FILE COPY

Harry Kim
Mayor

Michael Yee
Director

Daryn Arai
Deputy Director

MAR 0 8 2018

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

County of Hawai'i
PLANNING DEPARTMENT

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

February 12, 2018

RECEIVED
'18 FEB 13 P3:39
OFC. OF ENVIRONMENTAL QUALITY CONTROL

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

Dear Mr. Glenn:

Final Environmental Assessment (FEA)
Applicant: Association of Apartment Owners of Kona Reef, Inc.
Request: Kona Reef Condominiums Erosion Abatement Structure in the Shoreline Setback
TMK: (3) 7-5-018:071 North Kona, Hawai'i

The County of Hawai'i Planning Department has reviewed the comments received during the 30-day comment period on the draft environmental assessment that ended 30 days after November 23. 2017 (date the project was posted in the OEQC Environmental Notice). We have determined that the project will not have significant environmental effects and have issued a Finding of No Significant Impact (FONSI). Please publish notice of availability for this project in the next available OEQC Environmental Notice.

We have enclosed a completed OEQC Publication Form, one copy of the final EA, and a copy of the final EA and the project summary hardcopy on disk. If you have any questions, please feel free to contact Jeff Darrow at 961-8158.

If you have any questions regarding the above, please contact Jeff Darrow of this department at (808) 961-8158.

Sincerely,

MICHAEL YEE
Planning Director

JWD:mad
P:\wpwin60\CH343\2017\LKonaReefErosionAbatementStructure-FonsiDEA.doc

18-357

Enclosures: Final EA (1 copy)
Completed OEQC Publication Form and Project Summary
Final EA and Project Summary (on disk)

cc ltr only: Mr. Graham Paul Knopp, Pd.D.

APPLICANT
PUBLICATION FORM

Project Name:	Final Environmental Assessment for Erosion Abatement Structure in the Shoreline Setback, Kona Reef Condominiums, 75-5888 Alii Drive, Kailua-Kona, Hawaii
Project Short Name:	Kona Reef Condominiums Erosion Abatement Structure
HRS §343-5 Trigger(s):	Action in the Shoreline Setback
Island(s):	Hawaii
Judicial District(s):	North Kona
TMK(s):	(3) 7-5-018:071
Permit(s)/Approval(s):	Shoreline Setback Variance, Special Management Area
Approving Agency:	County of Hawaii Planning Department
Contact Name, Email, Telephone, Address	Michael Yee, planning@hawaiicounty.gov, (808) 323-4770, 101 Pauahi Street, Suite 3, Hilo, HI 96720
Applicant:	Association of Apartment Owners of Kona Reef, Inc.
Contact Name, Email, Telephone, Address	c/o Ray Pieri, pierir001@hawaii.rr.com, (808) 989-7439, 75-1029 Henry Street, #202, Kailua-Kona, Hawaii 96740
Consultant:	Graham Paul Knopp, Ph.D.
Contact Name, Email, Telephone, Address	GK Environmental LLC, gpknopp@gkenvllc.com, (808) 938-8583, PO Box 1310, Honokaa, HI 96727

Status (select one)	**Submittal Requirements**
____ DEA-AFNSI	Submit 1) the approving agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the DEA, and 4) a searchable PDF of the DEA; a 30-day comment period follows from the date of publication in the Notice.
__X__ FEA-FONSI	Submit 1) the approving agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEA, and 4) a searchable PDF of the FEA; no comment period follows from publication in the Notice.
____ FEA-EISPN	Submit 1) the approving agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEA, and 4) a searchable PDF of the FEA; a 30-day comment period follows from the date of publication in the Notice.
____ Act 172-12 EISPN ("Direct to EIS")	Submit 1) the approving agency notice of determination letter on agency letterhead and 2) this completed OEQC publication form as a Word file; no EA is required and a 30-day comment period follows from the date of publication in the Notice.
____ DEIS	Submit 1) a transmittal letter to the OEQC and to the approving agency, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the DEIS, 4) a searchable PDF of the DEIS, and 5) a searchable PDF of the distribution list; a 45-day comment period follows from the date of publication in the Notice.
____ FEIS	Submit 1) a transmittal letter to the OEQC and to the approving agency, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEIS, 4) a searchable PDF of the FEIS, and 5) a searchable PDF of the distribution list; no comment period follows from publication in the Notice.
____ FEIS Acceptance Determination	The approving agency simultaneously transmits to both the OEQC and the applicant a letter of its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS; no comment period ensues upon publication in the Notice.
____ FEIS Statutory Acceptance	The approving agency simultaneously transmits to both the OEQC and the applicant a notice that it did not make a timely determination on the acceptance or nonacceptance of the applicant's FEIS under Section 343-5(c), HRS, and therefore the applicant's FEIS is deemed accepted as a matter of law.

