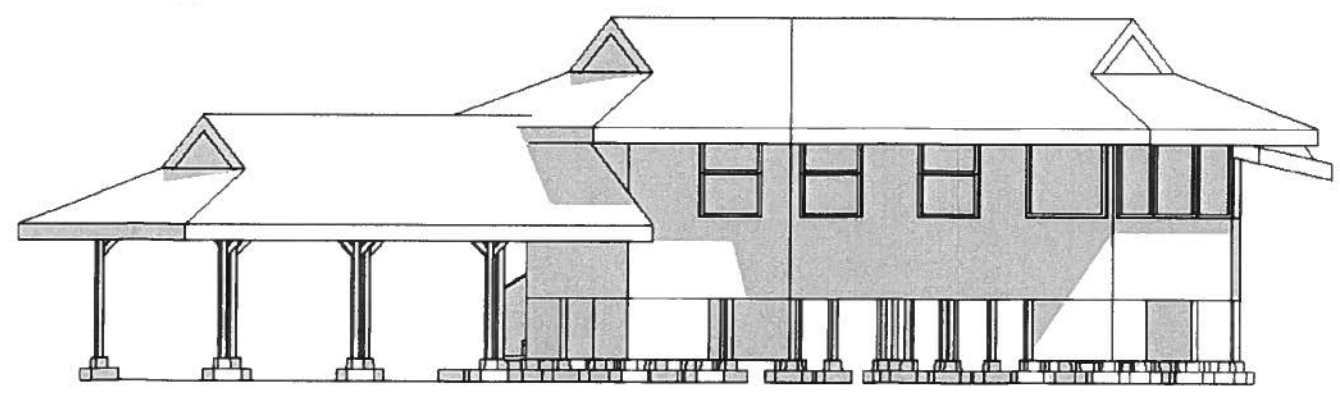
NOTE: many faces are turned at 22.5 deg to elevation view (see floor plan)



ELEVATION RIGHT



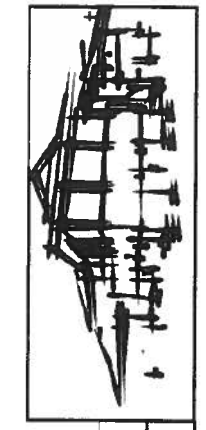
ELEVATION REAR(STREET SIDE)



ELEVATION LEFT

SCALE IN FEET

0 1 5 10



NEW RESIDENCE for Shon Magsalin, TMK # 3-1-4-028-007

Drawn by Matt Purvis, 808-960-4555, mattpurvis@gmail.com

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.

1.3 Public Involvement and Agency Coordination

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

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

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

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

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, set back 58 feet from the shoreline, was chosen in order to enjoy coastal breezes and views in an existing cleared area, on a property that in its inland section is densely vegetated with the native *hala* tree. Use of any other location on the lot would involve clearing of at least 70 *hala* trees, rather than the 20 to 30 that would need to be cleared for the proposed location. The site is about 30 to 35 feet above sea level and would avoid the actual shoreline area and its resources and hazards. Other than the shoreline reserve *makai* of the property, there are no public trails. There is relatively little public use of the rugged shoreline area except for occasional fishers, and there are no public vistas or sightlines that would be impaired. The proposed home location would appear to be 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. Illegal trash dumping, including items that the owner has had to periodically remove, would remain a problem, as it has in much of the vacant land in this area. 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

Ms. Magsalin's less than half-acre property is located between a narrow shoreline reserve associated with the Wa'awa'a Subdivision and the unpaved Government Beach Road and is flanked by similar shoreline lots. There are at least four homes within a quarter mile of the Magsalin property. The lot is vacant and unused and covered mainly with *hala* except near the seaward end of the lot along the road and on the unpaved driveway. These areas appear to have been hand-cleared many decades ago. At its highest point the lot is 50 feet above mean sea level, with a building site at about 30 to 35 feet above sea level.

3.1 Physical Environment

3.1.1 Geology, Soils and 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 Wa'awa'a, on lava flows dated at between 750 and 1,500 years ago. It is several hundred feet southeast of an 1840 kava flow. A littoral cone created by the 1840 flow at the shoreline is located approximately a half mile to the northwest (Wolfe and Morris 1996). Soil in the area is Opihikao extremely rocky muck (3-25% slopes), part of the Opihikao series of well-drained thin organic soils that have developed over pahoehoe bedrock. They are found from sea level to 1,000 feet in elevation and are rapidly permeable, with slow run-off, and a slight erosion hazard (U.S. Soil Conservation Service 1973). This soil is within subclass 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. As pointed out in the letter from DLNR in Appendix 1a, various parts of Puna are subject to a number of

hazards, including tsunami, stream flooding, high waves, high winds and volcanic/seismic activity. However, it is important to note that the Puna District is as large as the island of O'ahu 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. In terms of the actual site under consideration at Wa'awa'a:

- Tsunami: The home would be located 30 to 35 above sea level, 58 feet back from the shoreline (and over 60 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 30 to 35 feet above sea level, 58 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: 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 Hawai'i and is not undue.*
- Seismic hazard. As discussed above, the site shares the same level of seismic hazard as the entire island of Hawai'i. *The level of seismic hazard is at the site typical of that borne by over 180,000 residents of Hawai'i and is not undue.*

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

3.1.2 Flood Zones and Shoreline Setting

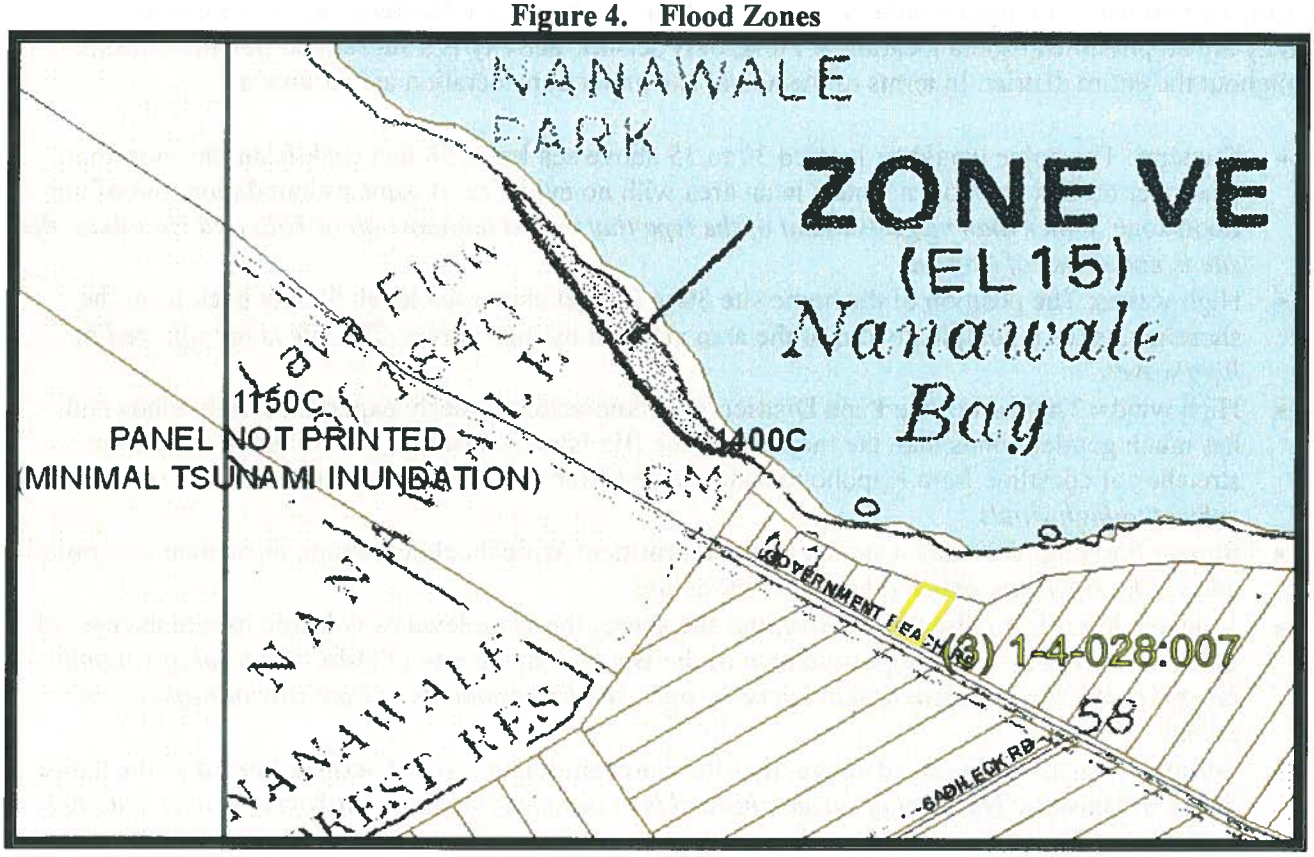
Floodplain Environmental Setting, Impacts and Mitigation Measures

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 1551661400C, has not been printed, as indicated in DLNR's flood map website (http://gis.hawaiinfip.org/fhat/) (Figure 4). The home building site is classified in Flood Zone X, areas outside the mapped 500-year floodplain, with minimal tsunami

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

inundation.

Figure 4. Flood Zones



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 the Magsalin property, the single-family home use 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 58 feet from the line that was surveyed by a licensed surveyor on December 23, 2009, and certified as the shoreline by DLNR on February 17, 2010, during Ms. Magsalin's initial 2010 application to build a home on her property (See Appendix 1a for a copy of the shoreline map and DLNR letter). It is important to note that Magsalin property is separated from the ocean by a shoreline reserve lot (TMK 1-4-028:051).

Although no government agencies requested that the shoreline be certified, and a shoreline certification did not appear to be required, Ms. Magsalin undertook this effort voluntarily in order to understand where the shoreline would be in relation to her building site.

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 4 and summarized below. Dr. Lockwood and an assistant worked with a pocket transit and measuring tape during a three hour period on July 24, 2012, as the tide dropped from +0.75 to +.0.1 feet above the tidal datum. The ocean had moderate swells of 3 to 4 feet, which generated light surf.

The lava flows underlying the project site are dense pahoehoe lava, but are underlain by 'a'a along a sharp contact. The "blue rock" core of the flow is gradationally overlain by dense 'a'a of fragments tightly welded together, forming an erosion-resistant surface that underlies a storm wave impact zone (Figure 5). The beach, *per se*, is a slightly sloping (12-15 degrees) accumulation of well-worn cobbles and boulders overlying the basal substrate of 'a'a. This 'a'a shelf is mostly scoured clean of debris by storm waves and extends another 60 to 80 feet to an 8 to 12-foot high sea cliff. The cliff is highly resistant to erosion, even by powerful marine wave action, as there is little jointing or fracturing of the 'a'a interior. Large subrounded to subangular detached boulders in the surf zone and apparently extending offshore do indicate that minor sea-cliff erosion has occurred.

Figure 5. Rock Seaward of Shoreline

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.

Inspection of available aerial photographs from 1954, 1965, 1977 and 2012 shows no measurable change in position of the overall coastal sea-cliff or of the vegetation line since the earliest 1954 photos. The large scale (limited resolution) of the aerial photographs available for study makes quantitative visual analyses of fine-scale morphological changes of the shoreline or sea-cliff impossible, as it is doubtful that horizontal changes of less than 10 feet could be detected. 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 – primarily observation of active erosion indicators such as freshly cut cliff faces or presence of angular erosional debris.

Since there is no visible indication that the shoreline vegetation line has changed over the 58 year period since the first aerial photographic record began, nor indication of measureable changes in sea cliff

position, it thus appears that the maximum amount of coastal erosion fronting the Property is less than 10 feet – for a maximum rate of 0.17 feet (2 inches)/year. If this maximum rate was in effect over 70 years, the shoreline might advance as much as 11.9 feet. Applying the standard of 40 feet plus 70 times the average annual coastal erosion rate, the shoreline setback would need to be 52 feet, as opposed to the 58 feet proposed by the applicant. It should furthermore be noted that the figure of 0.17 feet/year is basically a maximum, not an average rate. Given the elevation of the site 30 to 35 feet above sea level and the situation within an existing clearing that will require minimal grading and vegetation removal, the proposed house site appears reasonable and not subject to erosion within the foreseeable future.

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 inches/year 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 inches/year. Rates of subsidence at the Magsalin 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 inches/year. 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 at or 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 30 to 35 feet above sea level, 58 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 a narrow shoreline reserve. The house would be set back a minimum of 58 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 may be required. 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 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 in January 2013. Special attention was paid in these surveys and subsequent field visits to potential endangered

species, particularly *Ischaemum byrone,* a State and federally listed endangered grass known to grow in the general area.

As illustrated in the photos in Figure 3, aside from a roadside fringe of non-native species and a *makai* area with *naupaka* (*Scaevola taccada*), coconut palms (*Cocos nucifera*), and wedelia (*Sphagneticola trilobata*), over most of its extent, the project site is dominated by the native *hala* (*Pandanus tectorius*). Most of the other species present are non-native species, and all of the natives are very common in Puna and throughout the State of Hawai'i. 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 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*). No native birds were identified during site visits, and it is unlikely that many species of native forest birds would be expected to use the project site due to its low elevation, alien vegetation and lack of adequate forest resources, although it is likely that the Hawai'i 'Amakihi (*Hemignathus virens*) are often present, as some populations of this native honeycreeper appear to have adapted to the mosquito borne diseases of the Hawaiian lowlands. Common shorebirds, such as Golden Plover (*Pluvialis fulva*), Ruddy Turnstone (*Arenaria interpres*), and Wandering Tattler (*Heteroscelus incanus*), are often seen on the Puna coastline feeding on shoreline resources. 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*).

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.

Table 1. Plant Species Observed on Magsalin Property

Scientific Name	Family	Common Name	Life Form	Status
Ageratum conyzoides	Asteraceae	Ageratum	Herb	A
Casuarina equisetifolia	Casuarinaceae	Ironwood	Tree	A
Cecropia obtusifolia	Cecropiaceae	Guarumo	Tree	A
Chamaecrista nictitans	Fabaceae	Partridge pea	Herb	A
Cocos nucifera	Arecaceae	Niu	Tree	A
Cordyline fruticosa	Agavaceae	Ti	Shrub	A
Crotalaria mucronata	Fabaceae	Rattlebox	Herb	A
Desmodium sp.	Fabaceae	Desmodium	Vine	A
Emilia fosbergii	Asteraceae	Pualele	Herb	A
Fimbristylis cymosa	Cyperaceae	Mau'u akiaki	Sedge	I
Melinus minutiflora	Poaceae	Molasses grass	Grass	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
Panicum maximum	Poaceae	Guinea grass	Grass	A
Pennisetum purpureum	Poaceae	Napier grass	Grass	A
Phymatosorus grossus	Polypodiaceae	Laua'e	Fern	A
Pluchea symphytifolia	Asteraceae	Sourbush	Shrub	A
Psidium guajava	Myrtaceae	Guava	Tree	A
Scaevola taccada	Goodeniaceae	Naupaka	Shrub	I
Schefflera actinophylla	Araliaceae	Octopus tree	Tree	A
Sida rhombifolia	Malvaceae	Broom weed	Herb	A
Sphagneticola trilobata	Asteraceae	Wedelia	Herb	A
Tournefortia argentea	Boraginaceae	Tree heliotrope	Tree	A
Urochloa mutica	Poaceae	California grass	Herb	A

E= Endemic, I = Indigenous, A = Alien

Impacts and Mitigation Measures

Although some grading will be required, the edges of the existing cleared area and the proposed water tank site will be hand cleared to preserve as many *hala* as possible around the perimeter of the property and along the driveway. The fringe of invasives at the front of the lot will be managed and gradually replaced with *hala*. Because of the minor nature of the project and the lack of sensitive terrestrial ecosystems and threatened or endangered plant species, and the negligible effect to the lowland *hala* ecosystem, 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 3.1.3 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 native 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 taller than 15 feet 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, Vog, which results when sulfur dioxide and other gases and particles emitted by Kilauea Volcano react with oxygen and moisture in the presence of sunlight, is occasionally blown into this part of Puna. Noise on the site is low, and aside from vehicle noise on the Government Road, and noise from nearby residences, sound levels on the site mainly reflect natural sources such as surf and wind.

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. The General Plan specifically lists as examples of natural beauty a shoreline area about one mile to the north (Honolulu Landing) at TMK 1-4-003:019, and three areas at Kahuwai about one mile to the south (the black sand beach at Kapela Bay, Makaukiu Point and the shoreline) at TMK 1-4-003:013. There are also Exceptional Trees protected by County ordinance present on the Old Government Road in the form of a mango grove that lines both sides of the roadway. The area near the Magsalin property was inspected as part of the biological research, and it does not contain mango trees (see photos in Figure 2). Coastal views from the Government Beach Road are obstructed by vegetation along the lot front.

Impacts and Mitigation Measures

Low-density, low-intensity residential use should not result in deleterious impacts on air quality and the acoustical environment. Brief and minor adverse effects would occur during construction, and there will be occasional noise from the backup generator. However, the only sensitive noise receptors in the vicinity are residences producing similar impacts, and given the small scale of the project, noise mitigation does not appear to be necessary.

The home will be hidden from the road, but the expansion of the driveway will open up a narrow coastal viewplane. Replacement of the roadside fringe of weedy vegetation with *hala* will improve the visual character along the road. Off-power living generally results in less light pollution than on-the-grid as it restricts available power at night. 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. 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 Magsalin 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 Wa'awa'a area is part of the Hawaiian Beaches Census Designated Place (CDP). In the 2010 Census, Hawaiian Beaches contained a population of 4,280, with an average household size of 2.91 persons. The population was 31.2% White, 14.4% Asian, 14.4% Native Hawaiian or Pacific Islander, and 35.8% two or more races (http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml#none). The bulk of the population in this CDP is in the Hawaiian Beaches/Hawaiian Shores subdivisions several miles north of the project area. The immediate community surrounding the Magasalin property is referred to as the Wa'awa'a Subdivision. Created in the 1960s, it contains 170 lots, most of which are 3 acres in size, with smaller lots fronting the ocean. Wa'awa'a can be characterized as sparsely developed with largely unimproved gravel and dirt roads and scattered houses, with about a quarter of the properties having homes. There is no County water or sewer service available. Electrical service does not extend past the Hawaiian Shores subdivision to Wa'awa'a. Residents of the area elect to live in this remote setting for the privacy and self-sufficient lifestyle available. The Magsalin property is bordered by the shoreline reserve property to the north, by the Government Beach Road to the south, and by unoccupied private lots on the east and west.

The growing population in Puna, including such areas as Hawaiian Shores and Hawaiian Beaches, induces a high demand for coastal recreation in Puna. Despite the long coastline, there are few beaches in Puna, and areas such as Kapoho, Pohoiki and Kehena experience heavy use. In most locations, however, ocean recreation is much more scattered and 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. Fishermen apparently did clear an informal jeep road on the property at one time, which was long since gated. The nearest *mauka-makai* shoreline public accesses from the Government Road is at the northwestern corner of the Wa'awa'a Subdivision, about 500 feet from Magsalin lot, within a 78.33-acre parcel (TMK 1-4-003:018). This property is owned by the State of Hawai'i, which is a portion of the Nānāwale Forest Reserve. This parking spot and trail provide access to the Forest Reserve coastline to the west as well as the shoreline reserve property to the east that is held in common by the Wa'awa'a

Subdivision owners. This strip provides a setback from the shoreline and an area for residents and the public to walk, fish or gather. Fishers and gatherers are often seen in the shoreline area 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 Hawai'i. The residence and associated improvements will not adversely affect recreation, as access along the shoreline will not be affected.

Illegal dumping is a severe problem on this portion of Old Government Road, especially in the area around Pu'u One (Sand Hill). 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 chronic dumping lowers the quality of life and decreases property value for residents. There have been many volunteer and County-organized cleanups to deal with this problem, but ultimately, it is the presence of a critical mass of vigilant residents in the many subdivided lots that will discourage dumping. The Magsalin property is also, sadly, the site where Dana Ireland's body was found after she was brutally murdered on Christmas Eve, 1991, while bicycling on the Old Government Road. Residents who have stopped to chat with our fieldwork teams have expressed support for the prospect of another resident to help keep the neighborhood clean and safe.

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 by mail 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 Hawai'i 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 Hawai'i were underway by A.D. 300, although recent work suggests that Polynesians may not have arrived in Hawai'i until about A.D. 1000 (Kirch 2012).

The initial inhabitants of Hawai'i 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 Wa'awa'a 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 ['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).

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 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 were recorded as residing in the district of Puna; 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, the context of the Magsalin property, though there were hundreds of individuals who lived inland.

Also in 1841, Commander Charles Wilkes of the U.S. Exploring Expedition, toured the Hawaiian Islands (Wilkes 1845). His expedition traveled through lower Puna not far from the project site area:

"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 of 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)

The lava flow mentioned by Wilkes that entered the sea at Nānāwale along the western boundary of Wa'awa'a Ahupua'a near the current project area occurred in 1840 just prior to the U.S. Exploring Expedition's tour of Puna. The flow began on May 30th, issuing from a subterranean crack about 12 miles inland. By June 3rd it had reached the coast, covering a small village there, where it flowed into the sea for three weeks. Titus Coan, who was absent from the island at time, described what witnesses of the event told him:

". . . The atmosphere in all directions was filled with ashes, spray, gases, etc., while the burning lava as it fell into the water was shivered into millions of minute particles, and being thrown back into the air fell in showers of sand on all the surrounding country. The coast was extended into the sea for a quarter of a mile, and a pretty sand beach and new cape were formed. Three hills of scoria and sand were also formed in the sea, the lowest about two hundred and the highest about three hundred feet.

For three weeks this terrific river disgorged itself into the sea with little abatement. Multitudes of fishes were killed, and the waters of the ocean were heated for twenty miles along the coast. The breadth of the stream where it fell into the sea, is about a half a mile, but inland it varies from one to four or five miles in width, conforming, like a river, to the fall of the country over which it flowed. The depth of the stream will probably vary from ten to two hundred feet, according to the inequalities of the surface over which it passed. During the flow night was converted into day on

> all eastern Hawaii; the light was visible for more than one hundred miles at sea; and at the distance of forty miles fine print could be read at night." (Coan in Hitchcock 1909:189-190)

In 1846, Chester S. Lyman, "a sometime professor" at Yale University visited Hilo, Hawai'i, 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 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).

The *Mahele 'Aina* took place in 1848, placing all land in Hawai'i 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. Wa'awa'a Ahupua'a was retained as Government Land. The entire *ahupua'a* was later commuted as four separate grant parcels: Grant No. 997 to Haole in 1852, Grant No. 1363 to Pakaka in 1854, Grant No. 2687 to Manamana in 1860, and Grant No. 3687 to R. A. Lyman in 1894. No Land Commission Award claims were made in Wa'awa'a Ahupua'a (Haun and Henry 2004). The Magsalin property is located *makai* of Grant No. 997 to Haole, but was part of Grant No. 3687 to Lyman. Hawai'i Registered Map No. 1684 prepared in 1893 by A. B. Lobenstein (see Figure 6 of Appendix 3) shows the Government Road, which follows the current alignment of the Government Beach Road, and several trails running *mauka* from the road across Lyman's grant parcel. The current project area is situated *makai* of the road within an area labeled "open country below gov't road." To the east of the project area within Grant No. 1363 to Pakaka a canoe landing is shown at the coast with two canoe sheds inland.

During the latter part of the nineteenth century land use within Lower Puna and the Wa'awa'a Ahupua'a began to change. Archaeologists Yent and Ota noted that the "native agricultural system began to decline around 1840 as the population declined" (1982:11). The inland portions of the *ahupua'a* (portions of Grant No. 2687 and 3687) appear to have been used for cattle ranching and possibly sugarcane cultivation. By 1900, a new inland road in Puna had been completed. 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. Puna ranches that had begun grazing cattle as early as the 1850s continued to expand during this time, and sugar plantation formed and expanded as well.

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 Kea'au. The railroad passed through Wa'awa'a several miles *mauka* of the shore. The railroad ceased operations in 1946. By 1950, most inhabitants of this part of the Puna coast moved away.

Between 1890 and 1931 the area from Wa'awa'a to Puala'a (likely including Grant No. 3687 to R. A. Lyman) was ranched by the Lyman Estate. The lease for cattle was transferred to Kamau in 1931 (Yent and Ota 1982:11). Other portions of the *ahupua'a* may have been used for sugarcane cultivation. The Puna Sugar Company operated in the vicinity of the current project area from 1900 until the 1980s. The Magsalin property does not appear to have been used for either purpose. An aerial photograph of the Wa'awa'a coastline taken on November 12, 1954 shows the current Government Beach Road alignment and a road running to the coast to the east of the current project area, but indicates that no structures or agricultural plots were present within Wa'awa'a Ahupua'a at this time (see Figure 7 of Appendix 3).

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 Wa'awa'a without significant disturbance might be expected to possibly contain archaeological remains.