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

Project Summary

Association of Apartment Owners of Kona Reef, Inc. (Kona Reef AOAO) proposes to build an erosion abatement structure within the lawn area fronting the Kona Reef Condominiums, located mauka (i.e. uphill or inland) of the certified shoreline and within the shoreline setback. The purpose of the structure would be to prevent erosion of soil underlying the lawn area, and consequent loss of the use of the lawn area. The project would maintain the lawn area and protect it for users, who include both members of the public and Kona Reef condominium residents. The structure would parallel the certified shoreline for approximately 220 linear feet, would be anchored in bedrock, and would be built flush to grade (at the same height as the surrounding lawn area).

No adverse impacts from construction of the structure to shoreline processes are anticipated. No sensitive biological, hydrological, archaeological, cultural, or other important resources are present on the project site. Construction activities would produce short-term impacts to noise, air quality, access, and scenery, which would be mitigated by implementation of standard construction Best Management Practices, as well as restrictions on construction hours, would ensure that construction-related impacts, including potential impacts to water quality, are avoided or minimized.

FINAL
ENVIRONMENTAL ASSESSMENT FOR EROSION ABATEMENT STRUCTURE IN THE SHORELINE SETBACK

KONA REEF CONDOMINIUMS
75-5888 ALI'I DRIVE
KAILUA-KONA, HAWAI'I
TMK (3) 7-5-018:071 (por.)

February 2018

Prepared for**:**
Association of Apartment Owners of Kona Reef, Inc.
75-1029 Henry Street #202
Kailua-Kona, Hawaii 96740

FINAL
ENVIRONMENTAL ASSESSMENT FOR EROSION ABATEMENT STRUCTURE IN THE SHORELINE SETBACK

KONA REEF CONDOMINIUMS
75-5888 ALI'I DRIVE
KAILUA-KONA, HAWAI'I
TMK (3) 7-5-018:071 (por).

February 2018

Applicant:
Association of Apartment Owners of Kona Reef, Inc.
75-1029 Henry Street #202
Kailua-Kona, Hawaii 96740

Accepting Agency:
Hawaii County Planning Department
101 Pauahi Street, Suite 3
Hilo, Hawaii 96720

Consultant:
Graham Paul Knopp, Ph.D.
P.O. Box 1310
Honokaa, Hawaii 96727
(808) 938-8583

Class of Action:
Action in Shoreline Setback Area

TABLE OF CONTENTS

1.0 .....PROJECT DESCRIPTION, PURPOSE AND NEED, AND IMPACT ASSESSMENT PROCESS 1

1.1 PROJECT DESCRIPTION AND LOCATION 1
1.2 PURPOSE AND NEED 2
1.3 ENVIRONMENTAL ASSESSMENT PROCESS 6
1.4 PUBLIC INVOLVEMENT AND AGENCY COORDINATION 6

2.0 ALTERNATIVES 8

2.1 ALTERNATIVE LOCATIONS 8
2.2 ALTERNATIVE DESIGNS 8
2.3 PROPOSED PROJECT 9
2.4 NO ACTION ALTERNATIVE AND ALTERNATIVE SITES 9

3.0 ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION 11

3.1 PHYSICAL ENVIRONMENT 11
3.1.1 Geology, Soils, and Geologic Hazards 11
Environmental Setting 11
3.1.2 Coastal Setting, Coastal Erosion and Flood Zone 12
3.1.3 Water Quality 15
3.1.4 Flora and Fauna 16
3.1.5 Air Quality and Noise 18
3.1.6 Hazardous Substances, Toxic Waste and Hazardous Conditions 18
3.2 SOCIAL AND CULTURAL ENVIRONMENT 19
3.2.1 Land Use, Designations, and Controls 19
3.2.2 Socioeconomic Characteristics and Recreation 21
3.2.3 Cultural and Historic Resources 22
3.2.4 Archaeology and Historic Sites 24
3.3 PUBLIC FACILITIES, PUBLIC ACCESS AND UTILITIES 25
3.4 SECONDARY AND CUMULATIVE IMPACTS 25
3.5 REQUIRED PERMITS AND APPROVALS 26
3.6 CONSISTENCY WITH GOVERNMENT PLANS AND POLICIES 26
3.6.1 County of Hawai'i General Plan 26
3.6.2 Special Management Area 31
3.6.3 Shoreline Setback Rules 32
3.6.4 Kona Community Development Plan 33

4.0 DETERMINATION, FINDINGS AND REASONS 34

4.1 DETERMINATION 34
4.2 FINDINGS AND SUPPORTING REASONS 34

LIST OF FIGURES

Figure 1. Project Location Map 3
Figure 2. TMK Map 3
Figure 3. Aerial Photograph 4
Figure 4. Site Photographs. 5
Figure 5. Proposed Project Site Map 10
Figure 6. Preliminary DFIRM Map for Proposed Project Area 13

LIST OF TABLES

Table 1. Project Vicinity General Coastal Hazards Summary 15
Table 2. Plant Species Identified on the Project Site 17

APPENDICES

Appendix 1A Comment Letters in Response to Early Consultation
Appendix 1B Comment to Draft EA and Responses
Appendix B Engineering Drawings
Appendix C State Certified Shoreline Survey and Photographs
Appendix D Archaeological Inventory Survey, Haun & Associates
Appendix E Coastal Resource and Erosion Assessment, GCI, Int.
Appendix F Flora and Fauna Study, Grant Gerrish, Ph.D.

SUMMARY OF PROJECT, ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Association of Apartment Owners of Kona Reef, Inc. (Kona Reef AOAO) proposes to build an erosion abatement structure within the lawn area fronting the Kona Reef Condominiums, located mauka (i.e. uphill or inland) of the certified shoreline and within the shoreline setback. The purpose of the structure would be to prevent erosion of soil underlying the lawn area, and consequent loss of the use of the lawn area. The structure would parallel the certified shoreline for approximately 220 linear feet, would be anchored in bedrock, and would be built flush to grade (at the same height as the surrounding lawn area).

The project would maintain the lawn area and protect it for users, who include both members of the public and Kona Reef condominium residents. Both types of users often use the lawn area for recreational activities including sunbathing, whale watching, and to access both the shoreline makai (i.e., downhill or towards the ocean) of the lawn area and the adjacent beach and surfing area commonly referred to as Honl's located offshore Waiaha County Beach Park.

The project would be built above the shoreline on private lands, and no adverse impacts from construction of the structure to shoreline processes are anticipated. No sensitive biological, hydrological, archaeological, cultural, or other important resources are present on the project site.

Construction activities would produce short-term impacts to noise, air quality, access, and scenery. Implementation of standard construction Best Management Practices, as well as restrictions on construction hours, would ensure that construction-related impacts, including potential impacts to water quality, are avoided or minimized.

The proposed project has negligible potential to cause long-term adverse impacts, or to cause adverse cumulative or secondary impacts. The proposed project would be built flush to surrounding grade, and would thus have no visual impact. Other long-term impacts would be negligible or positive, as the proposed project would reduce the potential for loss of soil and related discharge of polluted stormwater runoff to the shoreline, reef, and ocean habitats.