On April 8 and 12, 2011, Matthew R. Clark, B.A., and Dave Nelson, B.A., under the direction of Robert B. Rechtman, Ph.D., conducted a thorough on-foot field survey of the property, with fieldworkers maintaining transects with a 5-meter spacing interval. Seven discrete cobble features were identified on the project site during the transect sweeps, all of them given the category temporary features. They were associated with a toilet, a bench, a shower, and a retaining wall created during the last two decades by campers. There was also the base of a memorial erected after the murder of Dana Ireland on December 24, 1991. Items that may have been placed on the memorial appear to have been removed by May 2013.

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 8, 2011 (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 HAR 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.

On September 10, 2009, an informal consultation was conducted with Jesse Kawaaloa at his job site in Pahoa. This individual has strong genealogical ties to the area having descended from Hawaiians residing in Kalapana dating from pre-Māhele times, and likely Precontact times. Jesse's personal recollection of the general project area extends back to the 1950s, when he was a small boy walking the trails and roads to his Auntie and Uncle's house in Wa'awa'a to go fishing and swimming in the warm pond. He explained that before the Hawaiian Beaches Subdivision was created that the coastal area of Wa'awa'a was a great place for fishing and the gathering limu and opihi. Access to Wa'awa'a from his home in Kalapana was by way of trails and the Old Government Road. Jesse stated, "when we were young we used to walk the whole way" stopping only to swim in the warm pond which he said "the pond was great! It was the only warm pond with white sand, but the owners started charging 10 cents then they raised it to 25 cents that's when we stopped coming because a quarter was a lot of money in those days". When asked how he felt about the construction of the single-family dwelling, Jesse indicated that as long as the house was not an "eyesore," that ocean access is never denied to people wanting to fish, and that no cultural sites are impacted then it would be acceptable.

In an earlier consultation by Dr. Rechtman (documented in Geometrician Associates 2010) with members of the Kanaka Council (a native Hawaiian cultural organization), with respect to a property located six lots to the west of the Magsalin property (TMK 1-4-028:001) with a similar geography and flora, the general sentiment was that as long as cultural resources and traditional coastal access were not impacted, then there was no objection to a single-family development.

Another source for identifying community-based concern over potential cultural impacts with respect to development of this portion of the Puna coastline can be found many communications by Malama O Puna, a nonprofit volunteer service organization that focuses on environmental issues. Their stated mission is to assure critical habitat for native species and open space for future generations through environmental education, hands-on projects, advocacy, watch-dogging and land trusting. With respect to potential traditional cultural resources of the immediate project area, Malama O Puna has identified *hala* groves as potential cultural resource that would be impacted by allowing any development of the Puna coastline, but does not provide any specific information on practitioners or gathering locales.

As discussed above, the Office of Hawaiian Affairs and Malama O Puna were contacted by mail as part of early consultation for this EA, but have not responded to date.

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 Magsalin property does not contain any springs, *pu'u*, or caves that might be important cultural sites. There is a grove of *hala* trees, which the proposed design can largely preserve. Twenty to thirty *hala* would require removal, leaving more than 200 on the property, which would be left undisturbed. Additional *hala* would be planted near the road. This tree, which is not endangered and is distributed throughout the Indo-Pacific region, is common in the coastal Puna District and particularly the Wa'awa'a area, and the *hala* resource would not be materially affected by allowing a home on the Magsalin property.

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 a driveway off a paved section of the Government Beach Road. This unimproved, narrow, intermittently paved public roadway extends from Beach Road in Hawaiian Paradise Park, through Papio Street in Hawaiian Shores Recreational Estates, to Kapoho (see Figure 1a and 1b). Like other residents of Wa'awa'a, the applicant needs to traverse a distance of about 1.2 miles on this mostly unpaved road to access the paved, public road system in the Hawaiian Shores subdivision, and 3.2 miles to access Kapoho Road. No road improvements are planned or needed.

3.3.2 Public Utilities and Services

Environmental Setting, Impacts and Mitigation Measures

No electricity/ telephone poles and lines are present on this part of Government Beach Road. The nearest service is over a mile away in Hawaiian Shores Recreational Estates. The home will utilize a photovoltaic solar system with propane generator backup.

Domestic water supply would be through a planned water well with a small storage tank (see Figure 3 for locations). A permit from the Commission on Water Resources Management will be required for the well. The water tank would have a capacity of 9,000 gallons to provide fire flow. The applicant has reviewed standards at 18.3.8 of the Hawai'i Fire Code, including sections (1)-(3) and (5)-(6), dealing with minimum tank size, pipe sizes, tank and valve construction and location, and inspection and maintenance. 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 – requires 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. In this case, potable water supply will be via a well and the entire 9,000 gallons can be used for fire flow. Furthermore, the applicant will construct the tank to have a compatible connector system for use by the Hawai'i Fire Department.

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 and farms located on Government Beach Road between Hawaiian Beaches and Kapoho 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 widening to two lanes and completely paving 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 Electrical/Plumbing/Building Permits

State of Hawai'i:

Conservation District Use Permit
Well Permits from Commission on Water Resource Management
Wastewater System Approval

3.6 Consistency With Government Plans and Policies

3.6.1 Hawai'i County General Plan and Puna Community Development 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 back about 58 feet from the shoreline at an elevation of about 30 to35 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 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

Although the State Land Use District for the property is Conservation, it is zoned by the County of Hawai'i as within the Agricultural District, minimum lot size of three acres (A-3a). The parcel was subdivided prior to the adoption of the current County Zoning Code and State Land Use law. As a result, zoning and State Land Use designations have been laid over the existing subdivision after it was legally created. County zoning does not apply in the Conservation District portion of the property.

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. An SMA Assessment was prepared and submitted to the County concurrent with the Draft EA. The proposed land use complies with provisions and guidelines contained in Chapter 205A, Hawai'i Revised Statutes (HRS), entitled *Coastal Zone Management*. A summary of consistency is provided below.

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 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 mostly 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 the native *hala*, which will largely be preserved, and *naupaka*, which is extremely common in the area; the remainder of the vegetation is non-native. No floodplains are present in the area. In terms of beach protection, construction is set back from the shoreline, with a shoreline reserve lot in between the project site and the sea, and use for a single-family home 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 Magsalin 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. 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.

The proposed improvements conform to the development standards for the Conservation District for single-family dwellings. The structure will not exceed the 3,500-square foot developable area for lots smaller than one acre. The structure will not exceed 20 feet in height, and is proposed to be smaller than those already existing on nearby lots. Compatibility provisions of HAR 13-5 state that all structures must be connected or best alternative, and the home will consist of one connected structure.

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 rare native 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. Twenty to thirty native *hala* trees would require removal, leaving more than 200 on the property, which would be left undisturbed, and new *hala* would be planted. This tree, which is not endangered and is distributed throughout the Indo-Pacific region, is common in the coastal Puna District and particularly the Wa'awa'a area. 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 1,365 square feet total for all features and will be set back 58 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 *hala* and *naupaka*, 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 planting *hala* near the road.

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 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. Twenty to thirty native *hala* trees would require removal, leaving more than 200 on the property, which would be left undisturbed, and new *hala* would be planted. 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, species that range island wide and for which mitigation in the form of timing of vegetation removal and/or hawk nest survey will obviate impacts, 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 30 to 35 feet above sea level and about 58 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 obstructed by dense vegetation. The minimal alteration of the lot and the design of the home and 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.

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ENVIRONMENTAL ASSESSMENT
MAGSALIN SINGLE-FAMILY RESIDENCE IN THE CONSERVATION DISTRICT AT WA'AWA'A

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

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William P. Kenoi
Mayor

Harry S. Kubojiri
Police Chief

Paul K. Ferreira
Deputy Police Chief

County of Hawai`i

POLICE DEPARTMENT
349 Kapi'olani Street • Hilo, Hawai'i 96720-3998
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May 15, 2013

Mr. Ron Terry, Ph.D.
Geometrician Associates, LLC
P.O. Box 396
Hilo, HI 96720

Dear Mr. Terry:

SUBJECT: EARLY CONSULTATION FOR ENVIRONMENTAL ASSESSMENT FOR PROPOSED SHON MAGSALIN SINGLE-FAMILY HOME IN THE CONSERVATION DISTRICT AT WA'A WA'A, PUNA DISTRICT: TMK 1-4-028:007

Staff has reviewed your letter of May 9, 2013, concerning the early consultation for environmental assessment for proposed Shon Magsalin single-family home in the conservation district at Wa'a Wa'a in Puna (TMK: 1-4-028:007). At this time staff does not anticipate any significant impact to traffic and/or other public safety concerns.

Thank you for allowing us the opportunity to comment.

If you have any questions or concerns, please contact Acting Captain Reed Mahuna of the Puna District at 965-2716.

Sincerely,

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

RM:lli
110106

William P. Kenoi
Mayor

BJ Leithead Todd
Director

Margaret K. Masunaga
Deputy

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County of Hawai'i
PLANNING DEPARTMENT

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May 16, 2013

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

Dear Mr. Terry:

Subject: **Pre-Consultation for Draft Environmental Assessment**
Project: **Magsalin Single-Family Residence in Conservation District**
TMK: **(3) 1-4-028:007; Wa'awa'a, Puna, Hawai'i**

Thank you for your letter dated May 09, 2013, requesting comments from this office regarding the preparation of a draft Environmental Assessment (EA) for the subject project.

Proposed is the construction of a 1,436 s.f. single-family residence, water well and individual wastewater system on the property defined by the above-referenced TMK. The subject property consists of 0.415 acres, is situated in the State Land Use Conservation district, and designated Open by the Hawai'i County General Plan Land Use Pattern Allocation Guide (LUPAG) map. The subject parcel is entirely within the Special Management Area (SMA) and borders a narrow shoreline reserve parcel. A previous SMA determination for this parcel required a 50' setback from the shoreline. That determination, and a time extension for compliance with its conditions requiring the applicant to secure a Conservation District Use Permit and Building Permits by May 11, 2013, has since expired. A new SMA Assessment Application will need to be submitted to the Planning Department for review. Furthermore, in view of the amount of time that has passed since our previous approvals for the subject property, we may require a current shoreline survey certified by the Board of Land and Natural Resources as part of a complete SMA Assessment Application. The requirement for a certified shoreline survey is contingent upon the findings of the Planning Department following a site inspection to be scheduled after the submittal of a SMA Assessment Application.

It is our understanding that the EA will address water quality assurance; wastewater treatment; flora, fauna, and ecosystems; traffic impacts; geology, soils, and hazards; flooding and drainage impacts; social, cultural and community impacts; and historic sites. It will also include archaeological and cultural reports, a coastal erosion study, and the results of botanical surveys.

Please note that nearby parcels have been found to contain culturally significant groves of hala (*Pandanus tectorius*) and the EA should address this in the analysis of biological and cultural resources of the subject area.

We have no further comments to offer at this time. However, please keep us informed and provide our department with a copy of the draft Environmental Assessment for our review and comment. If you have any questions or if you need further assistance, please feel free to contact Lucas Mead of this office at (808) 961-8140.

Sincerely,

for BJ LEITHEAD TODD
Planning Director

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William P. Kenoi
Mayor

Darren J. Rosario
Fire Chief

Renwick J. Victorino
Deputy Fire Chief

County of Hawai'i
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May 23, 2013

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

Dear Mr. Terry,

SUBJECT: EARLY CONSULTATION FOR ENVIRONMENTAL ASSESSMENT FOR PROPOSED SHON MAGSALIN SINGLE-FAMILY HOME IN CONSERVATION DISTRICT AT WA'AWA'A, PUNA DISTRICT
TMK: 1-4-028:007

The Hawai'i Fire Department does not have any comments to offer at this time regarding the above-referenced early consultation on Environmental Assessment.

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

RP:lc

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:

13-106
Shon Magsalin

May 21, 2013

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

Dear Mr. Terry:

SUBJECT: Early Consultation for Environmental Assessment for Proposed Shon Magsalin Single-Family Home in the Conservation District at Wa'awa'a, Puna District, TMK 1-4-028:007

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your letter dated May 9, 2013. Thank you for allowing us to review and comment on the subject document. The document was routed to the Department of Health's Clean Water Branch. They will provide specific comments to you if necessary. EPO recommends that you review the Standard Comments (www.hawaii.gov/health/epo under the land use tab). You are required to adhere to all Standard Comments specifically applicable to this application.

EPO suggests that you examine the many sources available on strategies to support the sustainable design of communities, including the:

- U.S. Environmental Protection Agency's report, "Creating Equitable, Health and Sustainable Communities: Strategies for Advancing Smart Grants, Environmental Justice, and Equitable Development" (Feb. 2013), http://www.epa.gov/smartgrowth/pdf/equitable-dev/equitable-development-report-508-011713b.pdf;
- U.S. Environmental Protection Agency's sustainability programs: www.epa.gov/sustainability;
- U.S. Green Building Council's LEED program: www.new.usgbc.org/leed; and
- World Health Organization, www.who.int/hia.

The DOH encourages everyone to apply these sustainability strategies and principles early in the planning and review of projects. We also request that for future projects you consider conducting a Health Impact Assessment (HIA). More information is available at www.cdc.gov/healthyplaces/hia.htm. We request you share all of this information with others to increase community awareness on sustainable, innovative, inspirational, and healthy community design.

We wish to receive notice of the environmental assessment's availability when it is completed. We request a written response confirming receipt of this letter and any other letters you receive from DOH in regards to this submission. You may mail your response to: 919 Ala Moana Blvd., Ste. 312, Honolulu, Hawaii 96814. However, we would prefer an email submission to epo@doh.hawaii.gov. We anticipate that our letter(s) and your response(s) will be included in the final document. If you have any questions, please contact me at (808) 586-4337.

Mahalo,

Laura Leialoha Phillips McIntyre, AICP
Manager, Environmental Planning Office

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

June 3, 2013

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 for Proposed Shon Magsalin Single-Family Home in the Conservation District, Geometrician Associates, LLC for Shon Magsalin, Applicant, Wa'awa'a, Puna, Hawaii, TMK: (3) 1-4-028:007

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 the (i) Engineering Division, (ii) Hawaii District Land Office, and (iii) 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

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

RECEIVED
LAND DIVISION

2013 MAY 20 PM 2:49

DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

May 10, 2013

MEMORANDUM

~~TO:~~ From: **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:~~ To: Russell Y. Tsuji, Land Administrator
SUBJECT: Early Consultation for Environmental Assessment for Proposed Shon Magsalin Single-Family Home in the Conservation District
LOCATION: Wa'awa'a, Puna, Hawaii, TMK: (3) 1-4-028:007
APPLICANT: Geometrician Associates, LLC

Transmitted for your review and comment is information on the above referenced project. We would appreciate your comments on this project. Please submit any comments by May 31, 2013.

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: Carty S. Chang, Chief Engineer
Date: 5/17/13

cc: Central Files

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/KevinMoore
RE:DShon-MagsalinSingleFamlyHomeEarlyEAConDistrict
Hawaii.609

COMMENTS

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

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

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

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

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

( ) Mr. Mario Siu Li at (808) 768-8098 or Ms. Ardis Shaw-Kim at (808) 768-8296 of t he 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.

( ) Ms. Carolyn Cortez at (808) 270-7813 of the County of Maui, Department of Planning.

( ) Ms. Maile Aiu at (808) 241-4884 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: 5/17/13

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

2013 MAY 14 P 2:08

RECEIVED
LAND DIVISION
HILO, HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

May 10, 2013

MEMORANDUM

RECEIVED
LAND DIVISION
2013 MAY 24 AM 11:37
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 for Proposed Shon Magsalin Single-Family Home in the Conservation District
LOCATION: Wa'awa'a, Puna, Hawaii, TMK: (3) 1-4-028:007
APPLICANT: Geometrician Associates, LLC

Transmitted for your review and comment is information on the above referenced project. We would appreciate your comments on this project. Please submit any comments by May 31, 2013.

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. HEU
Date: 5/20/13

cc: Central Files

HA-13-160

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

RECEIVED
OFFICE OF CONSERVATION
AND COASTAL LANDS
2013 MAY 13 A 9:53

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

May 10, 2013

FROM:

MEMORANDUM

RECEIVED
LAND DIVISION
2013 MAY 29 PM 3:08
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

TO:

~~FROM:~~ Russell Y. Tsuji, Land Administrator
SUBJECT: Early Consultation for Environmental Assessment for Proposed Shon Magsalin Single-Family Home in the Conservation District
LOCATION: Wa'awa'a, Puna, Hawaii, TMK: (3) 1-4-028:007
APPLICANT: Geometrician Associates, LLC

Transmitted for your review and comment is information on the above referenced project. We would appreciate your comments on this project. Please submit any comments by May 31, 2013.

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: [signature]

Print name: ALEX J. ROY
Date: 5/29/13

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-13-160

MAY 2 9 2013

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

SUBJECT: **PRE-CONSULTATION FOR PROPOSED NEW SINGLE FAMILY RESIDENCE**
Wa'awa'a, Puna, Island of Hawaii, Hawaii
TMK: (3) 1-4-028:007

Dear Mr. Terry,

We are in receipt of your correspondence dated *May 10, 2013* concerning a proposal to construct a new Single Family Residence (SFR) on the subject parcel located at Wa'awa'a, Puna District, Island of Hawaii within the Conservation District Resource Subzone.

The OCCL would like to remind you that the construction of Single Family Residence (SFR) 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.

The OCCL previously provided information regarding the development of the subject parcel and has outlined concerns regarding a proposed Single Family Residence (*HA-11-165* and *HA-3618*). Please refer to the previous correspondences, copies of which are attached to this letter.

The OCCL is requesting that the applicant address the following concerns in the Draft Environmental Assessment (DEA) and Conservation District Use Application (CDUA), along with a discussion of the comments listed above:

- According to our files the applicant was to secure a Conservation District Use Permit (CDUP) prior to *May 11, 2013* in order for the SMA permit to remain valid. Since this did not occur the OCCL is requesting that the applicant provide an updated Special Management Area (SMA) determination from the County of Hawaii;

- 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 regarding shoreline setbacks and the calculation of the maximum developable area (MDA); and

- If any landscaping is to occur as part of the proposed project the applicant should submit a landscaping plan with the DEA and CDUA for review.

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 – Department of Planning
DOFAW

Attachments: *Copy of Correspondence Letter (HA-11-165)*
Copy of Incomplete Application Letter (HA-3618)

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

GUY H. KAULUKUKUI
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
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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:TM

Correspondence: HA 11-165

MAR - 7 2011

Val Colter
12-7242 Kii Nani St.
Pahoa, HI 96778

SUBJECT: Proposed Single Family Residence (SFR) Located at Waawaa, Puna, Hawaii, TMK: (3) 1-4-028:007

Dear Mr. Colter:

The Office of Conservation and Coastal Lands (OCCL) is in receipt of your notice of preparation of an Environmental Assessment (EA) for a proposed SFR. According to the information provided, a 2-bedroom residence with two bathrooms, a living room, dining area, a kitchen and covered lanai and entry is proposed. In addition, a two car detached garage with a full bath and a catchment tank, septic system, driveway and landscaping are also proposed. The SFR will be post on pier with 6' of headroom under the house. The footprint of the residence is approximately 1436-ft² and the footprint of the garage (slab on grade) with full bath is 660-ft².

The OCCL notes the subject property lies within the Resource subzone of the Conservation District. A SFR is an identified land use that could be applied for within the Resource subzone pursuant to the Hawaii Administrative Rules, (HAR) §13-5-24, R-8 SINGLE FAMILY RESIDENCE (D-1) A single family residence that conforms to design standards as outlined in this chapter. To approve, modify or deny the construction of a SFR shall be at the discretion of the Board of Land and Natural Resources (Board).

What is currently being proposed does not appear to conform to Chapter 13-5, HAR Exhibit 4 Single Family Residential Standards of all structures connected or best alternative. Please review Chapter 13-5, HAR Exhibit 4 and insure that the proposal conforms to Exhibit 4. In regards to the water catchment and septic system, you may wish to consult with the Department of Health to insure compliance with their policies.

The coastal area of Waawaa harbors the largest pockets of older substrate lava that are surrounded by younger lava. These pockets harbor successionally older plant communities that often support unique and diverse assemblages of flora and fauna, sometimes representing genetically distinct populations of species. These older pockets of lava play an important role such as serving as a source of seed and pollen that may prove to be critical in the recolonization of surrounding younger flows. This area is a littoral lowland native forest.

The Federally listed *Ischaemum byrone,* or Hilo Beach Grass may be present throughout this coastal area. Several endangered native terrestrial vertebrates may be present in the general area

and may fly over, roost, nest, or utilize resources of the property, including the endangered Hawaiian Hawk, the endangered Hawaiian Hoary Bat, the endangered Hawaiian Petrel and the threatened Newell's Shearwater. A continual removal of forest cover will undoubtedly cause irrevocable loss of the natural and cultural resources to this area. Mitigation for the loss of existing flora should be included in the EA.

According to the Atlas of Natural Hazards in the Hawaiian Coastal Zone[1], the Nanawale shoreline under goes periodic morphologic changes due to tectonic and seismic activity associated with Kilauea Volcano. High waves are common along the rugged coastal cliffs making it dangerous for fishermen. The Overall Hazard Assessment for the subject area is moderately high. This coast is in lava flow hazard zone 2 on a scale of 9 to 1 with 1 being the most hazardous. The threat of tsunami and volcanic/seismic hazard is high due to the proximity to great seismic activity associated with Kilauea volcanism. The EA should include a discussion of these hazards and proposed mitigation.

This area does not have any public infrastructure such as municipal water or sewer service or electricity. Access to the property is through the Old Government Road that is not paved or regularly maintained. The County of Hawaii Civil Defense Agency recognizes that the area is susceptible to wild land fires due to the periodic drought conditions. The EA should discuss these challenges.

The vicinity of this area was once the site of a village. Archeological and cultural finds should be expected. A cultural impact assessment is required as part of the EA.

The Board recently approved two Conservation District Use Permits in this area. To mitigate the loss of the littoral forest resource, a proposed SFR was downsized to 2,000-ft² under roof and the other SFR was reduced to 3,000-ft² in addition to relocating the water catchment system due to a burial. All proposed landscaping in this area should be native flora.

For your information and use, Chapter 13-5, HAR and the Conservation District Use Application (CDUA) may be found at our website at hawaii.gov/dlnr/occl. Should you have any questions regarding this correspondence, contact Tiger Mills of our Office at (808) 587-0382.

Sincerely,

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

C: Chairperson
HDLO
County of Hawaii, Planning Dept.

[1] Fletcher. Grossman. Richmond & Gibbs. 2002. Atlas of Natural Hazards in the Hawaiian Coastal Z...

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

GUY H. KAULUKUKUI
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
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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:MC

File No.: CDUA HA-3618

Val Colter
12-7242 Ki`i Nani Street
Pāhoa, HI 96778

MAR - 8 2012

Subject: Conservation District Use Application (CDUA) HA-3618
Magsalin Single Family Residence
Wa`awa`a, Puna, Hawai`i
TMK (3) 1-4-028:007

The Office of Conservation and Coastal Lands (OCCL) has reviewed the Conservation District Use Application (CDUA) and Environmental Assessment (EA) you provided regarding a proposed single family residence located on the above subject parcel. The parcel is in the Resource Subzone of the State Land Use Conservation District.

OCCL finds the application and environmental assessment incomplete, and are returning them to you, along with your check.

Our office had the following concerns regarding the application:

- The calculations for the developed area do not appear to include all relevant elements of the proposal. The elevation plans show what appears to be a walkway or lanai on one side of the house, but this is not shown on the floor plans. The elevation plans should also contain a scale so that the structure height can be determined.

- The shoreline setback calculations do not appear to be consistent with the minimum setback contained in Hawai`i Administrative Rules (HAR) §13-5, CONSERVATION DISTRICT, Exhibit 4: Single Family Residential Standards. You will need to determine the Average Lot Depth (ADL) and annual coastal erosion rate to determine the setback. Exhibit 4 of §13-5 discusses how to calculate the ADL, while a qualified coastal engineer or surveyor can help in determining the coastal erosion rate. The expert should provide a defensible argument if they determine that the coastal erosion rate is zero.

- In a prior correspondence regarding the draft EA (HA-11-165) OCCL wrote that

> *The coastal area of Waawaa harbors the largest pockets of older substrate lava that are surrounded by younger lava. These pockets harbor successionally older plant communities that often support unique and diverse assemblages of flora and fauna, sometimes representing genetically distinct populations of species. These older pockets of lava play an important role such as serving as a source of seed and pollen that may prove to be critical in the recolonization of surrounding younger flows. This area is a littoral lowland native forest.*

> *The Federally listed Ischaemum byrone, or Hilo Beach Grass may be present throughout this coastal area. Several endangered native terrestrial vertebrates may be present in the general area and may fly over, roost, nest, or utilize resources of the property, including the endangered Hawaiian Hawk, the endangered Hawaiian Hoary Bat, the endangered Hawaiian Petrel and the threatened Newell's Shearwater. A continual removal of forest cover will undoubtedly cause irrevocable loss of the natural and cultural resources to this area.* ***Mitigation for the loss of existing flora should be included in the EA.***

We see no indication that these issues were addressed in the EA. There was no botanical survey, and the landscaping plan was lacking in detail. The application states that "pockets of hala" would remain, but one could infer from the site plan that almost the entire lot would be cleared of hala (*Pandanus tectorius*). Without any supporting detail it is impossible to make a proper environmental assessment.