1.0 PROJECT DESCRIPTION, PURPOSE AND NEED, AND IMPACT ASSESSMENT PROCESS

1.1 Project Description and Location

Kona Reef Condominiums Association of Apartment Owners (Kona Reef AOAO) proposes to build an erosion abatement structure within the ocean front lawn area of the Kona Reef Condominium property (Figures 1 – 4). The proposed project would maintain the integrity of the lawn area fronting the condominium structure by construction of a concrete-rubble masonry (CRM) structure that would be flush to ground surface. The structure would be parallel to and located entirely mauka (i.e., inland or uphill), of the State Certified Shoreline Survey of March 1, 2017, and separated from it by a buffer of at least 12 inches. Figure 5 presents the proposed alignment overlain on an aerial photograph. The structure would extend for approximately 220 linear feet and would be built entirely on the Kona Reef Condominium's private property. The top of the structure would be flush to grade (at the same elevation of the surrounding lawn area). The southern half, or approximately 100 feet, of the structure would be embedded in the existing soil on both faces (i.e., both mauka and makai). The structure would vary from approximately 12 to 52 inches in height, depending on the depth to bedrock, with the top surface varying from approximately 12 to 15 inches in width. These dimensions are flexible to allow for adjustments to the finish height and width needed at various points along the structure, and to allow the structure to be flush with the existing lawn elevation. The proposed project would be completed within about three to four months of receipt of required permits.

The Kona Reef Condominium, located at 75-5888 Ali'i Drive, Kailua-Kona, County of Hawaii, Tax Map Key (TMK) (3) 7-5-018:071, is an approximately 3.1-acre shoreline property. The Kona Reef Condominium consists of five (5)-four story residential buildings, and a one-five-story residential building with two lower floors composed of a parking lot. The Kona Reef Condominium also includes a swimming pool, jacuzzi, courtyard gazebo and a poolside cabana, as well as an office structure.

The proposed structure is not a seawall as it would not receive wave energy during normal circumstances, as it is located above the shoreline as defined by Hawai'i Administrative Rule 205A that defines the shoreline 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." The shoreline was recently established by a Certified Shoreline Survey dated March, 2017 (File No. HA-538). The proposed project would be located within the shoreline setback and would therefore require a shoreline setback variance. As a result, the proposed project triggers the environmental review requirements under Chapter 343, Hawai'i Revised Statutes, known as the "Hawai'i Environmental Policy Act." The authority to

determine whether an Environmental Impact Statement is required is the accepting authority, the County of Hawaii Planning Department.

In this document the Kona Reef Condominium complex is also referred to also as Kona Reef, and the general area of the project site, including all of the Kona Reef Condominium property and adjacent properties, as the project vicinity. The terms abatement structure or structure, and erosion abatement structure refer to the proposed engineered concrete rubble masonry (CRM) wall structure. Also, the Association of Apartment Owners of Kona Reef, Inc. is referred to generally as the Kona Reef AOAO.

Portions of the existing Kona Reef Condominium structures, including an irrigation system, portions of the pre-existing CRM wall, and the lawn area itself were permitted by Shoreline Setback Variance #610 dated June 25, 1981, which also stipulated preparation of a public shoreline access plan including a pedestrian easement along the north property line, and provisions for lateral easement across the makai portion of the property boundary.

1.2 Purpose and Need

Kona Reef Condominiums desires to preserve the lawn area located between the condominiums and the certified shoreline by preventing loss of the soil underlying the lawn area. The soil and fill underlying the lawn area currently enters the ocean in small amounts when foot traffic, to and from the Kona Reef property and the shoreline area, causes erosion on the seaward exposed face of the lawn. Additionally, wind and storm water runoff pick up and carry the loosened soil into the ocean. Therefore, without action this recreational resource and shoreline access resource utilized by both the public and Kona Reef Condominium residents will slowly, but inevitably, be lost. Need for the project also relates to the potential effects of a major coastal flooding event. In the event of a major storm surge or tsunami, it is possible that much of the volume of the soil underlying the lawn area may be eroded and transported to the shoreline area and ocean.

The proposed structure would reduce the erosion of soil from the lawn area fronting the Kona Reef Condominiums and prevent soil from entering the ocean, which occurs primarily due to pedestrian traffic. This conscientious proposed action is protective of the environment and a resource utilized by the public, and therefore urgent and timely action is warranted. Without the erosion abatement structure, soil will enter the ocean, and both members of the public and Kona Reef residents would lose use of some, or all, of the lawn area.

The purpose of the project is not to deflect wave energy, or to hold soil in place against the eroding action of waves, as the structure would be located above the shoreline. Retention of all of the soil underlying the lawn area would require construction within the State-owned coastal lands, which is beyond the scope of this private action.