- The application states that "a stand of hala" would remain, but it appears that almost the entire lot would be cleared of hala (*Pandanus tectorius*). The application states that the removal of 8900 ft^2 would "not pose a threat to the remaining lowland lauhala forest in the area." OCCL would note that this intact native lowland forest 1) is part of what makes Wa`awa`a unique, and 2) remains intact precisely because the State limits landowners from the whole-scale removal of the forest from lots in Conservation District. As noted in the prior correspondence, proposed residences on neighboring parcels have been scaled back to 2000 ft^2 and 3000 ft^2 in order to preserve as much of the littoral forest resource as possible.

- OCCL has previously noted that the proposed detached garage appears to violate Conservation District Single Family Residential Standards that "all structures be connected, or best alternative." Your response is that the detached residence allows for more complete landscape screening of the main building, and minimal grading.

  OCCL feels that this is a strong argument for a detached structure. However, you must provide supporting evidence that this is the case, such as with grading plans and landscaping plans. Specifically, the proposed residence appears to lie on the makai side of a steep slope, so we are not sure how the current design can be built with minimal grading.

  We also noticed that the proposed "garage" contains a full bath, given it the appearance of a rental unit rather than a parking space. Please note that this, also, is not consistent with Single Family Residential Standards.

- The records indicate that the landowner has applied for building permits from the County of Hawai`i (B2009-1646H and B2009-1654H). As we have noted in three prior correspondences with the landowner (ref. HA-07-31, HA-09-31, and HA-11-165), the landowner should secure a Conservation District Use Permit (CDUP) prior to securing County building permits.

  Based upon our correspondence with the Hawai`i Planning Department, it is our understanding that a condition of the County Permits is that you have until May 11, 2013 to secure a CDUP from the Board of Land and Natural Resources. Please

any proposed residence will need to comply with §13-5 for our office to give a positive recommendation to the BLNR.

In summary, OCCL recommends that the following be included for a complete application and environmental assessment: site plans drawn to scale, a more developed landscaping plan that is appropriate to the parcel, a clearer explanation of the grading involved in the project, and a project design that is consistent with HAR §13-5 Single Family Design Standards.

We have enclosed a copy of HAR §13-5 for your use. We have also updated the Conservation District Use Application so that it better reflects the requirements of §13-5; it can be found online at hawaii.gov/dlnr/occl.

Please contact Michael Cain at 587-0048, should you have any questions on this matter.

Sincerely,

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

cc: Chair
HI County Planning Department
OEQC

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
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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

June 5, 2013

Dr. Ron Terry
Geometrician Associates, LLC.
PO Box 396
Hilo, Hawai'i 96721
(rterry@hawaii.rr.com)

LOG NO: 2013.3415
DOC NO: 1306SN04
Archaeology

Dear Dr. Terry:

SUBJECT: **Chapter 6E-42 Historic Preservation Review –**
Early Consultation for an Environmental Assessment, Magsalin Single-Family Home
Wa'awa'a Ahupua'a, Puna District, Island of Hawai'i
TMK: (3) 1-4-028:007

Thank you for the early effort to initiate consultation with our office regarding an Environmental Assessment (EA) for this project; we received your letter on May 16, 2013. The proposed project area is located on a 0.415 acre parcel in the Wa'awa'a Subdivision, and is within the State Conservation District. In January 2011, the owner began the process of applying for an EA/CDUA, but the process was terminated. A new larger and slightly different design for the home will be covered under this present EA. Your letter indicates that the owner, Shon Magsalin intends to construct a one-story 1,436 square foot single family dwelling.

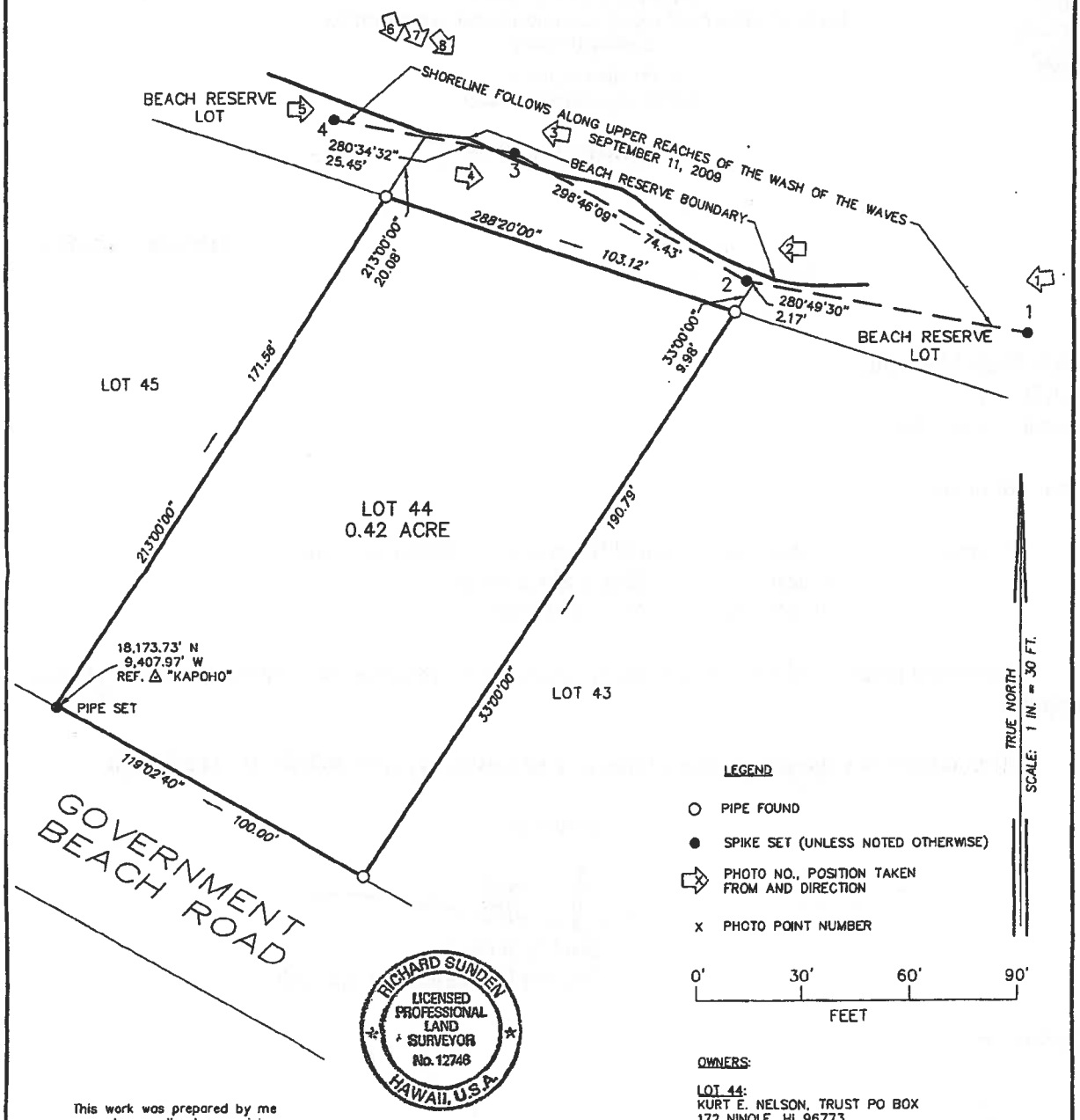
Our records indicate an archaeological assessment (Clark and Rechtman 2011) has been conducted for the parcel and it was accepted by our office in a letter dated November 8, 2011(*Log No. 2011.1369 Doc. No 1111TD06*). The report concluded that the construction of the single family dwelling would not impact any known historic properties. Additionally, features located on the parcel were determined to be modern and that no further historic preservation work is needed on this parcel. Based on current information, SHPD believes that **no historic properties will be affected** by the current project. We request the opportunity to review the EA when it is completed.

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

SHORELINE CERTIFICATION SURVEY FOR
LOT 44, WAAWAA SUBDIVISION,
A PORTION OF GRANT 3687 TO R.A. LYMAN,
WAAWAA, PUNA,
ISLAND OF HAWAII, HAWAII



LEGEND

- ○ PIPE FOUND
- ● SPIKE SET (UNLESS NOTED OTHERWISE)
- PHOTO NO., POSITION TAKEN FROM AND DIRECTION
- x PHOTO POINT NUMBER

RICHARD SUNDEN
LICENSED PROFESSIONAL LAND SURVEYOR
No. 12746
HAWAII, U.S.A.

This work was prepared by me or under my direct supervision

Richard Sunden
Licensed Professional Land Surveyor
License Number 12746
Expires 4/30/2010

NOTES:

1. PURPOSE OF THE SHORELINE IS TO DETERMINE THE BUILDING SETBACK OF LOT 44.

2. LOT 44 BOUNDARY COURSES ARE RECORD PER HAWAII COUNTY SUBDIVISION #1252.

3. CIVIC ADDRESS OF LOT 44:
14-3533 GOVERNMENT BEACH RD.
PUNA, ISLAND OF HAWAII,

OWNERS:

LOT 44:
KURT E. NELSON, TRUST PO BOX
172 NINOLE, HI 96773

TRUSTEE:
MARIA SHON MAGSALIN
P.O. BOX 172
NINOLE, HI 96773

BEACH RESERVE:
PUNA INVESTMENT COMPANY

The Independent Hawaii Surveyors, LLC
P.O. BOX 577
Hilo, HI 96721
Phone 808 959-0360
FAX 808 959-0353
info@hawaiiboundary.com

DLNR File HA-413

Date: Dec. 23, 2009
Drawing: JOB9119.dwg
TMK: (3) 1-4-28: 7

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
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

February 17, 2010

File No.: HA-413

Maria Shon Magsalin
P.O. Box 172
Ninole, Hawaii 96773

Dear Applicant:

Subject: Transmittal of Signed Shoreline Certification Maps
Owner(s): Maria Shon Magsalin
Tax Map Key: (3) 1-4-028:007

Enclosed please find two (2) copies of the certified shoreline survey maps for the subject property.

If you have any questions, please feel free to call us at (808) 587-0420. Thank you.

Sincerely,

Ian Hirokawa
Project Development Specialist

Enclosures

cc: DAGS
HDLO

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

November 8, 2011

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

LOG NO: 2011.1369
DOC NO: 1111TD06

Dear Dr. Rechtman:

Subject: **Chapter 6E-42 Historic Preservation Review –**
Draft Archaeological Assessment Report for a 0.415-Acre Parcel, Wa'awa'a Subdivision
Wa'awa'a Ahupua'a, Puna District, Island of Hawai'i
TMK: (3) 1-4-028: 007

Thank you for submitting the draft report titled *An Archaeological Assessment Survey of TMK:3-1-4-028:007, Wa'awa'a Ahupua'a, Puna District, Island of Hawai'i,* RC-0710 (M. R. Clark and R. B. Rechtman, April 2011). We received your submittal May 5, 2011, and we apologize for the delay in responding.

The report presents the findings of a 100% pedestrian survey of the subject parcel; and was conducted in connection with permits to construct a single family residence. Seven cultural features were identified, including four concrete and cobble structures (shower area, bench, lua and monument base), a borrow pit, a retaining wall and a free-standing wall segment along the property boundary. All of the features were determined to be less than 50 years in age and therefore not significant historic properties.

Based on the information provided in the report, we believe that the area was adequately covered during fieldwork, and that sufficient background information is provided to establish expected findings. We concur with the conclusion that the identified cultural features represent modern uses that occurred after the subdivision was created and after the access driveway was bulldozed through the parcel. The report contains information as required in Hawai'i Administrative Rule §13-284-5 (b) (5) and §13-276-5 (a) and (c) regarding assessment reports, and it is approved. 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 of "SHPD Library".

If you have any questions, please contact Theresa Donham at 808-933-7653 or Theresa.K.Donham@hawaii.gov.

Aloha,

Theresa K. Donham
Lead Archaeologist, Hawai'i Island Section
Historic Preservation Division

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ENVIRONMENTAL ASSESSMENT
MAGSALIN SINGLE-FAMILY RESIDENCE IN THE CONSERVATION DISTRICT AT WA'AWA'A

APPENDIX 2
Archaeological Assessment Survey

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RC-0710

An Archaeological Assessment Survey of TMK: 3-1-4-028:007

Wa'awa'a Ahupua'a
Puna District
Island of Hawai'i

FINAL VERSION

PREPARED BY:

Matthew R. Clark, B.A.
and
Robert B. Rechtman, Ph.D.

PREPARED FOR:

Shon Magsalin
Po Box 172
Ninole, HI 96773

April 2011

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: 3-1-4-028:007

Wa‘awa‘a Ahupua‘a
Puna District
Island of Hawai‘i

RECHTMAN CONSULTING

EXECUTIVE SUMMARY

At the request of Shon Magsalin, Rechtman Consulting, LLC conducted an archaeological assessment survey of a 0.415-acre conservation district parcel (TMK:3-1-4-028:007) within the Wa'awa'a Residential Subdivision, Wa'awa'a Ahupua'a, Puna District, Island of Hawai'i. The parcel is bounded to the south by the Government Beach Road, to the north by a thin oceanfront parcel, and to the east and west by undeveloped residential parcels. A bulldozed driveway with a chain across it leads from the Government Beach Road following the eastern property boundary to the *makai* portion of the property. The property owner intends to erect a single family dwelling on the parcel. This survey was undertaken in accordance with Hawai'i 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 Hawai'i 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 Hawai'i Planning Department.

O'Shaunessy (2008) previously prepared an archaeological assessment for the current project area that noted the presence of five features (TFs-1, 2, 3, 4, and 5) on the parcel including a retaining wall of indeterminate age, three cement and rock features that were part of a modern "hippy camp", and the base of a memorial erected after the murder of Dana Ireland on December 24, 1991. Intensive archaeological survey for the current study was conducted on April 8, 2011 by Matthew R. Clark, B.A. and J. David Nelson, B.A. under the direction of Robert B. Rechtman, Ph. D. Additional fieldwork at the study parcel was conducted by Matthew R. Clark, B.A. and Robert B. Rechtman, Ph. D. on April 12, 2011. During the fieldwork the entire project area was subject to east/west pedestrian transects with fieldworkers spaced at 5-meter intervals, and a scaled map of the project area showing feature locations, vegetation, and land disturbance was prepared.

Seven discrete cobble features were identified on the study parcel during the transect sweeps. All five of the temporary features (TFs) previously described by O'Shaunessy (2008) were relocated, and the presence of two additional features (TFs-6 and 7), a core-filled boundary wall and an excavated pit, was also noted. All of the features recorded on the study parcel, with the exception of TF-5, appear contemporaneous and less than fifty years old. TFs-1, 2, 3, 4, 6, and 7 were likely built within the confines of the study parcel after it was originally subdivided, the driveway was bulldozed, and *makai* western portion of the parcel was mechanically leveled. All of the mechanical alteration on the property conforms to the parcel's boundaries. TFs-4 and 6 were built along the edges of the mechanically cleared area in the *makai* portion of the study parcel, which likely served as a parking area and a location for tents. TFs-1, 2, 3, and 7 are located on a level area in the central portion of the property at the top of a slope *mauka* of TF-4. These features, which consist of a possible shower, a cobble alignment, a bench, a toilet, and an area excavated for cobble material, were likely built as part of the camp facilities by the property owners who originally had the parcel surveyed and authorized the mechanical clearing. All of these features were built, utilized, and abandoned prior to the Dana Ireland murder on December 24, 1991. A monument erected to Dana Ireland after her murder is no longer extant on the property, but the base (TF-5) is still present along the eastern property boundary to the east of the driveway. This was the most recent feature erected on the study parcel.

Given the negative findings of the current study, it is concluded that construction of a single family dwelling on the study parcel will not impact any known historic properties. It is therefore recommended that no further historic preservation work is needed. A Cultural Impact Assessment being prepared for the parcel may provide further information concerning the construction and occupation of the modern camp features recorded within the project area, and could identify cultural uses within the area.

CONTENTS

FIGURES

INTRODUCTION

At the request of Shon Magsalin, Rechtman Consulting, LLC conducted an archaeological assessment survey of a 0.415-acre conservation district parcel (TMK:3-1-4-028:007) in Wa'awa'a Ahupua'a, Puna District, Island of Hawai'i (Figures 1 and 2). The property owner intends to erect a single family dwelling on the parcel. This survey was undertaken in accordance with Hawai'i 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 Hawai'i 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 Hawai'i Planning Department.

Intended to accompany a State Conservation District Use Application (CDUA) in compliance with HRS Chapter 343, 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 survey methods and results.

BACKGROUND

To generate expectations regarding the nature of the historic properties that might exist on the study parcel, 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 studies relevant to the project area.

Project Area Description

The current project area consists of a 0.415-acre parcel located within the Wa'awa'a Residential Subdivision, Wa'awa'a Ahupua'a, Puna District, Island of Hawai'i (see Figures 1 and 2). The parcel is bounded to the south by the Government Beach Road (Figure 3), to the north by a thin oceanfront parcel (jointly owned by all of the subdivision lot owners), and to the east and west by undeveloped residential parcels. The current study parcel has 100 feet of road frontage, is 109.12 feet on its seaward side, and it measures 190.79 feet and 171.58 feet along its eastern and western boundaries, respectively. All four of the parcel's corners are clearly marked with metal pipes set in concrete, lathe, and flagging tape. A bulldozed driveway with a chain across it leads from the Government Beach Road following the eastern property boundary to the *makai* portion of the property (Figure 4).

The study parcel is situated on a 750 to 1,500 year old lava flow that originated from Kīlauea Volcano (Wolfe and Morris 1996). The project area soil is classified as *pāhoehoe* bedrock (rLW) (Sato et al. 1973), but pockets of thin organic soil have developed in the low lying bedrock areas, and within the bulldozed area in the *makai* portion of the property. A small *pali* with a wave swept *pāhoehoe* bedrock shelf beyond fronts the parcel at the coast (Figure 5). Vegetation within the project area consists primarily of a dense growth of beach *naupaka* (*Scaevola sericea*) along the shoreward side of the parcel, which transitions to a *hala* (*Pandanus odoratissimus*) forest toward the Government Beach Road. A few coconut palms (*Cocos nucifera*) are scattered across the parcel, *laua'e* fern (*Phymatosorus grossus*) is also common, and a single large tree heliotrope (*Tournefortia argentea*) is growing near the *makai* western boundary. This part of the island typically receives 60 to 100 inches of rain per year (Jurvik and Jurvik 1998).

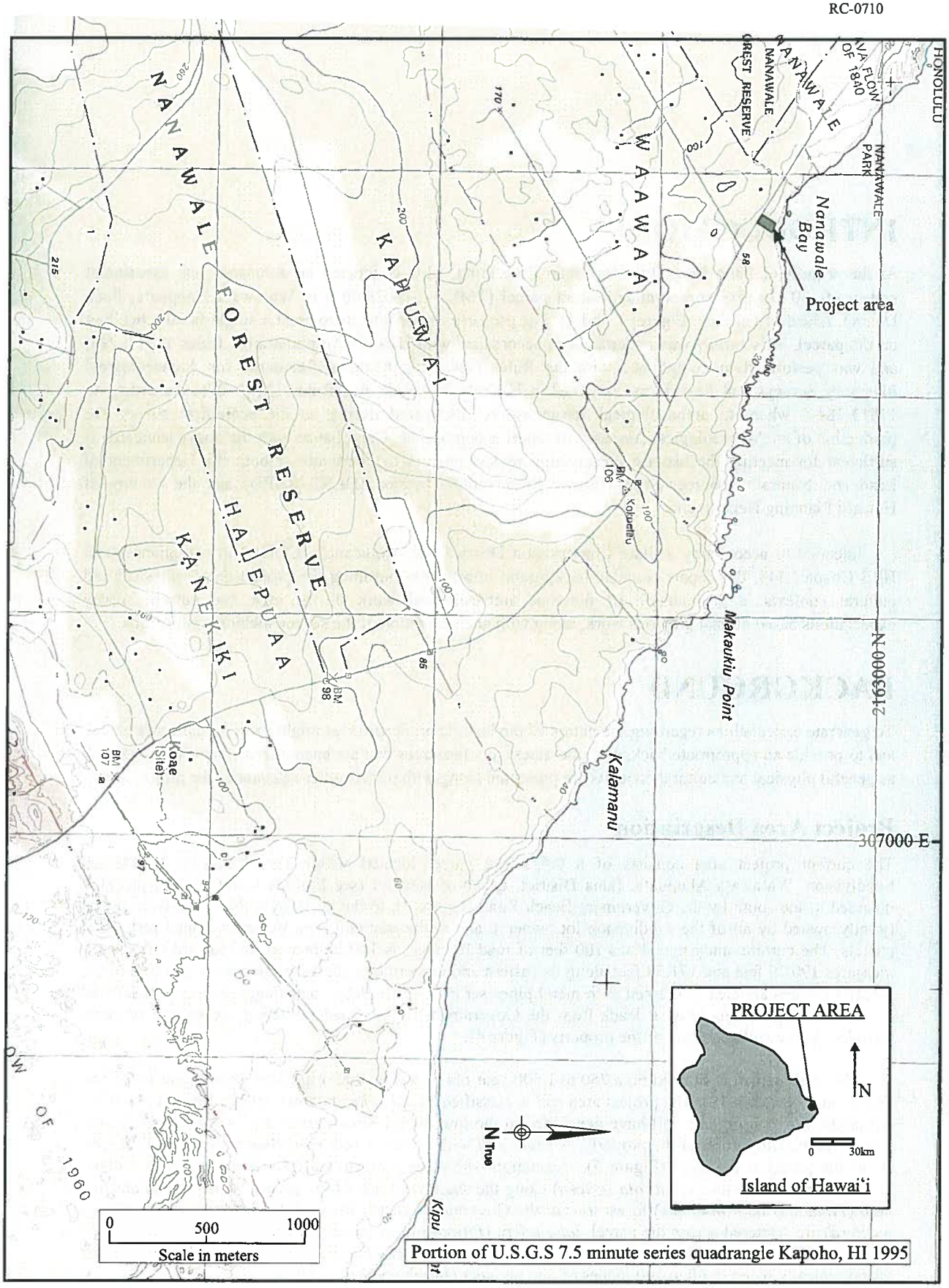

Figure 1. Project area location.

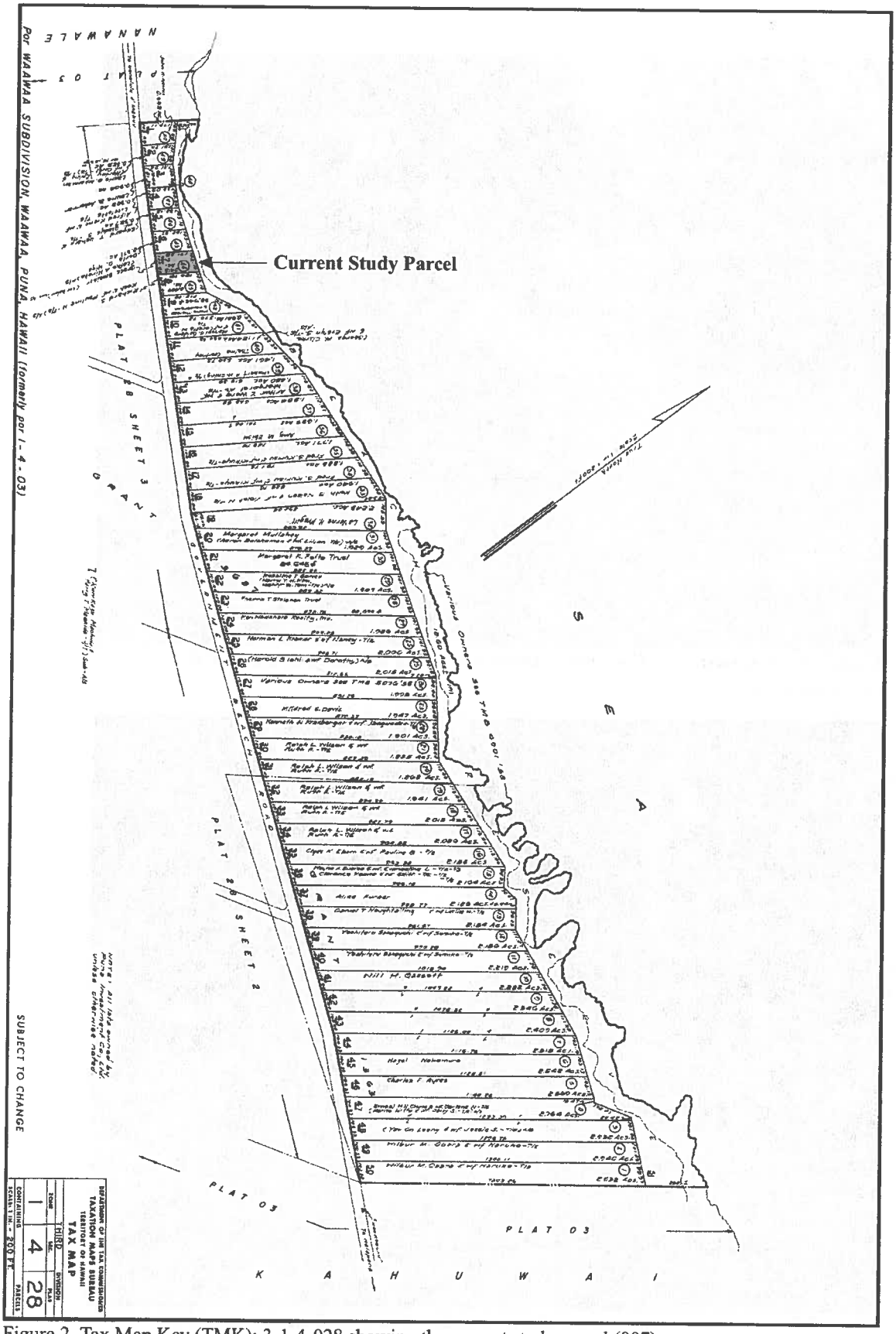

Figure 2. Tax Map Key (TMK): 3-1-4-028 showing the current study parcel (007).

Figure 3. View to west of the Government Beach Road along the *mauka* boundary of the current project area.

Figure 4. View to north of the driveway along the eastern boundary of the current project area.

Figure 5. View to north of the coastline fronting the current project area.

CULTURE-HISTORICAL CONTEXT

Archaeologists and historians describe the inhabiting of the Hawaiian Islands 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 (Rechtman and Maly 2003). More recently, however, Kirch (2010) has convincingly argued that Polynesians may not have arrived to the Hawaiian Islands until at least A.D. 1000, but expanded rapidity thereafter. 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).

Over a period of time areas with the richest natural resources became populated and perhaps crowded, and the population began expanding to the *kona* (leeward side) and more remote regions of the island (Cordy 2000:130). In Puna a few small communities were initially established along sheltered bays with access to fresh water and rich marine resources. The communities shared extended familial relations, and there was an occupational focus on the collection of marine resources. By the fourteenth century, inland elevations were being turned into dryland agricultural fields. 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 (*maka'āinana*). In the sixteenth century the population stabilized and the *ahupua'a* land management system was established as a socioeconomic unit (see Ellis 1963; Handy and Handy 1972; Kamakau 1992 [1961]; Kelly 1983; and Tomonari-Tuggle 1985). Soon, large areas of land began to be controlled by the most powerful chiefs.

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 for the diet, and the ocean provided a wealth of protein resources. Also, in communities with long-term royal residents, divisions of labor (with specialists in various occupations on land and in procurement of marine resources) came to be strictly adhered to.

The current project area is located within Wa'awa'a Ahupua'a, a land unit of the District of Puna, one of six major districts on the island of Hawai'i. Barrère (1959) summarizes 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 its 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)

The inhabitants of Puna were likewise famous for their expertise and skill in *lauhala* weaving. 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 coast between Hilo and Cape Kumakahi (Kea'au or Haena, Maku'u, Waiakahiula, Honolulu, Kahuwai, and Kula or Koa'e. The current project area is located between Honolulu and Kahuwai Villages. 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)

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 1996[1961]). 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 sea-shore, 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)

The lava flow mentioned by Wilkes that entered the sea at Nānāwale along the western boundary of Wa'awa'a Ahupua'a near the current project area occurred in 1840 just prior to the United States Exploring Expedition's tour of Puna. The flow began on May 30th, issuing from a subterranean crack about 12 miles inland. By June 3rd it had reached the coast, covering a small village there, where it flowed into the sea for three weeks. Titus Coan, who was absent from the island at time, described what witnesses of the event told him:

> . . . The atmosphere in all directions was filled with ashes, spray, gases, etc., while the burning lava as it fell into the water was shivered into millions of minute particles, and being thrown back into the airfell in showers of sand on all the surrounding country. The coast was extended into the sea for a quarter of a mile, and a pretty sand beach and new cape were formed. Three hills of scoria and sand were also formed in the sea, the lowest about two hundred and the highest about three hundred feet.

> For three weeks this terrific river disgorged itself into the sea with little abatement. Multitudes of fishes were killed, and the waters of the ocean were heated for twenty miles along the coast. The breadth of the stream where it fell into the sea, is about a half a mile, but inland it varies from one to four or five miles in width, conforming, like a river, to the fall of the country over which it flowed. The depth of the the stream will probably vary fro ten to two hundred feet, according to the inequalities of the surface over which it passed. During the flow night was converted into day on all eastern Hawaii; the light was visible for more than one hundred miles at sea; and at the distance of forty miles fine print could be read at night. (Coan in Hitchcock 1909:189-190)

In 1846, Chester S. Lyman, "a sometime professor" at Yale University visited Hilo, visited 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 3000-4000 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)

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. During the *Māhele*, land interests of the King (Kamehameha III), the high-ranking chiefs, and the low-ranking chiefs, the *konohiki,* were defined. 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).

During the *Māhele* all lands were placed in one of three categories: Crown Lands (for the occupant of the throne), Government Lands, and *Konohiki* Lands. All three types of land were subject to the rights of the native tenants therein. 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 a result of the *Māhele* of 1848, Wa'awa'a Ahupua'a was retained as Government Land. The entire *ahupua'a* was later commuted as four separate grant parcels: Grant No. 997 to Haole in 1852, Grant No. 1363 to Pakaka in 1854, Grant No. 2687 to Manamana in 1860, and Grant No. 3687 to R. A. Lyman in 1894. No Land Commission Award claims were made in Wa'awa'a Ahupua'a (Haun and Henry 2004). The current project area is located *makai* of Grant No. 997 to Haole, but was part of Grant No. 3687 to Lyman. Hawai'i Registered Map No. 1684 prepared in 1893 by A. B. Lobenstein (Figure 6) shows the Government

Road, which follows the current alignment of the Government Beach Road, and several trails running *mauka* from the road across Lyman's grant parcel. The current project area is situated *makai* of the road within an area labeled "open country below gov't road." To the east of the project area within Grant No. 1363 to Pakaka a canoe landing is shown at the coast with two canoe sheds inland.

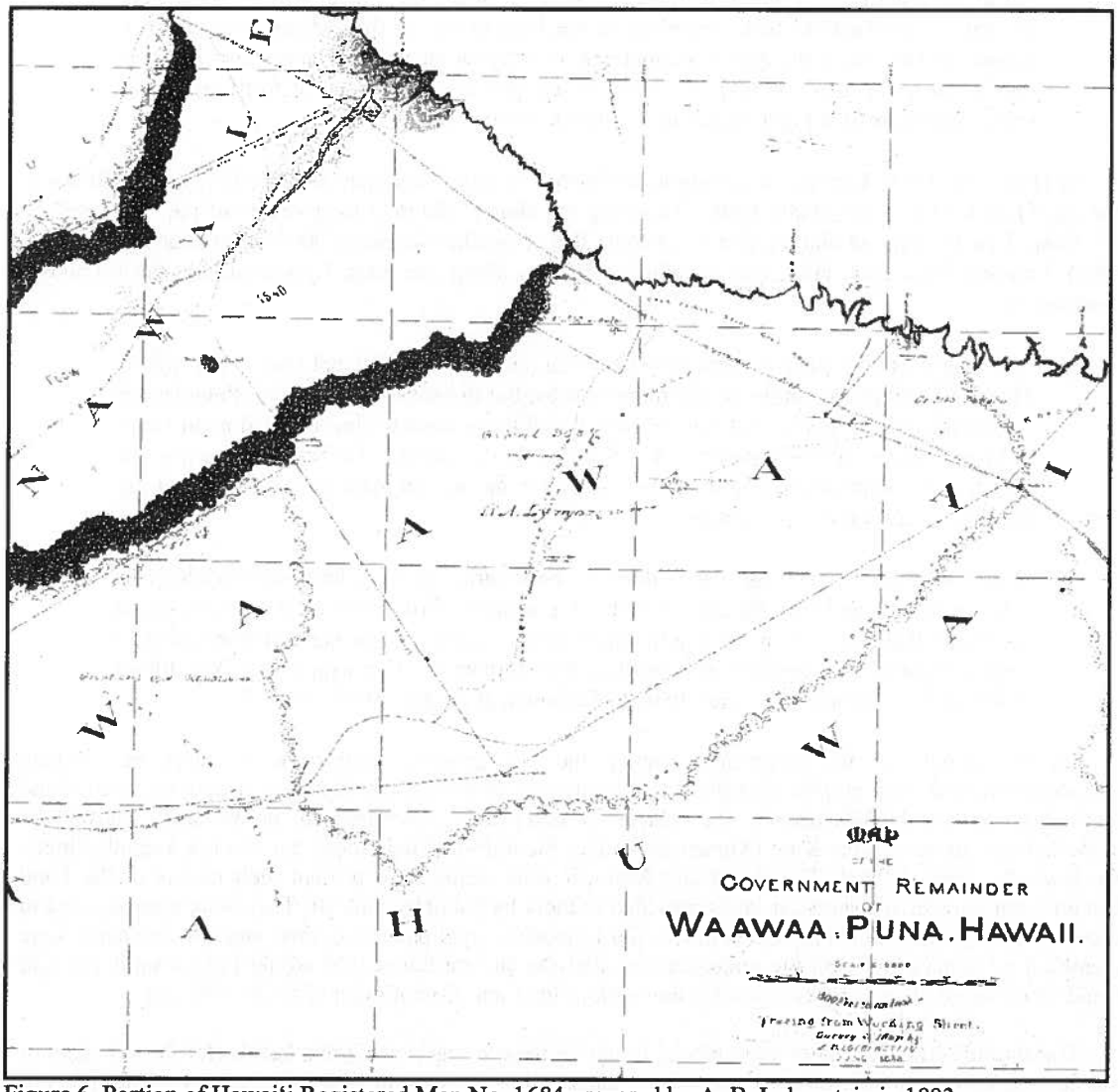

Figure 6. Portion of Hawai'i Registered Map No. 1684 prepared by A. B. Lobenstein in 1893.

During the latter part of the nineteenth century land use within Wa'awa'a Ahupua'a began to change. Yent and Ota note that the "native agricultural system began to decline around 1840 as the population declined" (1982:11). The inland portions of the *ahupua'a* (portions of Grant No. 2687 and 3687) appear to have been used for cattle ranching and possibly sugarcane cultivation. Between 1890 and 1931 the area from Wa'awa'a to Puala'a (likely including Grant No. 3687 to R. A. Lyman) was ranched by the Lyman Estate. The lease for cattle was transferred to Kamau in 1931 (Yent and Ota 1982:11). Other portions of the *ahupua'a* may have been used for sugarcane cultivation. The Puna Sugar Company operated in the vicinity of the current project area from 1900 until the 1980s (Haun and Henry 2004:7). The current project area does not appear to have been used for either purpose. An aerial photograph of the Wa'awa'a coastline taken on November 12, 1954 shows the current Government Beach Road alignment and a road running to the coast to the east of the current project area, but indicates that no structures or agricultural plots were present within Wa'awa'a Ahupua'a at this time (Figure 7).

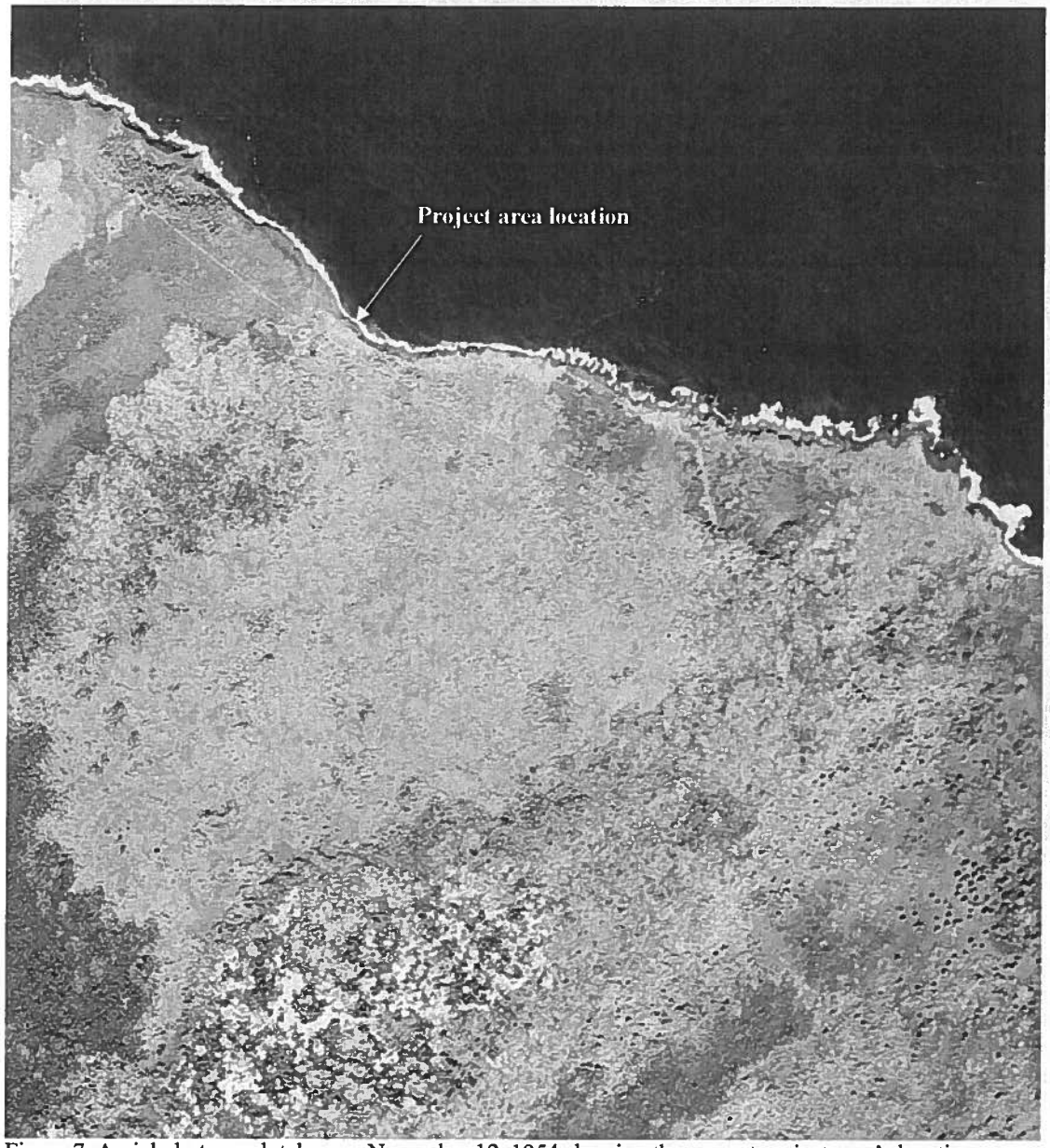

Figure 7. Aerial photograph taken on November 12, 1954 showing the current project area's location.

In more recent times small-scale agriculture, including the cultivation of orchids and papayas, has replaced the cattle and sugarcane operations in coastal Puna (Yent and Ota 1982). In 1958, a large portion of Wa'awa'a Ahupua'a, from the coast to the *mauka* boundary of Grant No. 3687, was subdivided into 177 residential lots (the Wa'awa'a Residential Subdivision). This is when the current study parcel was created. Lacking electricity and water, however, the Wa'awa'a subdivision lots were not quickly developed. An aerial photograph of the subdivision taken on February 6, 1965 shows that the subdivision roads have been bulldozed, but that as of that date none of the parcels had been developed (Figure 8). According to the Hawai'i County Real Property Tax Office the current study parcel was sold in 1987. It is not clear if the improvements to the property (i.e. the grading and camp features) were added prior to, or after, the sale. The grading of the driveway and the flat area in the *makai* portion of the parcel had certainly been completed prior to 1991.

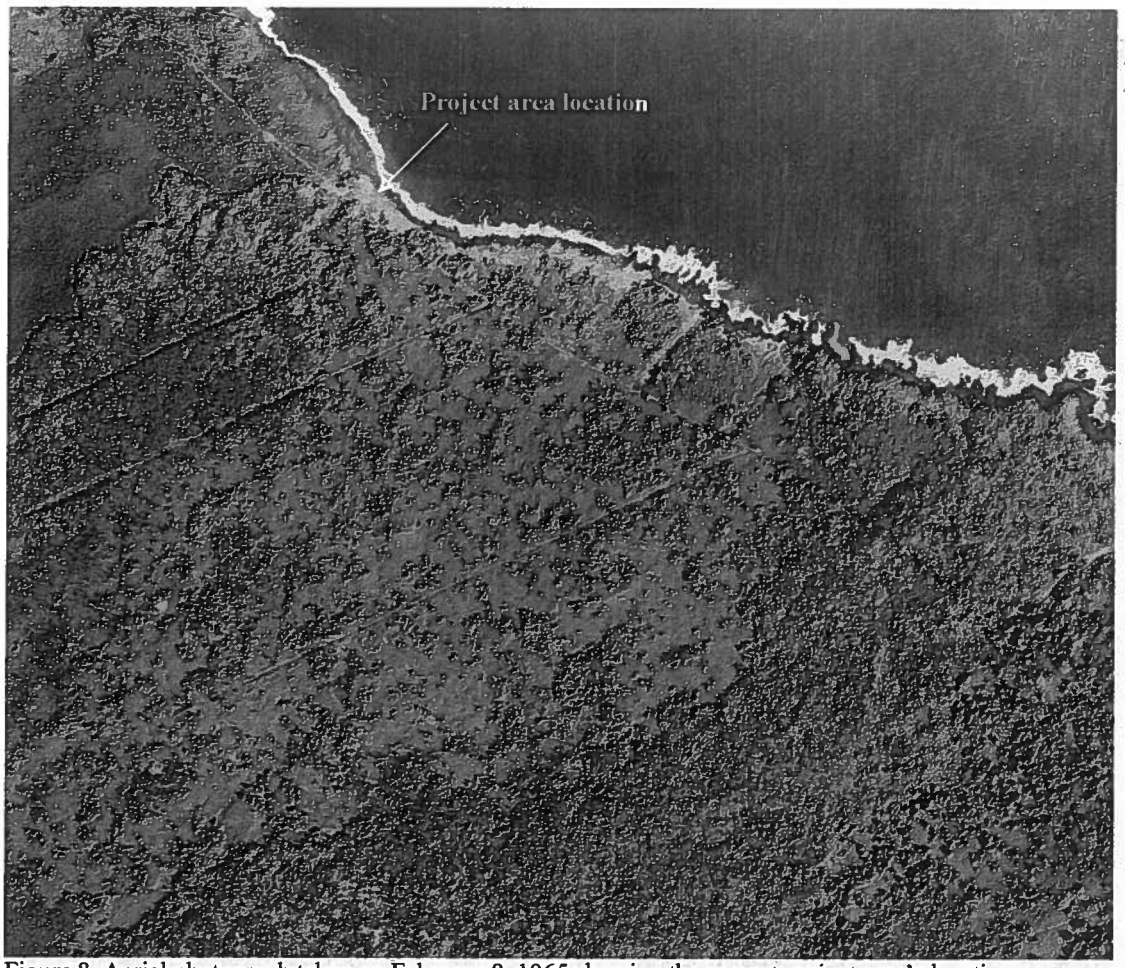

Figure 8. Aerial photograph taken on February 8, 1965 showing the current project area's location.

On December 24, 1991 an unfortunate event occurred on the subject property. According to a Honolulu Star-Bulletin Article dated Tuesday June 8, 1999 ("A Cry for Help" by Crystal Kua) around 4:45 p.m. that evening Ida Smith, a resident of the one of the houses in Wa'awa'a Subdivision located *mauka* of the Government Beach Road, heard tires screeching on a 4WD fishing trail near her house and then a faint cry of "help me, help me" emanating from what is now the current study parcel. When she went to investigate she found a 23 year old female visitor to the island from Virginia, Dana Ireland, lying in the bushes near the study parcel's driveway (the fishing trail) naked and bleeding. Dana had been struck by a car while riding her bike on Kapoho Kai Drive near Vacationland, and then taken to Wa'awa'a where she was brutally raped and beaten, and left to die. Mrs. Smith was able to flag down a passing vehicle as she went to get blankets for Dana, and the driver of that car went to call for help. Dana was eventually transported to the Hilo Hospital where she was pronounced dead at 12:25 a.m. on December 25, 1991 (Loos and Castberg 2003).

In 2000, two men, Frank Pauline Jr. and Albert Ian Schweitzer, both residents of Hawaiian Beaches Subdivision at the time of the attack, were convicted of murder, rape, and kidnapping in the Dana Ireland case. Pauline was sentenced to 180 years in prison and Schweitzer received a life's sentence. Schwietzer's younger brother Shawn, who was sixteen at the time, was present during the kidnapping, murder, and rape, but did nothing to stop it. He pleaded guilty to manslaughter and was sentenced to one year in prison and 5 years probation (Loos and Castberg 2003).

Not long after Dana Ireland's murder, a local sculptor named Jack Ryan erected a monument to Dana on the property (Figure 9). Ryan stated, "This heinous crime just blew me away, the only thing I could do was start sculpting." (The 1991 Murder Case of Dana Ireland/NowPublic Photo Archives http://www.nowpublic.com/world/1991-murder-case-dana-ireland-1). Following the murder the monument became a place for residents of Wa'awa'a and friends of Dana to leave small offerings such as shells, coral, and beach stones for her. The monument is no longer standing on the property, but the base of the statue and many of the offerings are still there.

Figure 9. Undated photograph of Dana Ireland's monument (from http://www.nowpublic.com/world/1991-murder-case-dana-ireland-1)

Previous Archaeological Research

Archaeological studies previously conducted in Wa'awa'a Ahupua'a have all examined coastal lots within the Wa'awa'a Subdivision (Figure 10). Archaeological inventory surveys have been conducted at TMKs:3-1-4-028:009, 023, 033, 038, 041, and 042 to the east of the current project area (Clark and Rechtman 2006; Corbin 2008; Haun and Henry 2002, 2004, 2010; Kirkendall and Hunt 1990), archaeological assessment surveys have been prepared for the current project area (O'Shaunessy 2008) and TMK:3-1-4-028:002 to the west of the current project area (Clark and Rechtman 2008), and a burial was inadvertently discovered within a lava tube on TMK:3-1-4-028:001 also to the west of the current project area (Rechtman 2009). Each of these previous studies is discussed in detail below.

Kirkendall and Hunt (1990) conducted an archaeological inventory survey of the inland (agriculturally zoned) portions of two coastal parcels within the Wa'awa'a Subdivision (TMKs:3-1-4-028:041 and 042) located to the east of the current project area (see Figure 10). As a result of this survey they recorded a single archaeological site (Temporary Site 1) containing 14 distinct features (Features A-N). The recorded features included two platforms (Features A and L), a modified outcrop (Feature B), four enclosures (Feature C, I, M, and N), three walls (Features D, F, and G), a walkway (Feature E), a historic roadway (Feature H), and two modified depressions (Features J and K). Six of these features (Features A, E, G, H, J, and K) were located within TMK:3-1-4-028:041, while the remaining 8 features were located within TMK:3-1-4-028:042.