Figure 1. Project Location Map

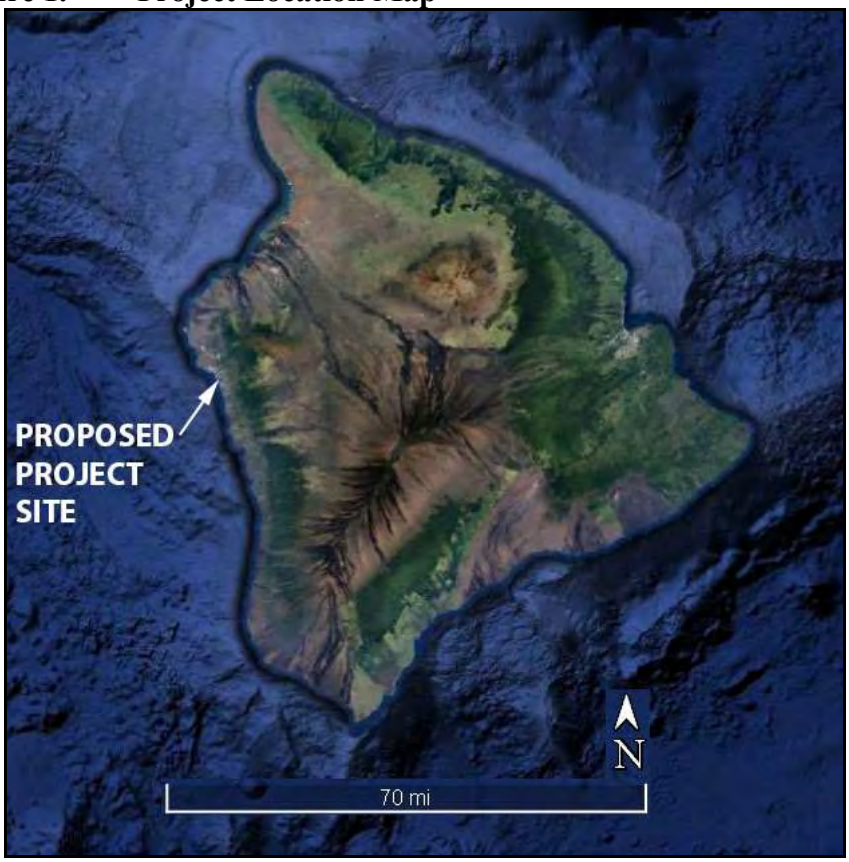


Figure 2. TMK Map

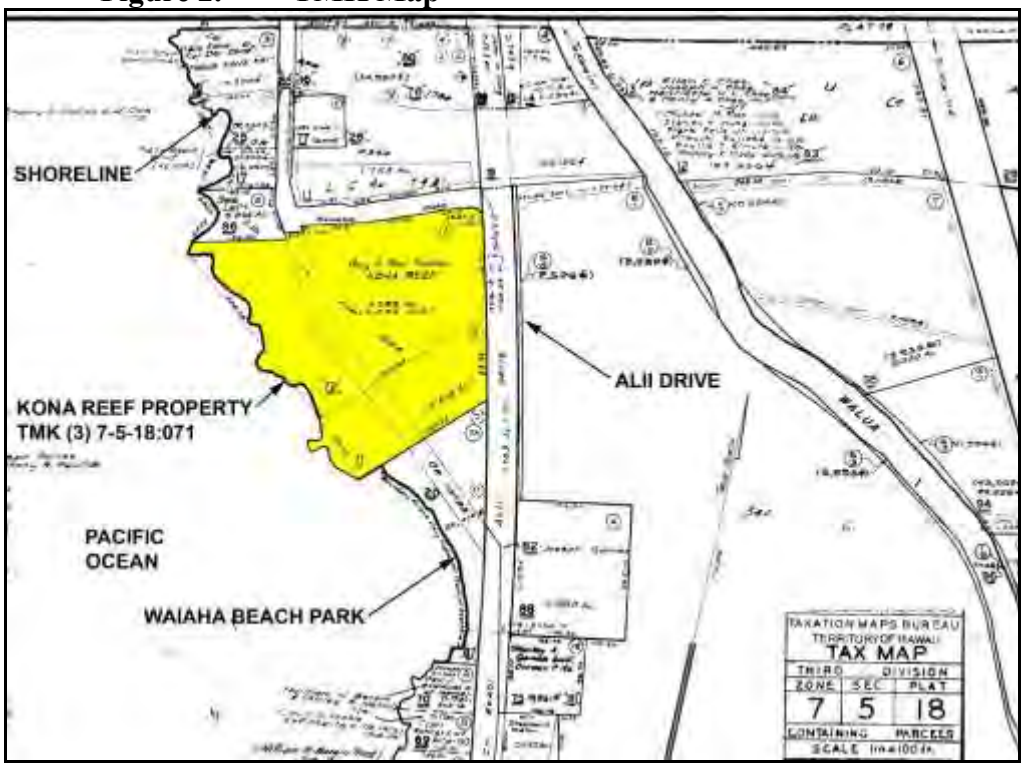


Figure 3. Aerial Photograph

Figure 4. Site Photographs.

Photograph taken from the lawn area near the southwest portion of the Kona Reef Condominium property, looking to the north.

Photograph is taken from the lawn area near the northern terminus of the proposed erosion abatement structure, looking to the south. The lawn area is used by both Kona Reef residents and the public.

1.3 Environmental Assessment Process

The Hawai‘i Environmental Policy Act was enacted by the Hawai‘i State Legislature to require State and County agencies to consider the environmental impacts of various actions as part of the decision-making process. Agencies are required to conduct an investigation and evaluation of alternatives as part of the environmental impact analysis process, prior to making decisions that may impact the environment. The implementing regulations are contained in Title 11, Chapter 200, Hawai‘i Administrative Rules.

This Environmental Assessment (EA) process was 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 process in the State of Hawai‘i. An EA is necessary because the site is within the shoreline setback and the County of Hawai‘i does not consider the project an exempt activity.

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. If a study concludes that no significant impacts would occur from implementation of the proposed action, a Finding of No Significant Impact (FONSI) is prepared and an action will be permitted to occur. If a study finds that significant impacts are expected to occur because of a proposed action, then an Environmental Impact Statement (EIS) is prepared in order to allow deeper investigation of impacts and allow more extensive public involvement.

Section 2 considers alternatives to the proposed project, and Section 3 discusses the existing environment and impacts associated with this project. Section 4 discusses the determination (anticipated determination in the Draft EA), and Section 5 lists the criteria and the findings made by the applicant in consultation with the County of Hawai‘i Planning Department for this project.

1.4 Public Involvement and Agency Coordination

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

<u>County:</u>

Department of Public Works