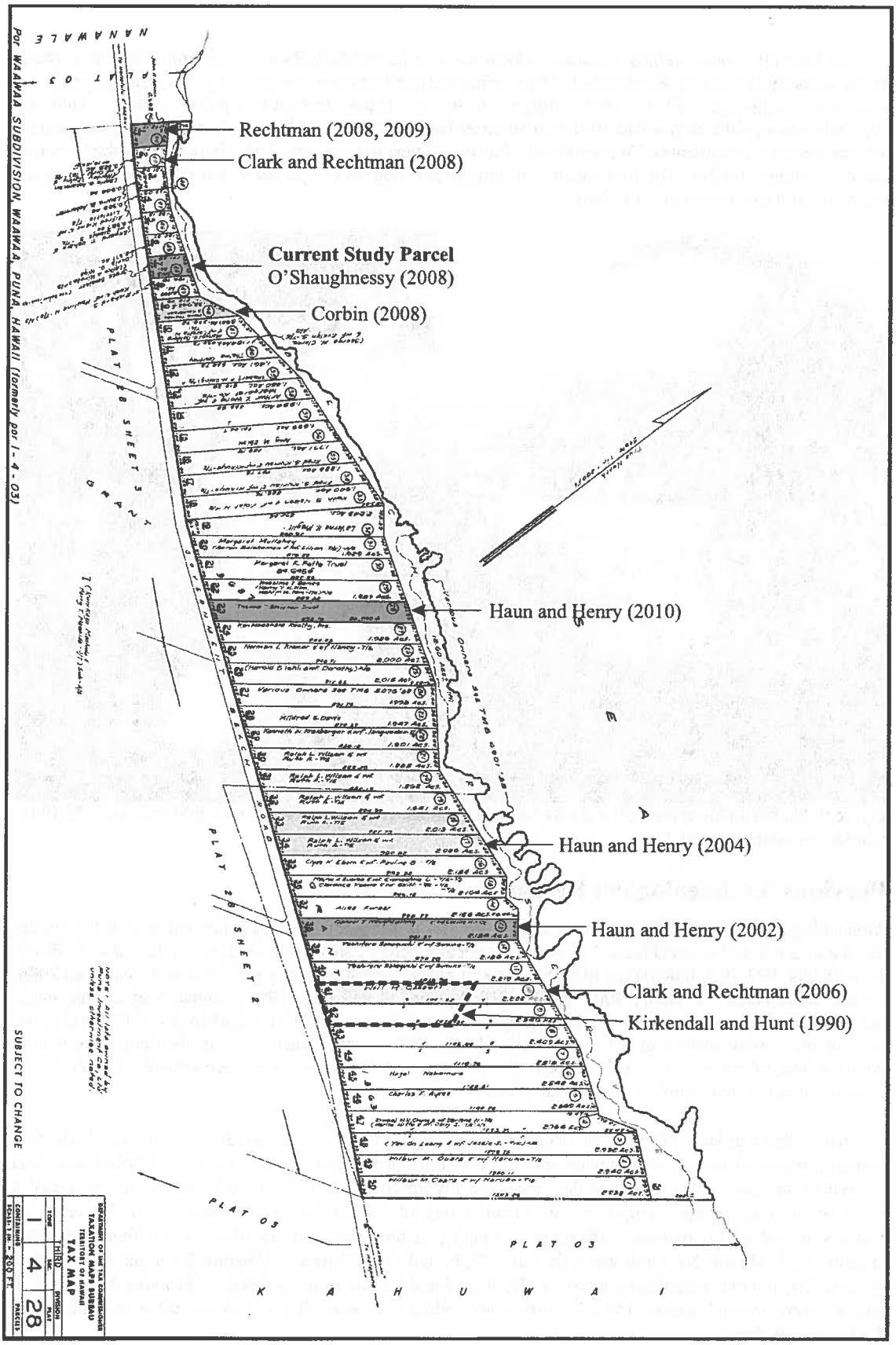

Figure 2. Previous archaeological studies conducted in the vicinity of the current project area.

Kirkendall and Hunt (1990) interpreted Temporary Site 1 as a residential complex with extensive agricultural features surrounding it. They noted that, "the two platforms, Features A and L are likely house platforms, with adjacent animal enclosures", and that, "the agricultural features are primarily unfaced depressions in the a'a", with, "rock having been removed and piled on the sides or used for walls" (Kirkendall and Hunt 1990:7). They suggested that the depressions were used for the cultivation of sweet potato and taro. They also noted that the walkway (Feature E) was likely older than the Historic roadway (Feature H), and that Feature B, based on its large size and construction, likely functioned as a *heiau* (Kirkendall and Hunt 1990:7). No interpretation was offered for the walls recorded on the parcels. As a result of the Kirkendall and Hunt (1990:8) recommend that the features of Temporary Site 1 be examined intensively and mapped in their entirety, and that a subsurface sampling strategy should be developed and carried out, prior to any land clearing on the parcels that might result in their destruction.

Haun and Henry (2002) conducted an archaeological inventory survey of TMK:3-1-4-028:038 located to the east of the current project area (see Figure 10). The survey identified five sites containing a total of 37 features. The recorded sites included a ranch wall (Site 23389), three agricultural complexes (Sites 23390, 23391, and 23393), and a habitation terrace (Site 23392). Feature types identified at these sites included twenty-four planting depressions, five modified outcrops, three terraces, two enclosures, a wall, a platform, and a possible cairn. In addition to these features, Haun and Henry (2002) also identified a portion of a Historic road, but did not assign a site number to it.

Haun and Henry (2004) conducted an archaeological inventory survey of two adjoining parcels (TMKs: 3-1-4-028:033 and 034) located to the east of the current project area and to the west of the area studied by Haun and Henery (2002) (see Figure 10). The survey identified six sites containing a total of 42 distinct features. The recorded sites included two permanent habitation complexes (Sites 23997 and 23998), a ranch wall (Site 23999), a permanent habitation enclosure (Site 24000), a burial platform (Site 24001), and an agricultural complex (Site 24002). Feature types identified at these sites consisted of fourteen excavated pits, eight enclosures, eight modified outcrops, six terraces, five walls, and one platform. Within the platform, Haun and Henry (2004) discovered a vaulted crypt that contained human skeletal remains. The agricultural features were similar to those recorded by Haun and Henry (2002). The habitation features recorded on these parcels consisted of:

> ...eight enclosures, two terraces, and several wall segments. The tested habitation features yielded volcanic glass flakes, charcoal, and marine shell. The excavation at Site 23997, Feature A, also produced a glazed ceramic fragment indicating the historic use of the feature. The wall segments and at least two of the features of Site 23997 (Features A and B), which are interpreted as yard enclosures, probably represent early historic features occupied after the free-ranging cattle became a problem in the early 1800s. If the Site 23999 connects to the Site 23389 noted by Haun and Henry (2002), then it may be part of a larger enclosure that functioned like the Kuakini Wall in Kona to keep cattle out of the coastal settlements and gardens. The presence of volcanic glass at two of the sites indicates prehistoric to early historic age, prior to the widespread use of metal cutting tools. The radiocarbon sample from Feature A at Site 23998 produced two potential age ranges: 1530-1550 and 1630-1960+. The absence of historic artifacts suggests that the site's occupation was prehistoric, but there is no basis to determine whether the former 1500s age range, or the 1630 to early 1800s portion of the latter age range, is the correct one.
>
> The relatively large number of habitation features (14) in the project area compared to a nearby parcel surveyed by Haun and Henry (2002) is probably related to the presence of a sheltered cove at the coast that would have permitted canoe access to the area, at least at times of calm weather. The other parcel, although half the area of the current project area, only had a single habitation feature. The shoreline of the adjacent parcel consisted of a low bluff that would have precluded a canoe landing. (Haun and Henry 2004:34).

Clark and Rechtman (2006) conducted an archaeological inventory survey of one of the parcels previously studied by Kirkendall and Hunt (1990) (TMK: 3-1-4-028:041) located to the east of the current project area (see Figure 10). As a result of the survey all of the features recorded by Kirkendall and Hunt (1990) in the *mauka* portion of the parcel were relocated, and additional features were recorded in the seaward portion. The features of Temporary Site 1 and the newly discovered features were separated into five archaeological sites including two agricultural complexes (Site 25516 and 25520), a core-filled wall (Site 25517), a raised trail (Site 25518), and a habitation complex (Site 25519). The identified feature types included five modified depressions, a modified outcrop, a wall, a raised walkway, a terrace, and two enclosures. The sites were all interpreted as being from the Precontact and continued early Historic Hawaiian use of the project area for habitation and agricultural purposes. Clark and Rechtman (2006) concluded that:

> . . . Primary habitation within the project area occurred at Site 25519, where a subsurface deposit of marine shell and fish bone discovered at Feature A, indicates that the nearby coastal marine resources were heavily exploited for subsistence purposes. The presence of volcanic glass flakes at Feature A may indicate that agricultural food supplies were also processed at Site 25519. Access to this site from the Government Beach Road may have been facilitated by the use of Site 25518, a raised trail that passes slightly *makai* of the habitation site from the direction of the road and continues on towards the ocean.
>
> Agriculture within the current project area was practiced at Sites 25516 and 25520, where modified depressions were likely planted with taro using the *pa-hala* method (Handy and Handy 1972). To accomplish taro cultivation using this method holes were excavated in the *'a'ā* lava within a *hala* grove, mulched with weeds, planted with a taro cutting wrapped in *hala* leaves, and then covered with *hala* leaves, which were later burned to provide the plant with nourishment. Sweet potato may have also been grown in a manner similar to this within the current project area. It is likely, since people were living on the project area into historic times, that the use of theses agricultural sites, like the use of Site 25519, also spanned the Precontact and Historic Periods.
>
> The presence of a single core-filled wall crossing the current project area suggests that perhaps ranching activities were conducted on at least the *mauka* portion of the project area during the second half of the nineteenth century and into the twentieth century (Yent and Ota 1982), or that maybe free-ranging cattle became a difficulty during the second half of the nineteenth century and the wall was constructed to control their movement away from agricultural and habitation areas (Haun and Henry 2002).

Corbin (2008) conducted an archaeological inventory survey of TMK:3-1-4-028:009 located one parcel east of the current project area (see Figure 10). As a result of the study Corbin (2008) recorded a single archaeological site (Site 26465) on the parcel that contained three features (Features A, B, and C). The recorded features included a stone platform (Feature A) interpreted as a temporary habitation feature, or perhaps a viewing platform, a stone clearing mound (Feature B), and a C-shaped wall (Feature C) located on a sloped ground surface that may have been a wind break or a planting feature. During the fieldwork Feature A was completely dismantled, revealing that most of the platform was natural bedrock, and that it lacked cultural debris. Corbin concluded that all of the features within the parcel were likely related to the agricultural use of the area during Precontact times, and that "prior to the development of modern housing in the area more such structures existed" (2008:16).

Clark and Rechtman (2008) prepared an archaeological assessment for TMK:3-1-4-028:002 located to the west of the current project area (see Figure 10). No archaeological sites were identified on that parcel, and modern debris (i.e. beer cans, fishing supplies, etc.) was the only type of cultural debris observed anywhere on the surface of the parcel, but a suspicious pile of cobbles was noted and tested. The collection of cobbles measured 2.5 meters long (east/west) by 2.0 meters wide (north/south). The north (*makai*) edge of the feature consisted of loosely stacked medium to large *pāhoehoe* cobbles standing up to 65 centimeters above the steeply sloped bedrock surface. The base of the stacking was along a vertical bedrock edge raised

40 centimeters above a thin soil pocket in a bedrock low spot. A 1 x 2 meter test unit (TU-1) was excavated in a northwesterly/southeasterly direction across the entire width of the cobble collection. Excavation of TU-1 revealed a 30 to 65-centimeter thick layer of loose cobbles (Layer I) resting on the sloped bedrock. At the base of layer I, mixed with the base course of cobbles on bedrock, a 2 to 10-centimeter thick layer of very dark brown (10YR 2/2) silt was present (Layer II). The soil layer was passed through 1/4-inch mesh screen, but no cultural material was recovered. No cultural debris of any kind was discovered within TU-1 or in the vicinity of the cobble collection. Based on the negative findings at TU-1, the loose construction of the cobble collection, and lack of any additional features on the parcel, Clark and Rechtman (2008) concluded that it was likely that cobbles were placed on the bedrock during modern times, and were therefore not an archaeological resource.

Rechtman (2008) surveyed the easternmost coastal parcel in Wa'awa'a Subdivision (TMK:3-1-4-028:001; see Figure 10) and initially reported no findings. Subsequently, while conducting a botanical study of the subject parcel, biologists discovered the opening to a small lava tube in a section of dense *naupaka* and contacted Rechtman Consulting, LLC to investigate. With the landowner's permission, Rechtman Consulting, LLC conducted a thorough examination of the lava tube and discovered a single set of badly preserved human skeletal remains; skeletal elements observed included teeth, cranial fragments, phalanges, and poorly preserved long bones. This inadvertent discovery of human skeletal remains was reported to DLNR-SHPD, and the tube was mapped and its extent projected to the ground surface, and a burial treatment plan was prepared (Rechtman 2009).

O'Shaunessy (2008) previously prepared an archaeological assessment for the current project area (see Figure 10). On December 3 and 8, 2008 O'Shaunessy conducted fieldwork at the parcel where he walked transects from east to west spaced at five meter intervals, and recorded five temporary features (TFs-1, 2, 3,4, and 5), which he sketched on a map of the parcel (Figure 11).

Figure 11. Map of temporary features recorded by O'Shaunessy (2008:9) on the current study parcel.

O'Shaunessy described the temporary features as follows:

> TF-l: This feature was found on the 4th transect, twenty meters from the southern boundary and 5 meters west of the egress. The south portion is an outcrop that has been modified with small boulders held in place with cement, is 2.2 meters long and 1.2 meters in height, with 3.5 cm being the modification. The east side of the structure is 80 cm long and 60 cm in height, basically one course of small boulders. On the makai side of the structure is a wall that is 2 meters long, and is 40 cm in height on the outside and 25 cm on the inside, and consists of 1 to 2 courses of small boulders, cemented in the 2 course section. The west side has no wall, but the rough paving ends at the area where a wall would be. Off the west side of the makai wall is a 1 course alignment that runs 3 meters to the north and "L'" s to the west, extending 2 meters, I to 2 courses of small boulders, 10 cm to 35 cm in height, forming a type of terrace. The whole structure appears to have been some type of hippy habitation site.
>
> TF-2: This feature is located on the same transect, and is 9 meters to the west (azimuth 330 degrees), and is a rock and cement bench, of the same type of construct as TF-1. The bench is 1.7 metes in length, and 60 cm in height, and is nicely curved.
>
> TF-3: 5 meters to the south (azimuth 200 degrees) is a toilet, circular, 60 cm in diameter, 45 cm in height, with a soft plastic toilet seat on top. Construct is loose small boulders on the bottom, with small boulders cemented in place on the upper section.
>
> TF-4: On transect 8, 41 meters from the mauka border is a small retaining wall, 9.3 meters in length, and 60 cm to 80 cm in height. Construct is of small boulders 2 courses to 3 courses of dry stone masonry, running on an azimuth of 280 degrees, and appears to be a modification of an outcrop, having no room for a terrace behind it.
>
> TF-5: This feature is located on the east side of the property, 20 meters from the mauka boundary, and abutting the egress. This feature is a memorial to Dana Ireland, who was murdered on this spot. It is of rock and cement construct, is 70 cm in diameter and 20 cm to 30 cm in height. The cement surface has a beer bottle and numerous small shells on it.
>
> In conclusion, TF -1, TF -2, and TF -3 appear to have been the recent handiwork of an interim resident. TF-4, the retaining wall, is of indeterminante [sic] age, and TF -5 can be dated to after the death of Dana Ireland. (2008:1-2)

Haun and Henry (2010) conducted an archaeological inventory survey of TMK:3-1-4-028:023 located to the east of the current project area (see Figure 10). The survey identified two archaeological sites (Sites 28138 and 28139) containing a total of nineteen features. Site 28138 consists of a rectangular shaped platform located near the Government Beach Road that based on the results of subsurface testing was determined to contain human skeletal remains within an oval shaped stone lined crypt. No artifacts or food remains were identified within the platform, but based on the monument's form Haun and Henry (2010) suggest that it likely post-dates the 1819 arrival of missionaries in the islands. Site 28139 is a complex of 18 agricultural features that span the inland two-thirds of the parcel. The features of this site include eight mounds, six pits, two modified outcrops, and two retaining walls. The mounds and modified outcrops were interpreted as clearing features. The pits were interpreted as planting features, and the retaining walls were interpreted as agricultural plot boundary walls that helped retain soil.

CURRENT SURVEY EXPECTATIONS

Based on the specific location, the terrain, and the small size of the project area, the archaeological expectations for the current study are limited. The results of the background research and a review of archaeological work previously conducted in the general vicinity of the parcel indicates that the primary areas of Precontact habitation were located to the east and west of the project area. Nearby Historic habitation may have occurred *mauka* of the parcel on the opposite side of the Government Beach Road at Grant No. 997 to Haole. Sections of a coastal trail are shown running *makai* of the study parcel on the TMK map for the area (see Figure 2). It is possible, although unlikely due to the *pāhoehoe* bedrock terrain, that a trail segment or a trail marker (cairn) will be present within the current project area.

Feature types previously recorded at coastal parcels within Wa'awa'a Ahupua'a, to the east of the study parcel, include modified depressions, excavated pits, modified outcrops, mounds, terraces, retaining walls, enclosures, platforms, a trail, and a possible cairn that were used for Precontact and early Historic habitation, agriculture, and burial. Walls related to Historic ranching activities were also recorded. The locations of most of these previously recorded features relative to the coast, however, places them further inland than the *mauka* boundary of the current study parcel. It is likely, due to the *pāhoehoe* bedrock terrain and the proximity to the coast, that the study parcel will not include these feature types. Corbin (2008) did record crude features related to Precontact temporary habitation and agriculture on a parcel nearby the current project area; Clark and Rechtman (2008) noted a rock pile on a parcel to the west of the project area but determined it was of modern origin; and a burial was discovered in a small coastal lava tube on a parcel neighboring that parcel (Rechtman 2009). It is possible that features similar to these may also be present within the current project area if not modified by later use of the parcel.

O'Shaunessy (2008) previously prepared an archaeological assessment for the current project area that noted the presence of five features on the parcel including a retaining wall of indeterminate age, three cement and rock features that were part of a modern "hippy camp", and the base of a memorial erected after the murder of Dana Ireland on December 24, 1991. It is expected that these features will still be present within the study parcel, but would not be considered significant historic properties as they are likely less than fifty years old.

ARCHAEOLOGICAL FIELDWORK

Intensive archaeological survey for the current study was conducted on April 8, 2011 by Matthew R. Clark, B.A. and J. David Nelson, B.A. under the direction of Robert B. Rechtman, Ph. D. Additional fieldwork at the study parcel was conducted by Matthew R. Clark, B.A. and Robert B. Rechtman, Ph. D. on April 12, 2011. During the fieldwork the entire project area was subject to east/west pedestrian transects with fieldworkers spaced at 5-meter intervals, and a scaled map of the project area showing feature locations, vegetation, and land disturbance was prepared (Figure 12).

Seven discrete cobble features were identified on the study parcel during the transect sweeps. Each feature was cleared of vegetation to a point that would allow for accurate dimensions to be taken and interpretation to be made, photographed both with and without a meter stick for scale, described using standardized feature record forms, and plotted on the map of the project area using a tape and compass. Based on location and appearance, the features were correlated in the field to the findings of the O'Shaunessy (2008) assessment survey (see Figure 11). All five of the temporary features (TFs) previously described by O'Shaunessy (2008) (TFs-1, 2, 3, 4, and 5) were relocated, and the presence of two additional features (TFs-6 and 7) was also noted. All of the features identified on the parcel are thought to be of modern origin. The presence of modern debris including cans, bottles, plastics, and other trash from camping and fishing activities was noted across the parcel, but was especially prevalent in the *makai* portion of the project area in the vicinity of TFs-4 and 6.

TFs-1, 2, 3, and 7 are all part of a camp located in the central portion of the project area on an elevated bedrock landform with a fairly level surface to the west of the driveway (see Figure 12). TFs-1, 2, and 3, a possible shower with an attached cobble alignment, a bench, and a toilet, respectively, are all made of cobbles held together with concrete, and TF-7 is an excavated pit in an area of loose cobbles that may have been a location from where materials used to construct the other three features were taken. *Hala* is the dominant vegetation in the vicinity of these features, but two large coconut palms, and several smaller ones, are also present in the area. A plastic five gallon bucket with the remains of a fish in it and box of mason jars, along with a number of beer cans, were noted nearby these features.

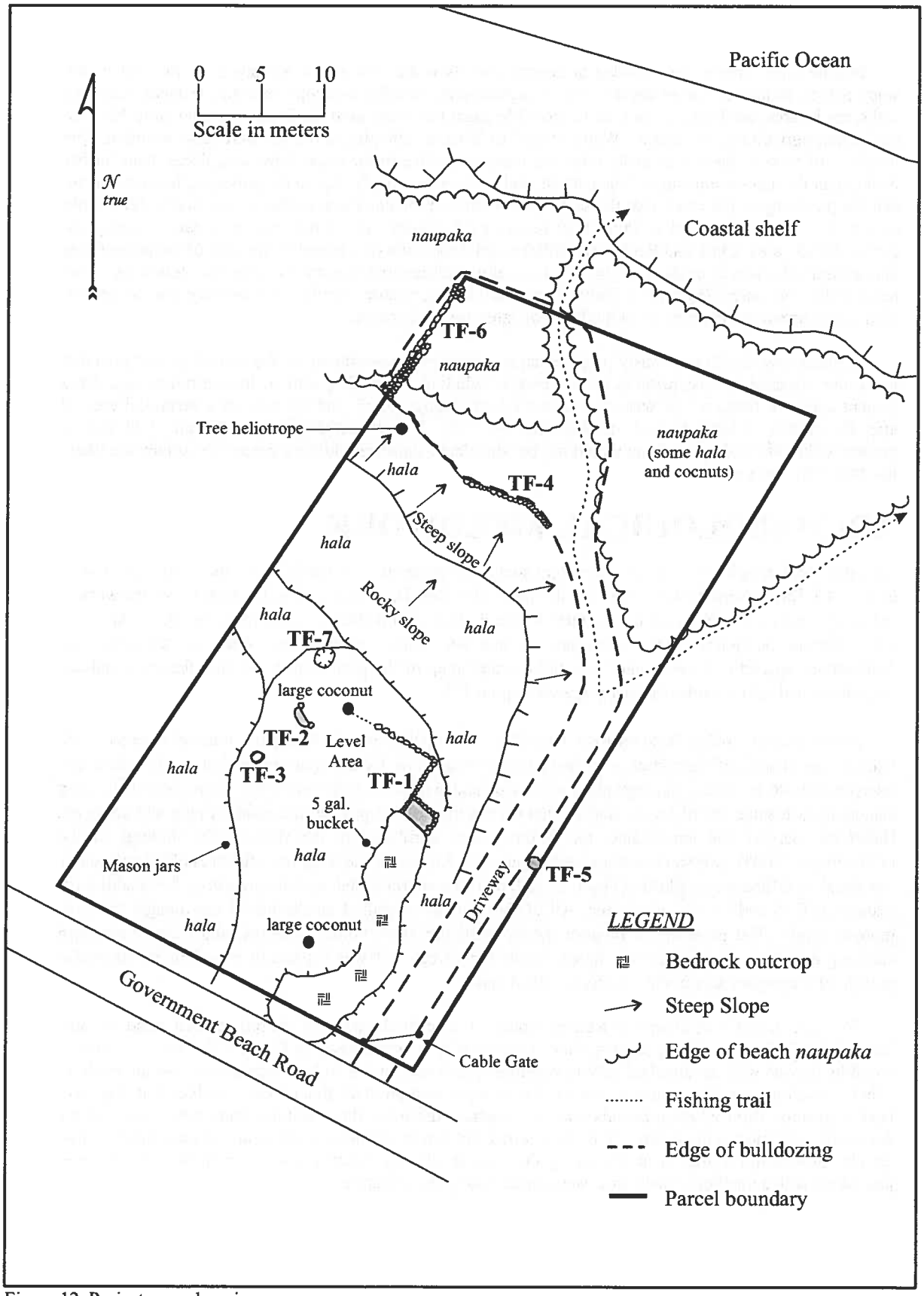

Figure 12. Project area plan view.

TF-1 is located against a nearly vertical bedrock face roughly 5 meters west of the driveway. This feature consists of a rectangular shaped, poured concrete slab, 2.5 meters long by 1.4 meters wide, that sits below (*makai* of) the 1.25 meter tall bedrock face (Figure 13). The slab is poured on a leveled base of cobbles, and the edges are lined with cobbles held together by concrete. The cobbles at the *mauka* corners of the slab are stacked to match the height of the bedrock face, but the remaining edges are only 1 or 2 cobbles high. This feature may have been the location of a shower. A small water tank with a shower nozzle attached to it could have been placed on top of the bedrock outcrop *mauka* of the feature. A plastic shower curtain hanger, a woman's shirt, and some rope were noted at this feature. The single course cobble alignment along the eastern edge of the slab runs 3 meters northeast from the corner of the slab and then turns ninety degrees and continues northwest for 7 meters stopping near the base of a large coconut palm. This alignment (Figure 14), which is not held together with concrete, stands 10-30 centimeters tall. The bedrock ground surface *makai* of the alignment slopes downward towards the coast, but the soil covered bedrock *mauka* of it is fairly level.

TF-2 is a cobble and concrete bench located 5 meters west of the TF-1 alignment's western end (see Figure 12). The bench is crescent moon shaped with two large cobbles at either point (Figure 15). It measures 1.7 meters long by 0.7 meters wide. The bench seat consists of poured concrete on a base of stacked cobbles with three holes in it to allow for drainage. The bench back (70 centimeters above ground surface) consists of stacked cobbles joined together with concrete. The bench faces the ocean.

TF-3 is a cobble and concrete toilet with a vinyl seat that is located roughly 5 meters *mauka* of TF-2 (see Figure 12). The toilet bowl is constructed of stacked cobbles held together with concrete on a base of loose cobble and boulder rubble (Figure 16). The exterior of the bowl measures 0.5 meters by 0.6 meters and stands 40 centimeters tall. The interior measures 25 centimeters in diameter by 35 centimeter deep. A vinyl toilet seat cover has been bolted in place to the concrete at the *mauka* end of the bowl.

TF-7 is an excavated pit in a loose cobble slope located 3 meters *makai* of TF-2 (see Figure 12). The pit measures 1.4 meters in diameter by 0.5 meters deep. TF-7 may have been where cobbles used to construct the TF-2 bench were taken from (Figure 17). Several modern beer cans were noted nearby TF-7.

Figure 13. TF-1, possible shower, view to southeast.

Figure 14. TF-1, cobble alignment with possible shower in background, view to southeast.

Figure 15. TF-2, bench, view to southwest.

Figure 16. TF-3, toilet, view to east.

Figure 17. TF-7, excavated pit with bench in background, view to southwest.

TF-4 and 6 are located in the *makai* western corner of the study parcel along the edges of the bulldozed area at the end of the driveway (see Figure 12). TF-4 is a retaining wall located at the base of the slope below TF-1, and TF-6 is a core-filled boundary wall that was never completed. The mechanically leveled area between the two walls appears to have been heavily utilized for camping purposes. Most of the modern trash observed on the parcel is concentrated in this general area. A sign in a *hala* tree immediately adjacent to TF-4 reads, "Private Prop. No Camping." TF-6 and the area *makai* of TF-4 are covered in a dense growth of beach *naupaka*, but the parcel's vegetation transitions primarily to *hala* at TF-4. A large heliotrope tree is growing along the edge of the bulldozed area between the two walls.

TF-4 is a cobble retaining wall located at the base of the unmodified slope along the *mauka* edge of the mechanically leveled area (see Figure 12). The wall is stacked 3-5 cobbles (30-65 centimeters) high. It runs generally east/west along the edge of the leveled area for 4.3 meters (Figure 18), and than gradually turns southwest following the edge of the driveway and continues for 5.1 meters. Two *hala* trees are growing on top of the wall where it makes the turn. The area *mauka* of the wall at the base of the slope may have been somewhat filled in. At the western end of TF-4 there is a 2. 1 meter wide level area that quickly narrows to less than a meter wide. Some cobbles have been loosely piled on the slope near the turn in the wall. Modern debris including food tins, beer cans, bottles, and a plastic garbage bag containing a broken guitar and food wrappers were present on top of TF-4 and in the surrounding area. A few *opihi* shells were also noted. TF-4 appears to have been constructed sometime after the grubbing and grading of the driveway and parking area on the parcel.

TF-6 is a low-lying core-filled wall that runs *makai* from the base of the slope, against which TF-4 is situated, along the edge of the bulldozed area to the property pin marking the northwestern corner of the parcel (see Figure 12). The wall measures 12 meters long by 0.6 meters wide, and it stands up to 0.5 meters tall (Figure 19). Construction of the *mauka* 6 meters of TF-6 has been completed, but at the *makai* end only the base cobbles of the eastern edge and a portion of the western edge have been placed. No filling has occurred between the cobbles, nor has any stacking occurred on top of them. Ground surface to the east of the wall (on the study parcel) is flat and level, while ground surface to the west of the wall (outside the study parcel) is uneven and rocky. Construction of TF-6 began after the parcel corner pin was placed and the bulldozed area was created.

TF-5 is a concrete covered cobble base to a monument erected in memory of Dana Ireland sometime after her murder on December 24, 1991. The monument base is located on the eastern property boundary along the eastern edge of the driveway (see Figure 12). TF-5 measures 80 centimeters in diameter. It consists of level concrete with a slightly raised ridge across the center of the *makai* side, and some bent metal rebar protruding from it. The concrete monument, which read "In Memory of Dana Ireland" (see Figure 9), is no longer present, and was likely destroyed by vandals. A small piece of the monument's decorative edge was noted on the surface of TF-1 during the current fieldwork, but no other pieces were found. Several offerings left to Dana Ireland at the monument including waterworn pebbles, coral pieces, shells, etc. are still present on the concrete base and in the surrounding area.

All of the features recorded on the study parcel, with the exception of TF-5, appear contemporaneous and less than fifty years old. TFs-1, 2, 3, 4, 6, and 7 were likely built within the confines of the study parcel after it was originally subdivided, the driveway was bulldozed, and *makai* western portion of the parcel was mechanically leveled. All of the mechanical alteration on the property conforms to the parcel's boundaries. TFs-4 and 6 were built along the edges of the mechanically cleared area in the *makai* portion of the study parcel, which likely served as a parking area and a location for tents. TFs-1, 2, 3, and 7 are located on a level area in the central portion of the property at the top of a slope *mauka* of TF-4. These features, which consist of a possible shower, a cobble alignment, a bench, a toilet, and an area excavated for cobble material, were likely built as part of the camp facilities by the property owners who originally had the parcel surveyed and authorized the mechanical clearing. All of these features were built, utilized, and abandoned prior to the Dana Ireland murder on December 24, 1991. The driveway, referred to as a fishing trail in the articles concerning that event, was preexisting at that time and likely so too were the nearby camp modifications. A monument erected to Dana Ireland after her murder is no longer extant on the property, but the base (TF-5) is still present along the eastern property boundary to the east of the driveway. This was the most recent feature erected on the study parcel.

Figure 18. TF-4, retaining wall, view to southwest.

Figure 19. TF-6, core-filled boundary wall, view to north.

Figure 20. TF-5, base of monument to Dana Ireland, view to east.

CONCLUSION AND RECOMMENDATIONS

Given the negative findings of the current study, it is concluded that construction of a single-family dwelling on the study parcel will not impact any known historic properties. It is therefore recommended that no further historic preservation work is needed. A Cultural Impact Assessment being prepared for the parcel may provide further information concerning the construction and occupation of the modern camp features recorded within the project area, and could identify cultural uses within the area.

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ENVIRONMENTAL ASSESSMENT
MAGSALIN SINGLE-FAMILY RESIDENCE IN THE CONSERVATION DISTRICT AT WA'AWA'A

APPENDIX 3
Cultural Impact Assessment

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RC-0710

Cultural Impact Assessment Associated with the Proposed Construction of a Single-Family Dwelling in the Wa'awa'wa Subdivision

(TMK: 3-1-4-028:007)

Wa'awa'a Ahupua'a
Puna District
Island of Hawai'i

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ARCHAEOLOGICAL, CULTURAL, AND HISTORICAL STUDIES

RC-0654

Cultural Impacts Associated with the Proposed Construction of a Single-Family Dwelling in the Wa‘awa‘wa Subdivision.

(TMK: 3-1-4-028:007)

Wa‘awa‘wa Ahupua‘a
Puna District
Island of Hawai‘i

RECHTMAN CONSULTING

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INTRODUCTION

At the request of Shon Magsalin (landowner), Rechtman Consulting, LLC has prepared this cultural impact assessment study to accompany an Environmental Assessment and a Conservation District Use Application associated with the proposed construction of a single family dwelling on TMK: (3)-1-4-028:007 in Wa'awa'wa Ahupua'a Puna, Hawai'i. (Figures 1 and 2). The 0.415-acre parcel is bounded to the south by the Government Beach Road (Figure 3), to the north by a thin oceanfront parcel, and to the east and west by undeveloped residential parcels. A bulldozed driveway with a chain across it leads from the Government Beach Road following the eastern property boundary to the *makai* portion of the property (Figure 4). The study parcel is situated on a 750 to 1,500 year old lava flow that originated from Kīlauea Volcano (Wolfe and Morris 1996). The project area soil is classified as *pāhoehoe* bedrock (rLW) (Sato et al. 1973), but pockets of thin organic soil have developed in the low lying bedrock areas, and within the bulldozed area in the *makai* portion of the property. A small *pali* with a wave swept *pāhoehoe* bedrock shelf beyond fronts the parcel at the coast (Figure 5). Vegetation within the project area consists primarily of a dense growth of beach *naupaka* (*Scaevola sericea*) along the shoreward side of the parcel, which transitions to a *hala* (*Pandanus odoratissimus*) forest toward the Government Beach Road. A few coconut palms (*Cocos nucifera*) are scattered across the parcel, *laua'e* fern (*Phymatosorus grossus*) is also common, and a single large tree heliotrope (*Tournefortia argentea*) is growing near the *makai* western boundary. This part of the island typically receives 60 to 100 inches of rain per year (Jurvik and Jurvik 1998).

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 Hawai'i, on November 19, 1997. Below is a description of the proposed development activities, a detailed cultural and historical background, and a presentation of prior studies; all of which combine to provide the physical and cultural setting and context. 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.

PROPOSED DEVELOPMENT ACTIVITIES

The landowner proposes to construct a 1,436-square-foot single-family dwelling and related improvements. The dwelling will contain two bedrooms, two bathrooms, living room, dining area, and covered *lānai* (Figure 6). A detached garage is also proposed along with water catchment and septic systems to be located on the *mauka* side of the dwelling. The project would also include minimal landscaping using mostly native or Polynesian species that are found in the area.

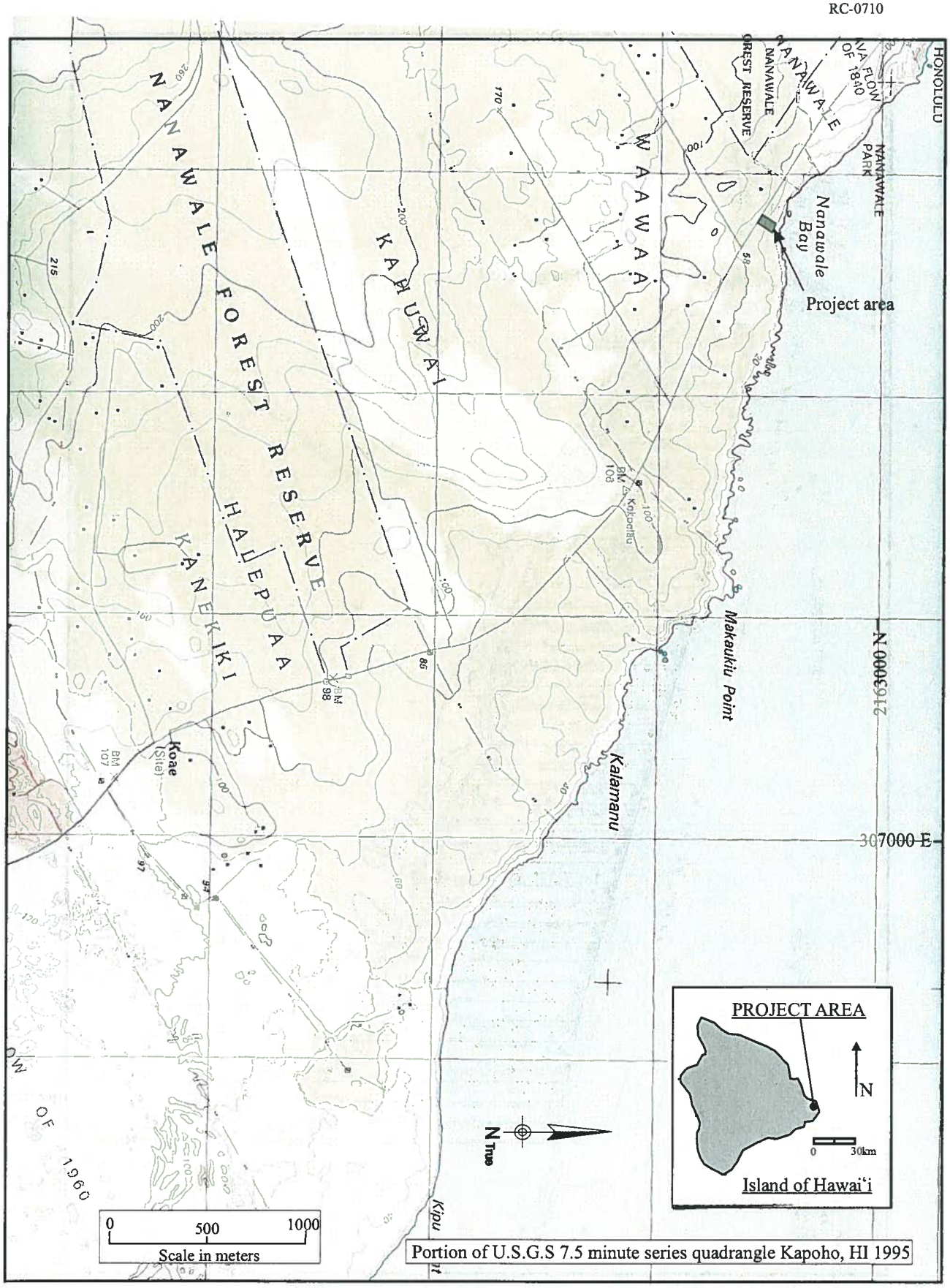

Figure 1. Project area location.

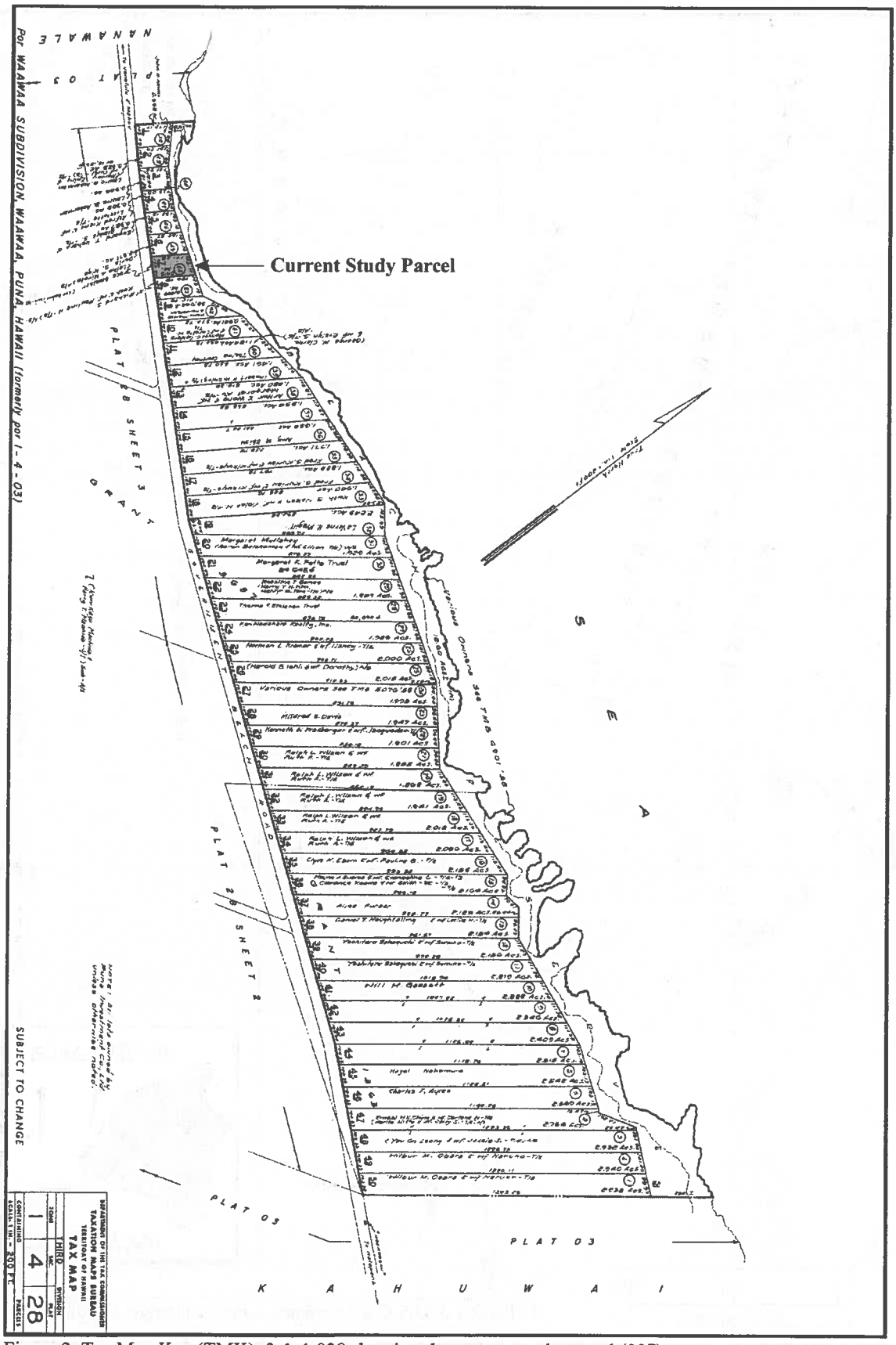

Figure 2. Tax Map Key (TMK): 3-1-4-028 showing the current study parcel (007).

Figure 3. Government Beach Road along the *mauka* boundary of the study parcel, view to the west.

Figure 4. The driveway along the eastern boundary of the study parcel, view to the north.

Figure 5. The coastline fronting the current study parcel, view to the north

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). More recently, Kirch (2010) and others (Wilmshurst et al. 2011) have suggested that the earliest Polynesian inhabitants did not arrive in Hawaii until after A.D. 1000, which if accurate will require alteration of the early part of current accepted chronology (Kirch 1985).

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 the next couple of centuries, areas with the richest natural resources became populated and perhaps crowded, and 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 1961; and Tomonari-Tuggle 1985).

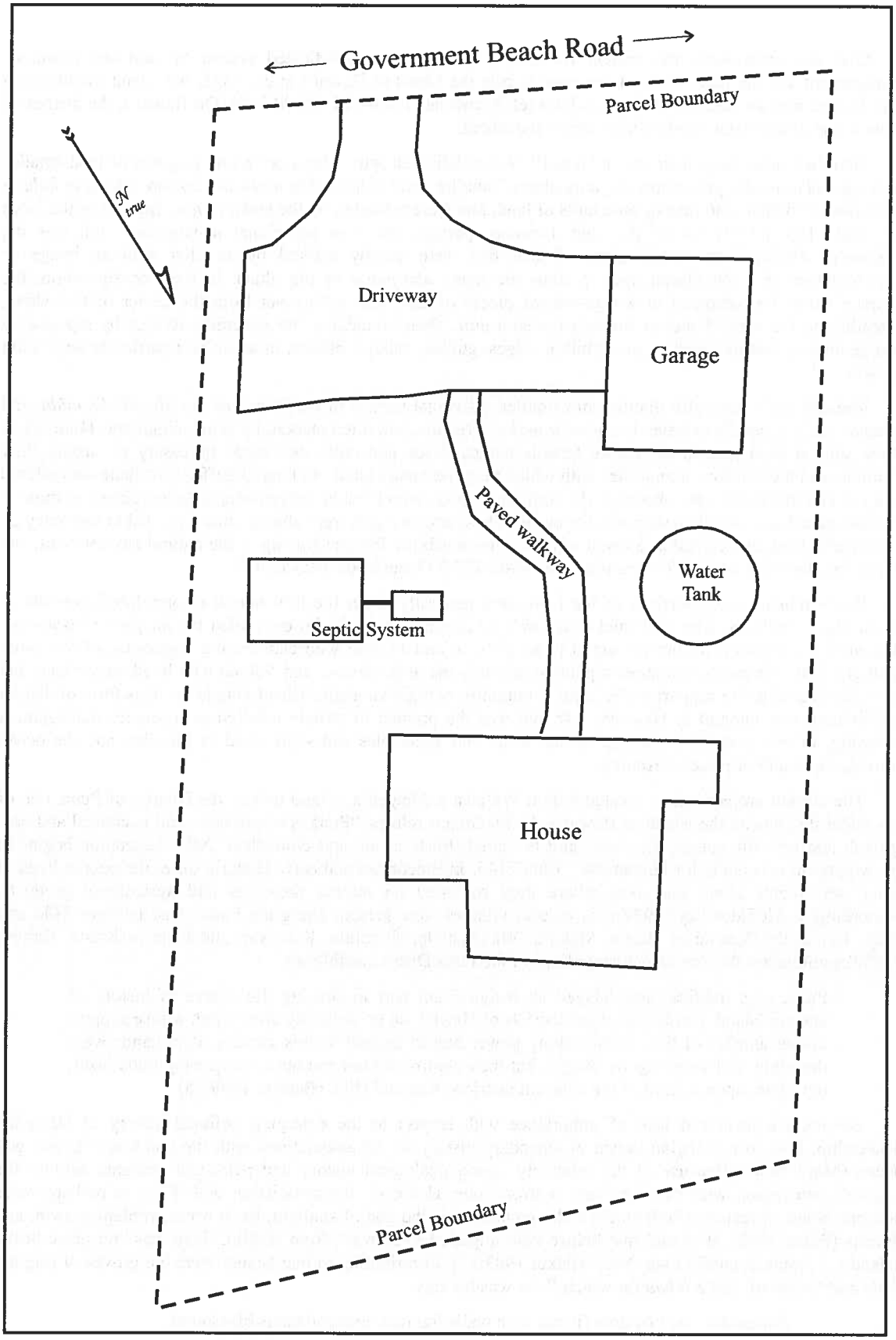

Figure 6. Proposed development plan..

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 1961:372-377 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 project area is located within Wa'awa'a 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. Barrère (1959) summarizes 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)

The inhabitants of Puna were likewise famous for their expertise and skill in *lauhala* weaving. 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 coast between Hilo and Cape Kumakahi (Kea'au or Haena, Maku'u, Waiakahiula, Honolulu, Kahuwai, and Kula or Koa'e. The current project area is located between Honolulu and Kahuwai Villages. 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]

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 1996[1961]). 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* of 1848 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). See Keme'eleihiwa (1992) for an in-depth discussion on indigenous perspectives, possible motivations, and dire outcomes of the 1848 *Māhele*. Needless to say, the *Māhele* paved the way for Hawai'i's land to be sold to foreigners.

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*, Wa'awa'a Ahupua'a was retained as Government Land. The entire *ahupua'a* was later commuted as four separate grant parcels: Grant No. 997 to Haole in 1852, Grant No. 1363 to Pakaka in 1854, Grant No. 2687 to Manamana in 1860, and Grant No. 3687 to R. A. Lyman in 1894 (Figure 7). The current project area is located *makai* of Grant No. 997 to Haole, but was part of Grant No. 3687 to Lyman. No Land Commission Award claims were made in Wa'awa'a Ahupua'a (Haun and Henry 2004).

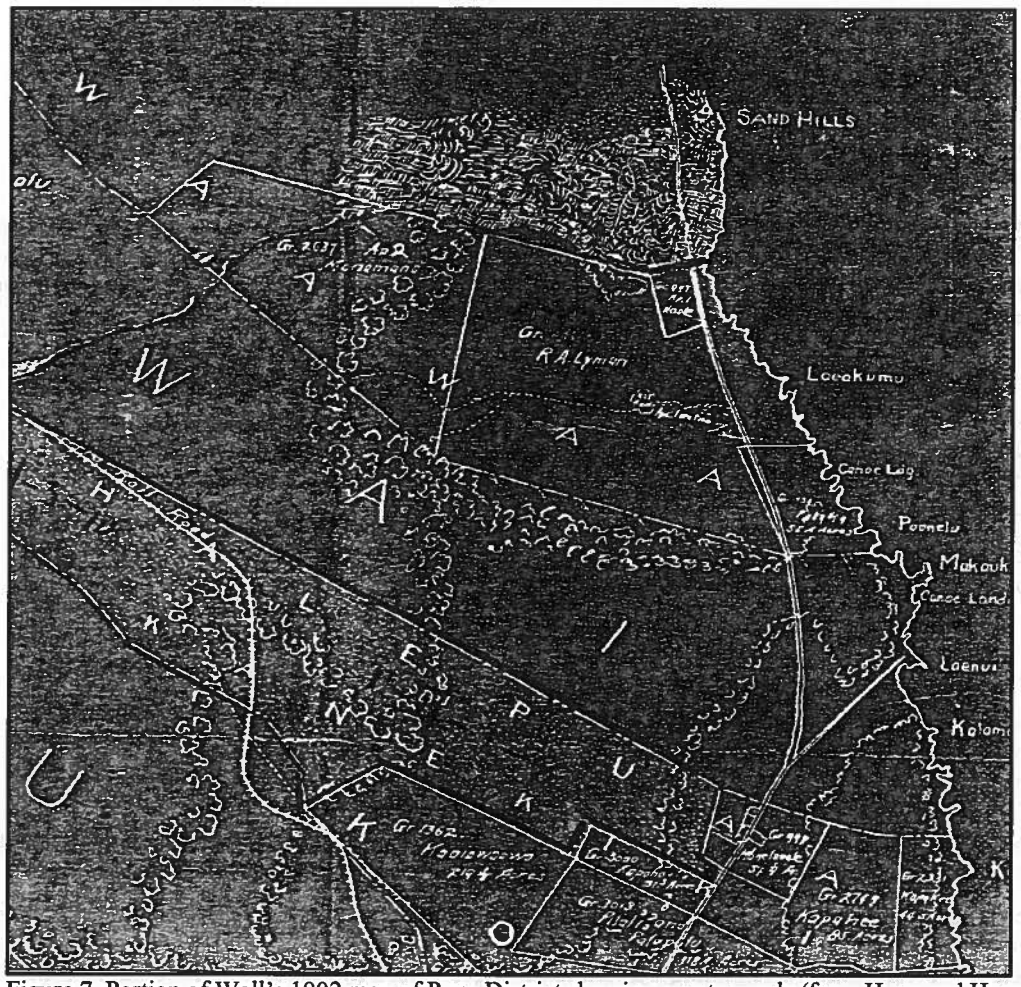

Figure 7. Portion of Wall's 1902 map of Puna District showing grant parcels (from Haun and Henry 2004).