Planning Department
County Council
Mayor’s Office
Department of Parks and Recreation
Fire Department
Police Department
Leeward Planning Commission

State:

Office of Environmental Quality Control
Department of Health, Environmental Planning Office
Department of Land and Natural Resources (DLNR):
Office of Conservation and Coastal Lands
State Historic Preservation Division
Division of Boating and Ocean Recreation
Office of Hawaiian Affairs – West Hawaii

Federal:

United States Army Corps of Engineers

Private:

Kona Hawaiian Civic Club
Kona Outdoor Circle
Adjacent Property Owners
Surfrider Foundation

Copies of the communications received during early consultation are contained in Appendix A1. Comments to the Draft EA and responses to these comments are contained in Appendix 1b. Specific portions of the Final EA have been modified to reflect comments received; amended or modified text is denoted by double underlines, as in these sentences.

2.0 Alternatives

2.1 Alternative Locations

Alternative locations are limited to the Kona Reef Condominium property, as use of other properties were not considered feasible for the proposed project. The proposed project would prove most effective on the makai portion of the lawn area, as this location would maximize the erosion abatement effectiveness of the structure, and there are no difficulties apparent with this site, as the proposed action places the erosion abatement structure near the makai boundary of the property. The applicant was not interested in designs that would be located, partly or all, outside of their property primarily as this would not be necessary to achieve project objectives and would introduce unnecessary expense and difficulties. Further, the proposed project site was also selected as the northern portion of the lawn area is not impacted by erosion.

2.2 Alternative Designs

Alternative designs evaluated and weighed for consideration had to satisfy the following project objectives and criteria: (1) the proposed project must stabilize the lawn area and prevent further erosion; (2) the proposed project must not affect the ability of users to enjoy the lawn area and use it for lateral access; (3) the project must not affect shoreline processes or adversely affect shoreline access; and (4) the project must not detract from the visual character of the area.

The project team evaluated several design options. Placement of rip-rap, or other coarse material, would not have readily achieved the project objectives of stabilizing the fill material that underlies the turf area. Placement of rip-rap or other coarse material could stabilize and hold in place finer material (i.e., the existing soil) with placement of a geotextile membrane. This solution was evaluated and rejected as it would have required removal of a portion of the lawn area for placement of the rip-rap. Furthermore, rip-rap is used to stabilize shoreline areas that receive wave energy, and is therefore not an appropriate material to achieve project objectives. Such a design would also have either required removal of part of the lawn area, or would have encroached upon the makai State lands (i.e., the shoreline area). Given the two requirements that the project would be restricted to the Applicant's property and would retain soil, a solid structure extending down to bedrock is the only practical solution to fulfill project objectives.

Another constraint was that of Hawaii County Code (HCC) Chapter 27 Floodplain Management, which requires that structures within a flood zone cannot increase the volume of runoff to adjacent properties. Furthermore, as discussed in Section 3.1.2, HCC Chapter 27 also prohibits increasing the water surface elevation of the base flood at any point. Therefore, the proposed structure cannot be above grade, as this would increase the water surface elevation of the base flood. The proposed project's design is compliant with these requirements.

Use of a geotextile membrane was also considered to stabilize the lawn area. This would require support by placement of cobbles or boulders, but this was rejected as un-aesthetic, and because it would be subject to weathering.

2.3 Proposed Project

The proposed project is described in Section 1.1 above with engineering drawings shown in Appendix B and annotated photographs showing the current Certified Shoreline Survey in Appendix C.

The structure would be located entirely above the Certified Shoreline and would not be a seawall. Approximately 12 to 18 inches wide on the top-surface and approximately 24 to 36 inches wide at the base, the structure would be anchored in bedrock and would have a length of approximately 220 linear feet. The structure would roughly parallel the Certified Shoreline and would be located mauka of it by a buffer of at least 12 inches. The structure would be embedded in the existing soil on both sides for about ½ of its length, and on approximately the northern ½ of its length the structure would be exposed on the makai side. Drainage would be a component of the design, so that water in the sub-grade is not retained and flow from the mauka side of the structure to the side would be allowed.

2.4 No Action Alternative and Alternative Sites

Under the No Action Alternative, the erosion abatement structure would not be built. This EA considers the No Action Alternative as the baseline by which to compare environmental effects from the project.

The obvious costs of the No Action Alternative would be foreseeably adverse impacts to water quality and shoreline/coastal habitats. Without stabilization, the soil underlying the lawn area will enter the ocean and result in polluted storm water runoff. Furthermore, both the residents of the Kona Reef Condominiums and members of the public would lose use of some or all of the lawn area. As the project site is free to be used by members of the public for shoreline access, this resource would be degraded and possibly lost. Within Section 3 the No Action Alternative impacts are discussed only when they are notable, as demonstrating an anticipated significant difference between proposed project impacts.

Figure 5. Proposed Project Site Map

Note: Map produced from overlay of engineering drawings (Appendix B) and GoogleEarth image, and shows the approximate alignment of the erosion abatement structure and the Certified Shoreline Survey. Erosion abatement structure will be offset from March 1, 2017 Certified Shoreline Survey by a minimum of 12 inches.

3.0 ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION

The project site is a portion of the Kona Reef Condominium property set between the ocean and the condominiums, and above the shoreline as established by the March 1, 2017 Certified Shoreline Survey (File No. HA-538). This area is a gradually sloping lawn area used by both the public and Kona Reef residents for sunbathing, shoreline access, lateral access, and other recreational activities. The lawn area is landscaped and irrigated. The Kona Reef Condominium property is bounded on the south by the Waiaha Beach Park (also known as Honl's Beach Park) and on the north by private residences and an abandoned resort structure. The shoreline to the west (i.e. makai side) is a rough and irregular pahoehoe shelf that extends into the ocean by a distance varying from approximately 50 – 150 feet in width, with the submerged portion varying with the tides. The climate in this part of Kona is hot and dry, averaging between 20 and 30 inches of rain annually, with a mean annual temperature of approximately 76 degrees Fahrenheit (Giambelluca 2016).