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 Wa'awa'a was retained as government land, it boundaries were not set by the land commission.

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.

During the latter part of the nineteenth century land use within Wa'awa'a Ahupua'a began to change. Yent and Ota note that the "native agricultural system began to decline around 1840 as the population declined" (1982:11). The inland portions of the *ahupua'a* (portions of Grant No. 2687 and 3687) appear to have been used for cattle ranching and possibly sugarcane cultivation. Between 1890 and 1931 the area from Wa'awa'a to Puala'a (likely including Grant No. 3687 to R. A. Lyman in 1894) was ranched by the Lyman Estate. The lease for cattle was transferred to Kamau in 1931 (Yent and Ota 1982:11). Other portions of the *ahupua'a* may have been used for sugarcane cultivation. The Puna Sugar Company operated in the Wa'awa'a from 1900 until the

1980s (Haun and Henry 2004:7). The current project area does not appear to have been used for either purpose. An aerial photograph of the Wa'awa'a coastline taken on November 12, 1954 shows the current Government Beach Road alignment and a road running to the coast to the east of the current project area, but indicates that no structures or agricultural plots were present within Wa'awa'a Ahupua'a at this time (Figure 7).

In more recent times small-scale agriculture, including the cultivation of orchids and papayas, has replaced the cattle and sugarcane operations (Yent and Ota 1982). In 1958, a large portion of Wa'awa'a Ahupua'a, from the coast to the *mauka* boundary of Grant No. 3687, was subdivided into 177 residential lots (the Wa'awa'a Residential Subdivision). This is when the current study parcel was created. Lacking electricity and water, however, the Wa'awa'a subdivision lots were not quickly developed. An aerial photograph of the subdivision taken on February 6, 1965 shows that the subdivision roads have been bulldozed, but that as of that date none of the parcels had been developed (Figure 8). According to the Hawai'i County Real Property Tax Office the current study parcel was sold in 1987. It is not clear if the improvements to the property (i.e. the grading and camp features) were added prior to, or after, the sale. The grading of the driveway and the flat area in the *makai* portion of the parcel had certainly been completed prior to 1991.

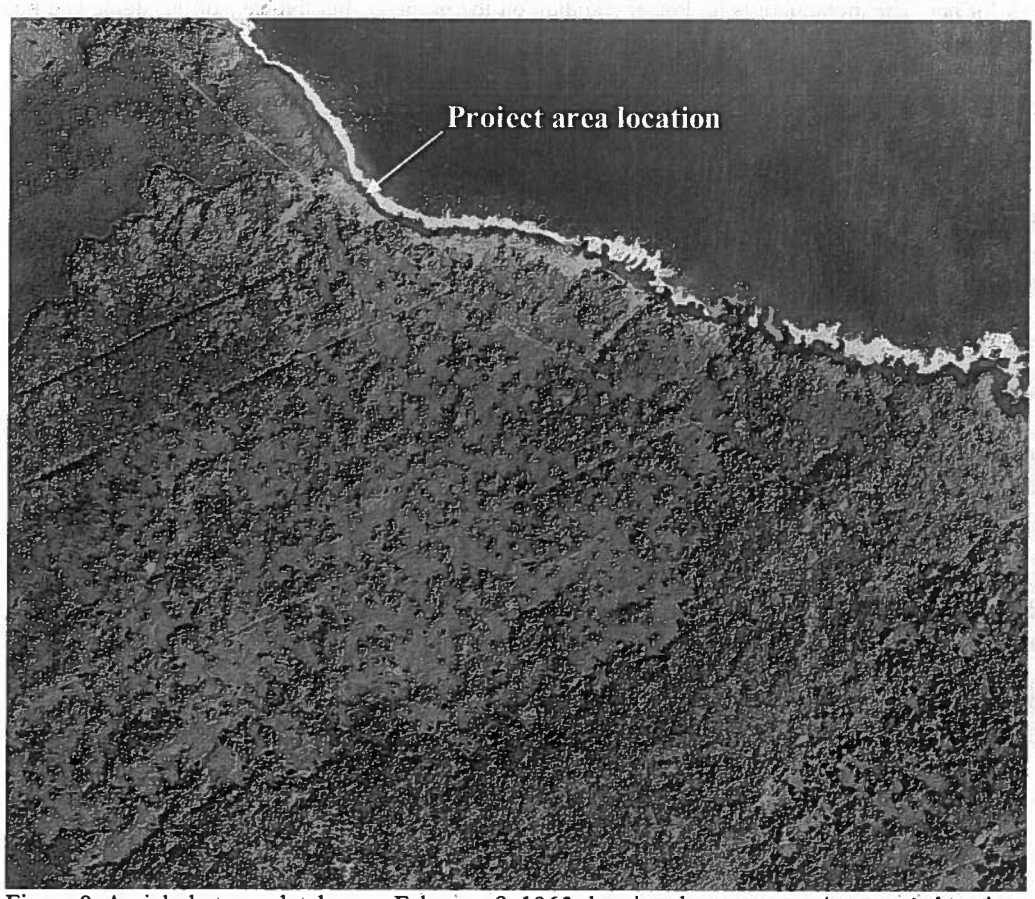

Figure 8. Aerial photograph taken on February 8, 1965 showing the current project area's location.

On December 24, 1991 an unfortunate event occurred on the subject property. According to a Honolulu Star-Bulletin Article dated Tuesday June 8, 1999 ("A Cry for Help" by Crystal Kua) around 4:45 p.m. that evening Ida Smith, a resident of the one of the houses in Wa'awa'a Subdivision located *mauka* of the Government Beach Road, heard tires screeching on a 4WD fishing trail near her house and then a faint cry of "help me, help me" emanating from what is now the current study parcel. When she went to investigate she found a 23 year old female visitor to the island from Virginia, Dana Ireland, lying in the bushes near the study parcel's driveway (the fishing trail) naked and bleeding. Dana had been struck by a car while riding her bike on Kapoho Kai Drive near Vacationland, and then taken to Wa'awa'a where she was brutally raped and beaten,

and left to die. Mrs. Smith was able to flag down a passing vehicle as she went to get blankets for Dana, and the driver of that car went to call for help. Dana was eventually transported to the Hilo Hospital where she was pronounced dead at 12:25 a.m. on December 25, 1991 (Loos and Castberg 2003).

In 2000, two men, Frank Pauline Jr. and Albert Ian Schweitzer, both residents of Hawaiian Beaches Subdivision at the time of the attack, were convicted of murder, rape, and kidnapping in the Dana Ireland case. Pauline was sentenced to 180 years in prison and Schweitzer received a life's sentence. Schwietzer's younger brother Shawn, who was sixteen at the time, was present during the kidnapping, murder, and rape, but did nothing to stop it. He pleaded guilty to manslaughter and was sentenced to one year in prison and 5 years probation (Loos and Castberg 2003).

Not long after Dana Ireland's murder, a local sculptor named Jack Ryan erected a monument to Dana on the property (Figure 9). Ryan stated, "This heinous crime just blew me away, the only thing I could do was start sculpting." (The 1991 Murder Case of Dana Ireland/NowPublic Photo Archives http://www.nowpublic.com/world/1991-murder-case-dana-ireland-1). Following the murder the monument became a place for residents of Wa'awa'a and friends of Dana to leave small offerings such as shells, coral, and beach stones for her. The monument is no longer standing on the property, but the base of the statue and many of the offerings are still there.

Figure 9. Undated photograph of Dana Ireland's monument (from http://www.nowpublic.com/world/1991-murder-case-dana-ireland-1)

PRIOR STUDIES

Rechtman and Bautista (2010) completed a cultural impact assessment for a nearby parcel (TMK:3-1-4-028:001), which contained a lava tube with a traditional Hawaiian burial. Consultation associated with that parcel was conducted with members of the Kawaaloa Family and the Kanaka Council (see also Rechtman 2009). Based on the archival research and oral consultations, there were no on-going cultural practices identified for the parcel. Additionally a cultural assessment study (Maly 1998) for the Puna *ahupua'a* of 'Ahalanui, Laepāo'o and Oneloa located to the east of the current study area was also reviewed. That project area contains numerous archaeological and burial sites, and is a locus of cultural practices associated resources collection and stewardship. Maly reported that based on the commitments of the landowner to preserve and protect the resources, the cultural interviewees felt that the then proposed project would "have no adverse effect on the lands of Ahalanui, Laepāo'o and Oneloa." (1999:iii).

Archaeological studies previously conducted in Wa'awa'a Ahupua'a have all examined coastal lots within the Wa'awa'a Subdivision (Figure 10). Archaeological inventory surveys have been conducted at TMKs:3-1-4-028:009, 023, 033, 038, 041, and 042 to the east of the current project area (Clark and Rechtman 2006; Corbin 2008; Haun and Henry 2002, 2004, 2010; Kirkendall and Hunt 1990), and TMKs:3-1-4-028:001, 002 to the west of the current project area (Clark and Rechtman 2008; Rechtman 2008), and a burial was inadvertently discovered within a lava tube on TMK:3-1-4-028:001 also to the west of the current project area (Rechtman 2009). Two archaeological assessment surveys have been prepared for the current project area (O'Shaunessy 2008; Clark and Rechtman 2011). Each of these previous studies is discussed in detail below.

Kirkendall and Hunt (1990) conducted an archaeological inventory survey of the inland (agriculturally zoned) portions of two coastal parcels within the Wa'awa'a Subdivision (TMKs:3-1-4-028:041 and 042) located to the east of the current project area (see Figure 10). As a result of that survey they recorded a single archaeological site (Temporary Site 1) containing 14 distinct features (Features A-N). The recorded features included two platforms (Features A and L), a modified outcrop (Feature B), four enclosures (Feature C, I, M, and N), three walls (Features D, F, and G), a walkway (Feature E), a historic roadway (Feature H), and two modified depressions (Features J and K). Six of these features (Features A, E, G, H, J, and K) were located within TMK:3-1-4-028:041, while the remaining 8 features were located within TMK:3-1-4-028:042.

Kirkendall and Hunt (1990) interpreted Temporary Site 1 as a residential complex with extensive agricultural features surrounding it. They noted that, "the two platforms, Features A and L are likely house platforms, with adjacent animal enclosures", and that, "the agricultural features are primarily unfaced depressions in the a'a", with, "rock having been removed and piled on the sides or used for walls" (Kirkendall and Hunt 1990:7). They suggested that the depressions were used for the cultivation of sweet potato and taro. They also noted that the walkway (Feature E) was likely older than the Historic roadway (Feature H), and that Feature B, based on its large size and construction, likely functioned as a *heiau* (Kirkendall and Hunt 1990:7). No interpretation was offered for the walls recorded on the parcels. As a result of the Kirkendall and Hunt (1990:8) recommend that the features of Temporary Site 1 be examined intensively and mapped in their entirety, and that a subsurface sampling strategy should be developed and carried out, prior to any land clearing on the parcels that might result in their destruction.

Haun and Henry (2002) conducted an archaeological inventory survey of TMK:3-1-4-028:038 located to the east of the current project area (see Figure 10). The survey identified five sites containing a total of 37 features. The recorded sites included a ranch wall (Site 23389), three agricultural complexes (Sites 23390, 23391, and 23393), and a habitation terrace (Site 23392). Feature types identified at these sites included twenty-four planting depressions, five modified outcrops, three terraces, two enclosures, a wall, a platform, and a possible cairn. In addition to these features, Haun and Henry (2002) also identified a portion of a Historic road, but did not assign a site number to it.

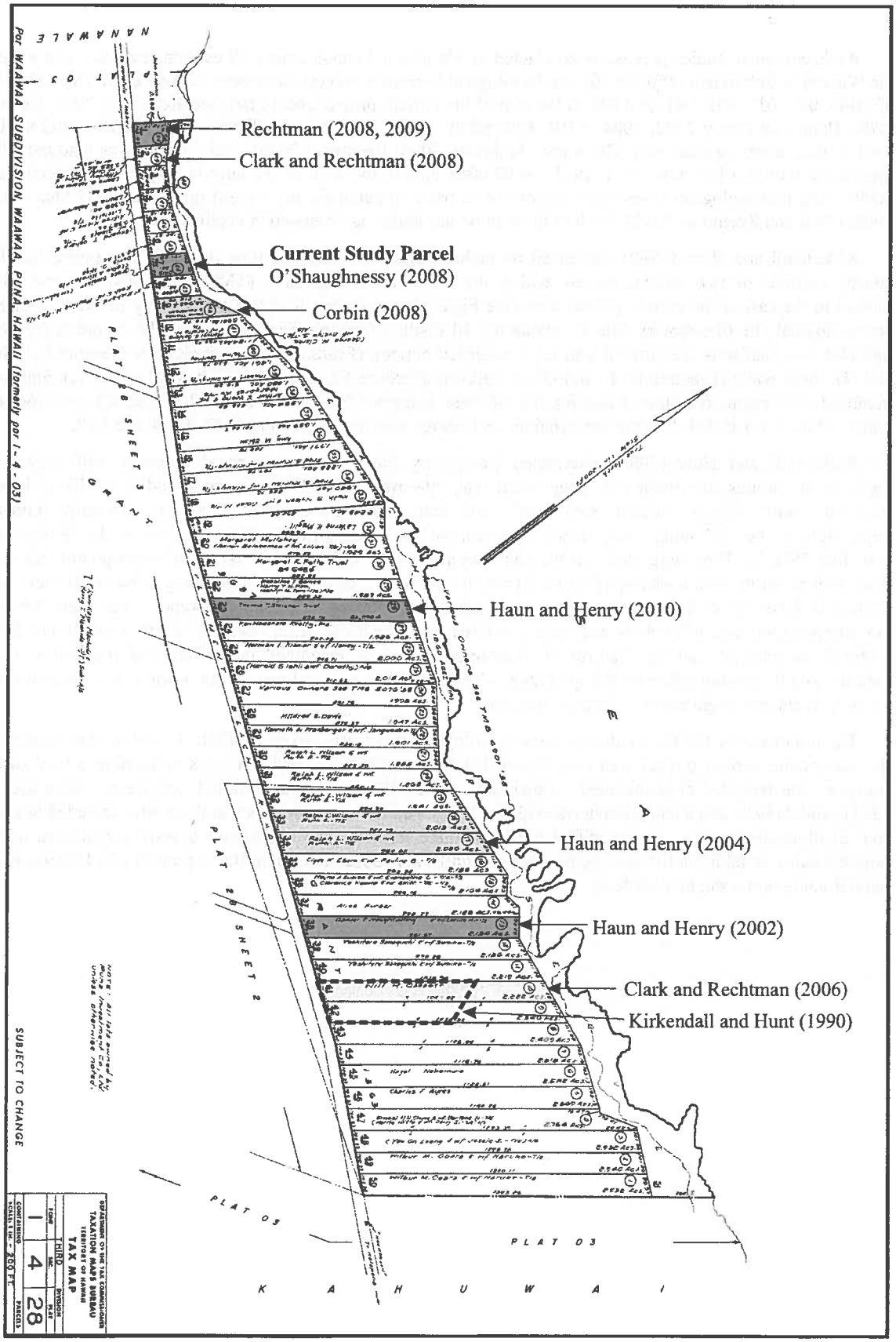

Figure 2. Previous archaeological studies conducted in the vicinity of the current project area.

Haun and Henry (2004) conducted an archaeological inventory survey of two adjoining parcels (TMKs: 3-1-4-028:033 and 034) located to the east of the current project area and to the west of the area studied by Haun and Henry (2002) (see Figure 10). The survey identified six sites containing a total of 42 distinct features. The recorded sites included two permanent habitation complexes (Sites 23997 and 23998), a ranch wall (Site 23999), a permanent habitation enclosure (Site 24000), a burial platform (Site 24001), and an agricultural complex (Site 24002). Feature types identified at these sites consisted of fourteen excavated pits, eight enclosures, eight modified outcrops, six terraces, five walls, and one platform. Within the platform, Haun and Henry (2004) discovered a vaulted crypt that contained human skeletal remains. The agricultural features were similar to those recorded by Haun and Henry (2002). The habitation features recorded on these parcels consisted of:

> ...eight enclosures, two terraces, and several wall segments. The tested habitation features yielded volcanic glass flakes, charcoal, and marine shell. The excavation at Site 23997, Feature A, also produced a glazed ceramic fragment indicating the historic use of the feature. The wall segments and at least two of the features of Site 23997 (Features A and B), which are interpreted as yard enclosures, probably represent early historic features occupied after the free-ranging cattle became a problem in the early 1800s. If the Site 23999 connects to the Site 23389 noted by Haun and Henry (2002), then it may be part of a larger enclosure that functioned like the Kuakini Wall in Kona to keep cattle out of the coastal settlements and gardens. The presence of volcanic glass at two of the sites indicates prehistoric to early historic age, prior to the widespread use of metal cutting tools. The radiocarbon sample from Feature A at Site 23998 produced two potential age ranges: 1530-1550 and 1630-1960+. The absence of historic artifacts suggests that the site's occupation was prehistoric, but there is no basis to determine whether the former 1500s age range, or the 1630 to early 1800s portion of the latter age range, is the correct one.
>
> The relatively large number of habitation features (14) in the project area compared to a nearby parcel surveyed by Haun and Henry (2002) is probably related to the presence of a sheltered cove at the coast that would have permitted canoe access to the area, at least at times of calm weather. The other parcel, although half the area of the current project area, only had a single habitation feature. The shoreline of the adjacent parcel consisted of a low bluff that would have precluded a canoe landing. (Haun and Henry 2004:34).

Clark and Rechtman (2006) conducted an archaeological inventory survey of one of the parcels previously studied by Kirkendall and Hunt (1990) (TMK: 3-1-4-028:041) located to the east of the current project area (see Figure 10). As a result of the survey all of the features recorded by Kirkendall and Hunt (1990) in the *mauka* portion of the parcel were relocated, and additional features were recorded in the seaward portion. The features of Temporary Site 1 and the newly discovered features were separated into five archaeological sites including two agricultural complexes (Site 25516 and 25520), a core-filled wall (Site 25517), a raised trail (Site 25518), and a habitation complex (Site 25519). The identified feature types included five modified depressions, a modified outcrop, a wall, a raised walkway, a terrace, and two enclosures. The sites were all interpreted as being from the Precontact and continued early Historic Hawaiian use of the project area for habitation and agricultural purposes. Clark and Rechtman (2006) concluded that:

> . . . Primary habitation within the project area occurred at Site 25519, where a subsurface deposit of marine shell and fish bone discovered at Feature A, indicates that the nearby coastal marine resources were heavily exploited for subsistence purposes. The presence of volcanic glass flakes at Feature A may indicate that agricultural food supplies were also processed at Site 25519. Access to this site from the Government Beach Road may have been facilitated by the use of Site 25518, a raised trail that passes slightly *makai* of the habitation site from the direction of the road and continues on towards the ocean.
>
> Agriculture within the current project area was practiced at Sites 25516 and 25520, where modified depressions were likely planted with taro using the *pa-hala* method (Handy and Handy 1972). To accomplish taro cultivation using this method holes were excavated in the *'a'ā* lava within a *hala* grove, mulched with weeds, planted with a taro cutting wrapped in *hala* leaves, and then covered with *hala* leaves, which were later burned to provide the plant

with nourishment. Sweet potato may have also been grown in a manner similar to this within the current project area. It is likely, since people were living on the project area into historic times, that the use of theses agricultural sites, like the use of Site 25519, also spanned the Precontact and Historic Periods.

The presence of a single core-filled wall crossing the current project area suggests that perhaps ranching activities were conducted on at least the *mauka* portion of the project area during the second half of the nineteenth century and into the twentieth century (Yent and Ota 1982), or that maybe free-ranging cattle became a difficulty during the second half of the nineteenth century and the wall was constructed to control their movement away from agricultural and habitation areas (Haun and Henry 2002).

Corbin (2008) conducted an archaeological inventory survey of TMK:3-1-4-028:009 located one parcel east of the current project area (see Figure 10). As a result of the study Corbin (2008) recorded a single archaeological site (Site 26465) on the parcel that contained three features (Features A, B, and C). The recorded features included a stone platform (Feature A) interpreted as a temporary habitation feature, or perhaps a viewing platform, a stone clearing mound (Feature B), and a C-shaped wall (Feature C) located on a sloped ground surface that may have been a wind break or a planting feature. During the fieldwork Feature A was completely dismantled, revealing that most of the platform was natural bedrock, and that it lacked cultural debris. Corbin concluded that all of the features within the parcel were likely related to the agricultural use of the area during Precontact times, and that "prior to the development of modern housing in the area more such structures existed" (2008:16).

Clark and Rechtman (2008) prepared an archaeological assessment for TMK:3-1-4-028:002 located to the west of the current project area (see Figure 10). No archaeological sites were identified on that parcel, and modern debris (i.e. beer cans, fishing supplies, etc.) was the only type of cultural debris observed anywhere on the surface of the parcel, but a suspicious pile of cobbles was noted and tested. The collection of cobbles measured 2.5 meters long (east/west) by 2.0 meters wide (north/south). The north (*makai*) edge of the feature consisted of loosely stacked medium to large *pāhoehoe* cobbles standing up to 65 centimeters above the steeply sloped bedrock surface. The base of the stacking was along a vertical bedrock edge raised 40 centimeters above a thin soil pocket in a bedrock low spot. A 1 x 2 meter test unit (TU-1) was excavated in a northwesterly/southeasterly direction across the entire width of the cobble collection. Excavation of TU-1 revealed a 30 to 65-centimeter thick layer of loose cobbles (Layer I) resting on the sloped bedrock. At the base of layer I, mixed with the base course of cobbles on bedrock, a 2 to 10-centimeter thick layer of very dark brown (10YR 2/2) silt was present (Layer II). The soil layer was passed through 1/4-inch mesh screen, but no cultural material was recovered. No cultural debris of any kind was discovered within TU-1 or in the vicinity of the cobble collection. Based on the negative findings at TU-1, the loose construction of the cobble collection, and lack of any additional features on the parcel, Clark and Rechtman (2008) concluded that it was likely that cobbles were placed on the bedrock during modern times, and were therefore not an archaeological resource.

Rechtman (2008) surveyed the easternmost coastal parcel in Wa'awa'a Subdivision (TMK:3-1-4-028:001; see Figure 10) and initially reported no findings. Subsequently, while conducting a botanical study of the subject parcel, biologists discovered the opening to a small lava tube in a section of dense *naupaka* and contacted Rechtman Consulting, LLC to investigate. With the landowner's permission, Rechtman Consulting, LLC conducted a thorough examination of the lava tube and discovered a single set of badly preserved human skeletal remains; skeletal elements observed included teeth, cranial fragments, phalanges, and poorly preserved long bones. This inadvertent discovery of human skeletal remains was reported to DLNR-SHPD, and the tube was mapped and its extent projected to the ground surface, and a burial treatment plan was prepared (Rechtman 2009).

Haun and Henry (2010) conducted an archaeological inventory survey of TMK:3-1-4-028:023 located to the east of the current project area (see Figure 10). The survey identified two archaeological sites (Sites 28138 and 28139) containing a total of nineteen features. Site 28138 consists of a rectangular shaped platform located near the Government Beach Road that based on the results of subsurface testing was determined to contain human skeletal remains within an oval shaped stone lined crypt. No artifacts or food remains were identified within the platform, but based on the monument's form Haun and Henry (2010) suggest that it likely post-dates the 1819 arrival of missionaries in the islands. Site 28139 is a complex of 18 agricultural features that span the inland two-thirds of the parcel. The features of this site include eight mounds, six pits, two modified outcrops,

and two retaining walls. The mounds and modified outcrops were interpreted as clearing features. The pits were interpreted as planting features, and the retaining walls were interpreted as agricultural plot boundary walls that helped retain soil.

O'Shaunessy (2008) previously prepared an archaeological assessment for the current project area (see Figure 10). On December 3 and 8, 2008 O'Shaunessy conducted fieldwork at the parcel where he walked transects from east to west spaced at five meter intervals, and recorded five temporary features (TF-1, 2, 3,4, and 5), which he sketched on a map of the parcel (Figure 11).

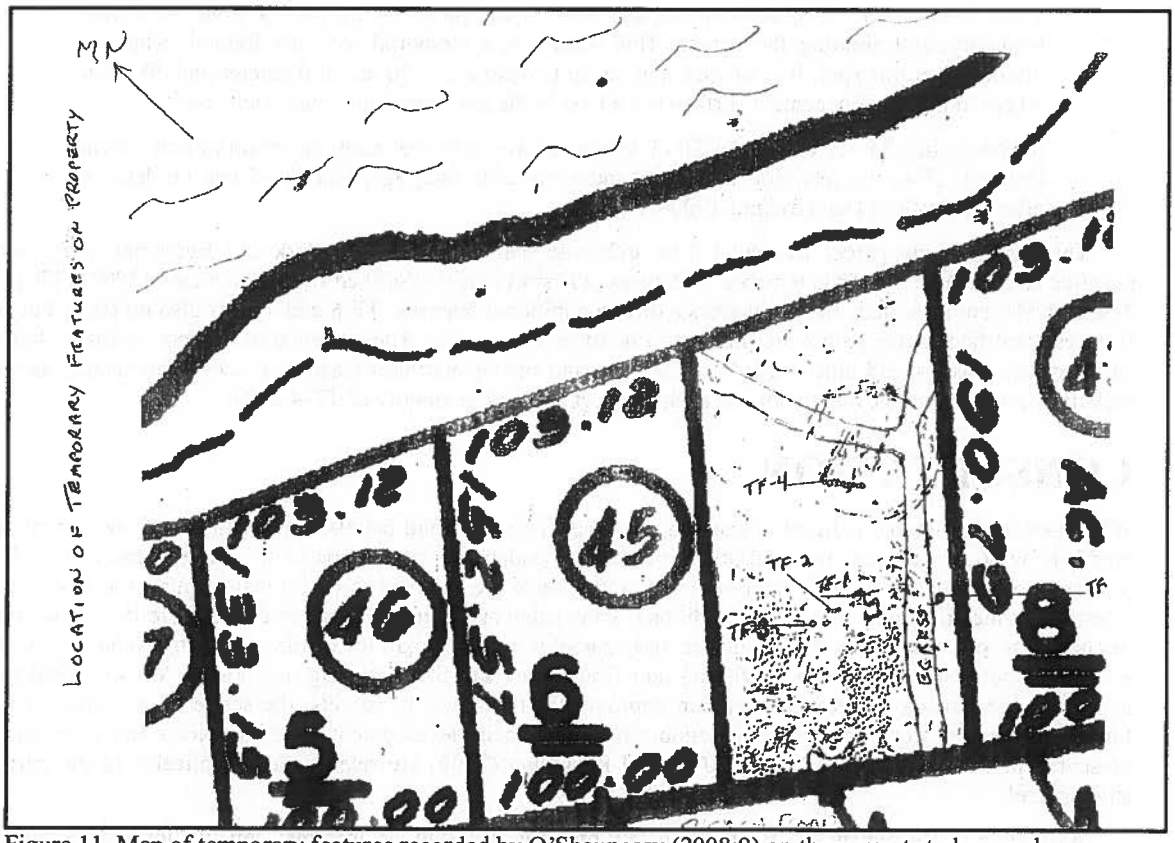

Figure 11. Map of temporary features recorded by O'Shaunessy (2008:9) on the current study parcel.

O'Shaunessy described the temporary features as follows:

> TF-l: This feature was found on the 4th transect, twenty meters from the southern boundary and 5 meters west of the egress. The south portion is an outcrop that has been modified with small boulders held in place with cement, is 2.2 meters long and 1.2 meters in height, with 3.5 cm being the modification. The east side of the structure is 80 cm long and 60 cm in height, basically one course of small boulders. On the makai side of the structure is a wall that is 2 meters long, and is 40 cm in height on the outside and 25 cm on the inside, and consists of 1 to 2 courses of small boulders, cemented in the 2 course section. The west side has no wall, but the rough paving ends at the area where a wall would be. Off the west side of the makai wall is a 1 course alignment that runs 3 meters to the north and "L'" s to the west, extending 2 meters, I to 2 courses of small boulders, 10 cm to 35 cm in height, forming a type of terrace. The whole structure appears to have been some type of hippy habitation site.
>
> TF-2: This feature is located on the same transect, and is 9 meters to the west (azimuth 330 degrees), and is a rock and cement bench, of the same type of construct as TF-1. The bench is 1.7 metes in length, and 60 cm in height, and is nicely curved.

> TF-3: 5 meters to the south (azimuth 200 degrees) is a toilet, circular, 60 cm in diameter, 45 cm in height, with a soft plastic toilet seat on top. Construct is loose small boulders on the bottom, with small boulders cemented in place on the upper section.
>
> TF-4: On transect 8, 41 meters from the mauka border is a small retaining wall, 9.3 meters in length, and 60 cm to 80 cm in height. Construct is of small boulders 2 courses to 3 courses of dry stone masonry, running on an azimuth of 280 degrees, and appears to be a modification of an outcrop, having no room for a terrace behind it.
>
> TF-5: This feature is located on the east side of the property, 20 meters from the mauka boundary, and abutting the egress. This feature is a memorial to Dana Ireland, who was murdered on this spot. It is of rock and cement construct, is 70 cm in diameter and 20 cm to 30 cm in height. The cement surface has a beer bottle and numerous small shells on it.
>
> In conclusion, TF -1, TF -2, and TF -3 appear to have been the recent handiwork of an interim resident. TF-4, the retaining wall, is of indeterminante [sic] age, and TF -5 can be dated to after the death of Dana Ireland. (2008:1-2)

The current study parcel was subject to archaeological investigation (Clark and Rechtman 2011) with negative results. All five of the temporary features (TF) previously described by O'Shaunessy (2008) (TF-1, 2, 3, 4, and 5) were relocated, and the presence of two additional features (TF-6 and 7) was also noted. All of the features identified on the parcel are thought to be of modern origin. The presence of modern debris including cans, bottles, plastics, and other trash from camping and fishing activities was noted across the parcel, but was especially prevalent in the *makai* portion of the project area in the vicinity of TF-4 and 6.

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 the current study parcel is but one small lot within an existing subdivision, and given that both State of Hawai'i (DLNR) and County of Hawai'i (Planning and Public Works) regulatory agencies have already granted construction approval for three nearby parcels, the scope of consultation was limited to the past work done in conjunction with prior recent development. The interviews and consultation presented in Rechtman and Bautista (2010) and Rechtman (2009) are relevant and applicable to the current study parcel.

As related in Rechtman and Bautista (2010), on Sept 10, 2009, an informal consultation was conducted with Jesse Kawaaloa at his job site in Pahoa. This individual has strong genealogical ties to the area having descended from Hawaiians residing in Kalapana dating from pre-*Māhele* times, and likely Precontact times. Jesse's personal recollection of the current study area extends back to the 1950s, when he was a small boy walking the trails and roads to his Auntie and Uncle's house in Wa'awa'wa to go fishing and swimming in the warm pond. He explained that before the Hawaiian Beaches Subdivision was created that the coastal area of Wa'awa'wa was a great place for fishing and the gathering *limu* and *opihi*. Access to Wa'awa'wa from his home in Kalapana was by way of trails and the Old Government Road. Jesse stated, "when we were young we used to walk the whole way" stopping only to swim in the warm pond which he said "the pond was great! It was the only warm pond with white sand, but the owners started charging 10 cents then they raised it to 25 cents that's when we stopped coming because a quarter was a lot of money in those days". When asked how he felt about the construction of the single family dwelling, Jesse indicated that as long as the house was not an "eyesore," that ocean access is never denied to people wanting to fish, and that no cultural sites are impacted then it would be alright.

In consultation (Rechtman and Bautista 2010 and Rechtman 2009) with members of the Kanaka Council (a native Hawaiian cultural organization), with respect to a property located six lots to the west of the current study parcel (TMK:3-1-4-028:001; see Figure 2) with a similar geography and flora, the general sentiment was that as long as cultural resources and traditional coastal access were not impacted, then there was no objection to a single-family development.

Another excellent source for identifying community-based concern over potential cultural impacts with respect to development of this portion of the Puna coastline can be found in the comment letters received by the Department of Land and Natural Resources-Office of Coastal and Conservation Lands (DLNR-OCCL). The administrative record provided by DLNR-OCCL for two Conservation District Use Applications (CDUA) that have been approved for the aforementioned parcel (TMK:3-1-4-028:001) and for a parcel (TMK:3-1-4-028:009) two lots to the east of the current study area contains substantial commentary offered by Malama O Puna, a non-profit volunteer service organization that focuses on environmental issues. Their stated mission is to assure critical habitat for native species and open space for future generations through environmental education, hands-on projects, advocacy, watch-dogging and land trusting. With respect to potential traditional cultural resources of the immediate study area, Malama O Puna identifies the *hala* grove that exists in the area as a potential cultural resource that would be impacted by allowing any development of the Puna coastline, but does not provide any specific information on practitioners or gathering locales.

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 Pa'akai O Ka'āina* 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.

Based on the archival research and record of consultation, there were no traditional cultural properties or customary practices identified specific to the current study parcel. Likewise there were no archaeological resources identified on the study parcel. Community members have suggested that the various *puhala* of the general Puna coastline are valued natural resources, however the extent to which there are and have been utilized within the specific study area is unclear. The Wa'awa'a Residential Subdivision was formally created in

1958, thus the current study parcel has been in private ownership for more than 50 years. While it is fully recognized that *hala* weavers collect their resources from the *puhala* of coastal Puna, no evidence was found that the *hala* trees on the current study parcel have been or are actively harvested. Additionally, similar (if not better) resources exist on public (state-owned) land a short distance to the west of the current study parcel.

With respect to coastal access for traditional and customary practices (i.e., fishing, gathering, etc), while there has been a history (albeit checkered) of *mauka/makai* "public trespass" across this property, there is no evidence that such use was of a traditional and customary nature. There is a private commonly-owned coastal strand between all of the *makai* Wa'awa'a parcels (including the current study parcel) and the shoreline, which is used by the public (albeit infrequently) and its continued use will not be affected by construction and use of the proposed single-family residence.

Given the above findings, it is concluded that if the landowner adheres to State Conservation District and County SMA rules and any all conditions placed on development by the appropriate regulatory bodies, then there will be no cultural impacts caused by the construction of a single-family dwelling on the study parcel.

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ENVIRONMENTAL ASSESSMENT
MAGSALIN SINGLE-FAMILY RESIDENCE IN THE CONSERVATION DISTRICT AT WA‘AWA‘A

APPENDIX 4
Coastal Erosion Study

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GCI

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

Coastal Erosion Study for the Shon Magsalin Property

Wa'awa'a Subdivision
Puna, Hawaii
TMK: (3) 01-04-028:007

J.P. Lockwood, Ph.D.

January, 2013

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Introduction – Study requirement

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 Magsalin property, based on quantitative measurements and observations obtained through field inspection, aerial photography, satellite imagery, and review of the geologic literature.

Field Inspection

John Lockwood and Tim Scheffler visited the subject property (hereafter referred to as "the Property") with Ms. Magsalin on July 24th, 2012. A total of three hours were spent making field observations, surveying with Brunton pocket transit and measuring tape, and obtaining site photography.

The field observations of observed water line (see Fig. 1) were taken as the tide dropped from +0.75 to +.0.1 feet above the tidal datum (tidal datum for Hilo, Hilo Bay, and Kuhio Bay, HI - *http://tidesand currents.noaa.gov)*. The ocean was characterized by moderate swells (3-4 feet), which generated light surf that prevented detailed observation of coastal lavas along the sea cliff (Figure 1).

Figure 1. View westward of the coastline fronting the Magsalin property. Normal surf does not reach above the coastal cliff, but rounded boulder rubble attests to the impact of storm waves, which removes vegetation 75-90 feet inland from the cliff face. This vegetation line defines the official "shoreline" along the coast in this area.

Geology

The lava flows underlying the Property have estimated ages of 750-1500 years before present, belonging to unit "f6a2" on Moore and Trusdell's (1991) geologic map of Kilauea's lower east rift zone. This unit mostly consists of dense pahoehoe lava, but is underlain by 'a'a at this site.

The lava flow underlying most of the Property is pahoehoe, but coastal erosion reveals that this pahoehoe overlies 'a'a, along a sharp contact (Figures 2, 3). The coastal sea cliff is composed of the dense `a`a "blue lava" core of this 'a'a unit, which grades upward into densely welded 'a'a breccia. This welded 'a'a breccia is in turn overlain by discontinuous loose 'a'a rubble zones up to 10 feet thick (see the later section on "Flow Internal Structure". The (slightly) order 'a'a lavas were formed during the same eruption that produced the overlying pahoehoe, but was erupted during earlier phases of this prehistoric eruption, when discontinuous high fountaining favored 'a'a production. The pahoehoe was formed during later phases of this eruption when major lava fountaining ceased and copious pahoehoe was erupted at steady rates and mostly buried the earlier 'a'a flows. The fact that both the pahoehoe and 'a'a were produced by the same eruption is demonstrated by their identical mineralogic and textural characteristics (next section).

Figure 2. Pahoehoe lava overlying loose 'a'a breccia northeast of the Magsalin Property. Both flow types were produced by the same eruption.

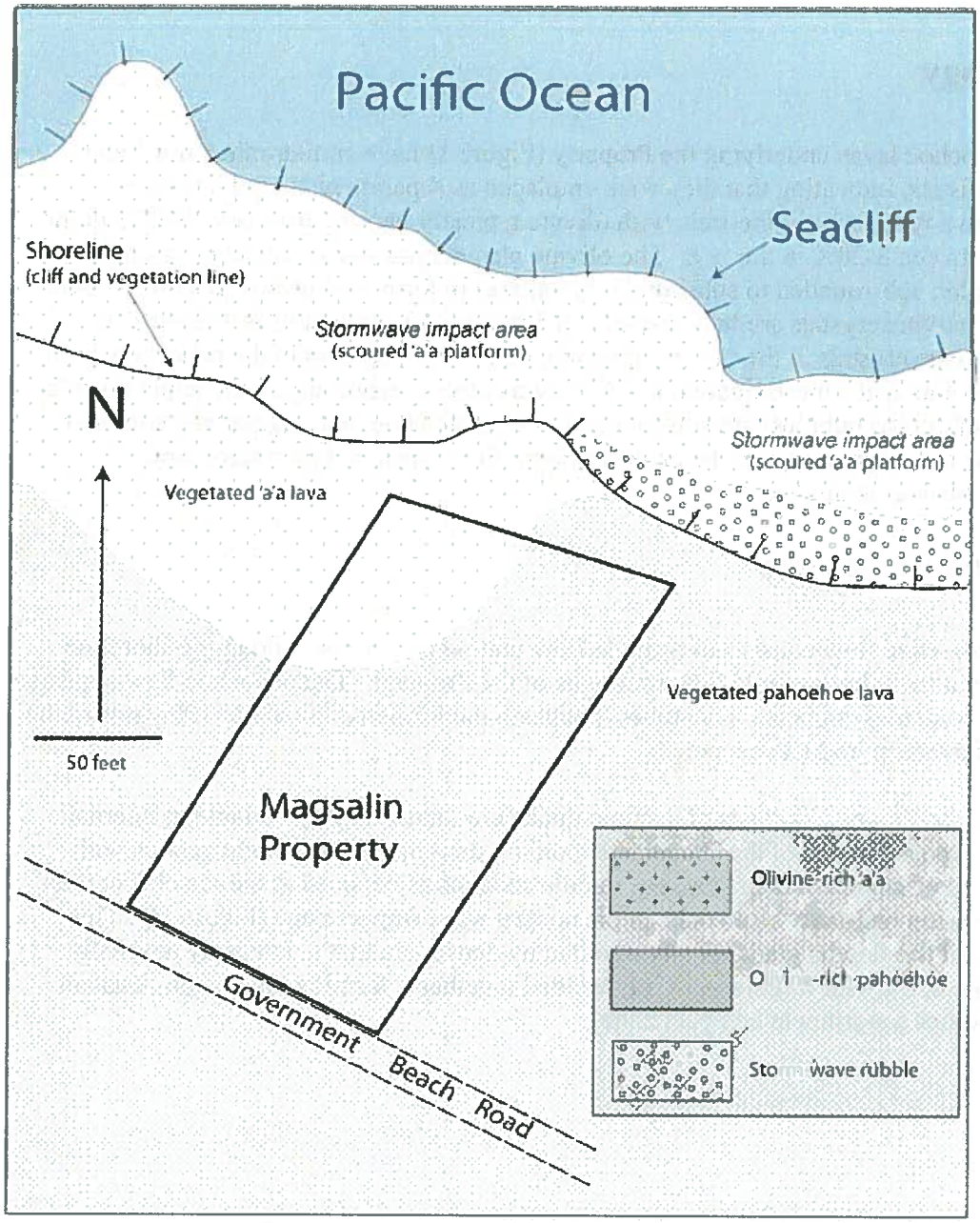

Figure 3. Geologic sketch map of the Magsalin Property and adjacent coastal area. The 'a'a and pahoehoe lavas were erupted during the same eruption, but the contact between them has not been mapped in detail in vegetated areas. Lateral distances were measured by tape and are thus approximate.

Flow Lithology

The 'a'a and pahoehoe lavas underlying the Property (Figure 1) have similar mineralogy and textural characteristics, indicating that they were emplaced as separate phases of the same eruption. Both lava types are olivine-rich, with olivine typically varying between 20-25% in the pahoehoe, and between 8-20% in the 'a'a. The olivine phenocrysts in the pahoehoe are light apple-green in color, sub-rounded to subhedral (crystalline) in form, and mostly 2-4 mm in size. Some distinctive olivine crystals are lath-shaped (<0.5 mm thick), appearing as "needles" in cross-section. Olivine crystals in the 'a'a are typically more oxidized than in the pahoehoe, with brownish-green colors and some oxidation to red-brown colors – especially in the upper portions of the flow. Vesicles (gas bubbles) are sub-rounded in the pahoehoe, but angular and contorted in the 'a'a. Some orthopyroxene may be present in both flow types, but no microscopic confirmation of this was attempted.

Flow Internal Structures

The overlying pahoehoe flow consists of a single flow unit where exposed along the shoreline cliff (Figure 1), but includes multiple flow units east of the Property. The pahoehoe flow appears to be too thin to contain pyroducts ("lava tubes") beneath the Property, but about 100 yards to the east a 1 meter-diameter pyroduct was noted.

The 'a'a beneath the Property consists of a single thick flow, and is highly variable in internal structure where exposed makai of the Property, becoming denser and more homogenous with depth. The flow is of unknown thickness, but middle sections as exposed at the sea cliff consist of very dense, erosion resistant "blue rock" in the normal wave impact zone (Figure 1). This "blue rock" core of the flow is gradationally overlain by dense 'a'a that is intensely internally brecciated (Figure 4, 5), with fragments tightly welded together – forming an erosion-resistant surface that underlies a storm wave impact zone.

Figure 4. Welded breccia zone in upper sections of the 'a'a flow underlying the Property.

Figure 5. Internally brecciated 'a'a "blue rock" inland from the seacliff fronting the Magsalin Property. This dense rock is sculpted by storm waves that overtop the seacliff. Note the subrounded storm-tossed boulders overlying this 'a'a closer to the vegetation-defined shoreline.

In the uppermost sections of this 'a'a flow pockets of unwelded, loose 'a'a fragments directly underlie a cap of the younger pahoehoe (Figure 2). These fragmental zones are highly vulnerable to erosion by the highest reaches of storm waves. The relationships of these flows is shown in a schematic geologic cross-section of the coastal area fronting the Property (Figure 6).

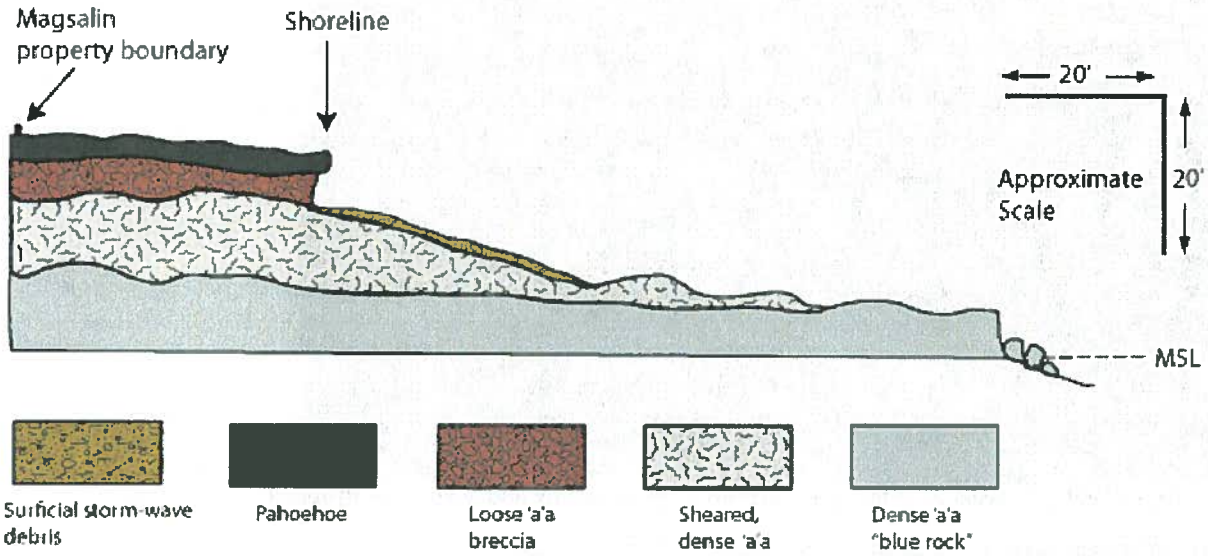

Figure 6. Geologic profile sketch map of the coastal area fronting the Magsalin Property - view to west.

Findings

The shoreline is legally defined in Hawaii 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). In this case the shoreline has been surveyed as the edge of vegetation growth (Figures 1, 5), that also coincides with the 4-10' high erosional cliff that marks the landward most impact of storm waves. This cliff lies 25-50' seaward of the Property boundary.

The vegetation inland from this cliff is dense *naupaka* growth with some large *lauhala* within twenty feet of this shoreline. The pahoehoe flow is overlain by a discontinuous soil zone, consisting mostly of organic debris intermixed with fine silt- and clay-size mineral material, likely derived from the accumulation of windblown volcanic ash. The fact that this loose soil is present inland of the shoreline indicates no erosion is taking place in this area.

The beach, *per se*, is a slightly sloping (12-15 degrees) accumulation of well-worn cobbles and boulders overlying the basal substrate of `a`a. This `a`a shelf is mostly scoured clean of debris by storm waves and extends another 60-80' to a 8-12' ft high sea cliff. The cliff is highly resistant to erosion, even by powerful marine wave action, as there is little jointing or fracturing

of the `a`a interior. Large subrounded to subangular detached boulders in the surf zone and apparently extending offshore do indicate that minor sea-cliff erosion has occurred.

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 (Figure 2). Where it subject to storm or tsunami wave erosion, however, the loose 'a'a fragmental zone has been completely eroded away. The "blue rock" interior core of this 'a'a flow (that forms the sea cliff - Figures 1, 6) is extremely durable, however, and is not subject to appreciable horizontal erosion.

Inspection of available aerial photographs (Table 1) 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 (limited resolution) of the aerial photographs inspected study makes quantitative visual analyses of fine-scale morphological changes of the shoreline or sea-cliff impossible, as it is doubtful that horizontal changes of less than 10 feet could be detected. 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 – primarily observation of active erosion indicators such as freshly cut cliff faces or presence of angular erosional debris.

Date	Agency	Flight Line	Frames
1954	USN-USGS	017	132, 133
1965	USDA	EKL-12CC	007, 008
1977	USGS	GS-VEEC 6	152, 153
2012	Google Earth		

Table 1 Available aerial photography

Since there is no visible indication that the shoreline vegetation line has changed over the 58 year period since the first aerial photographic record began, nor indication of measureable changes in sea cliff position, it thus appears that the maximum amount of coastal erosion fronting the Property is less than 10 feet – for a maximum rate of 0.17ft (2 in.)/yr.

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 the area of Puna fronting the Magsalin 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
Overall Hazard Assessment	Medium	4 (on scale of 1-7)

Table 2 Natural hazards impacting the coastline fronting the Magsalin Property (from Fletcher et al., 2002, p.150)

Effects of Subsidence and Sea Level Rise on Shoreline

An overall global 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. Relative sea-level rise, of course, is a result of the combined water rise and land subsidence.

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 Property, however, are necessarily much lower as a result of their distance from Kilauea's active rift zone.

The combined effects of land subsidence and rising sea 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 six feet at even the highest tides) ensures that combined sea level change and land subsidence will not cause significant shoreline transgression in this area. The northern boundary of the Property (Figs. 3, 6) lies at 30-35 feet above sea level, as estimated by hand-leveling and Google Earth vertical measurements.

Summary

The shoreline, beach and sea-cliff in front of the Property were mapped in order to assess the erodibility of underlying rocks and the dynamic nature of geologic and marine processes that contribute to erosion. Where overlying loose 'a'a rubble northwest of the property, a thin pahoehoe flow that defines the shoreline is susceptible to erosion by storm or tsunami waves, but no measurable lateral erosion could be documented. Historical aerial photos dating back to 1954 were compared to 2012 Google imagery in an attempt to establish an erosion rate for the area, but no measureable change was observed, and a continuous and steady rate of erosion does thus not characterize this coastline. Future migration of the shoreline will be impacted predominantly by unpredictable and episodic events including subsistence due to seismicity or by accretion due to future eruptions of Kilauea. The fact that the Magsalin Property boundary is located 30-40 feet inland from a shoreline that shows no measurable retreat in the past 58 years, and that it lies 30-35 feet above sea level indicates that there is no erosional threat to the Property.

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