3.1 Physical Environment

3.1.1 Geology, Soils, and Geologic Hazards

Environmental Setting

The surface geology consists of lava flows from Hualalai volcano older than 10,000 years of age (Wolfe and Morris 1996). According to the United States Department of Agriculture Soil Conservation Service's "Web Soil Survey" website, soils in the area are minimal and classified as Waiaha-Punaluu-Lava complex with 2 to 10 percent slopes, formed of ash fields on top of lava, with depth to bedrock of 15 to 25 inches. Above bedrock is a medial silt loam from 0 to 8 inches and extremely cobbly medial fine sandy loam from 8 to 15 inches of depth. This is a well-drained soil with a low to moderately low capacity to transmit water. The land capability classification is 7s, meaning that this soil has severe limitations that make it unsuited to cultivation and that restrict its use largely to grazing, woodland, or wildlife, and is excessively stony (USDA 2017).

Haun & Associates (Appendix D) described the soils as consisting of the following three horizons: (1) surficial fill deposits of silt with roots, and varying quantities of sand and clay of approximate depth of 0.00 to 0.13 meters, (2) fill deposits of silt and silty sand from approximately 0.13 to 0.33 meters, and (3) beach sand deposits from approximately 0.33 to 1.07 meters.

The entire Big Island is subject to geologic hazards, especially lava flows and earthquakes. The U.S. Geological Survey classifies all of Kailua-Kona, which is on the slopes of the dormant volcano Hualalai, as within Lava Flow Hazard Zone 4, on a scale of ascending risk 9 to 1 (Wright et al. 1990). This hazard risk is based on the fact that Hualalai has steep slopes and is historically the third most active volcano on the island.

Lava Flow Hazard Zone 4 areas have had about 5 percent of the area covered with lava since 1800 and less than 15 percent of the area covered in the past 750 years.

Major earthquakes in Hawaii are not rare, and in terms of seismic risk the entire Island of Hawai‘i is rated Zone 4 Seismic Hazard (Uniform Building Code, Appendix Chapter 25, Section 2518). Zone 4 areas are at risk from earthquake damage, especially to structures that are poorly designed or poorly constructed. The October 15, 2006 magnitude 6.7 earthquake’s epicenter was located approximately 13 miles north-northwest of the project site. Other major earthquakes on Hawaii Island include the magnitude 7.9 1868 earthquake and a magnitude 6.9 tremor on August 21, 1951 that, “damaged scores of homes on the Kona coast and triggered numerous damaging landslides (USGS 2016).”

Impacts and Mitigation Measures

Geologic conditions impose no substantial constraints on the project. The abatement structure would displace artificial fill, would be anchored to bedrock, and would not present a hazard in the event of a major earthquake. Although the general area is exposed to a certain degree of hazards from lava flows and earthquakes, the proposed project would present no additional geologic hazard to the public. Landowners and residents of high-hazard lava inundation areas of the island have been made aware of the potential and accept the risks and geologic hazards when they purchase and/or inhabit such areas. In the event of a major earthquake the erosion abatement structure would serve to prevent soil from entering shoreline areas and consequent sedimentation and adverse water quality impacts.

3.1.2 Coastal Setting, Coastal Erosion and Flood Zone

Existing Environment, Impacts and Mitigation Measures

The project site is a narrow corridor located mauka of the shoreline as defined by a certified shoreline survey published on March 1, 2017. The elevation of the project site is approximately 4-8 feet above mean sea level. The certified shoreline roughly follows a topographic change in slope created by the edge of the soil of the Kona Reef Condominiums lawn area and a change of elevation of several feet to the lava shelf of the shoreline area.

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 (FMEA 2017). The map for the project site is 1551660713D, which designates the area of the subject property where the proposed erosion abatement structure is to be located as Zone AE on the Preliminary DFIRM maps, with a base flood elevation of 10 feet (Figure 6). The shoreline area makai of the project site is designated as Zone VE (Coastal High Hazard Area).

Construction in flood zone AE, as per the Hawaii County Code Chapter 27, cannot increase the water surface elevation of the base flood at any point. As such, the proposed

structure cannot be above grade, as this would increase the water surface elevation of the base flood. Therefore, the design is consistent with the flood restrictions of the Hawaii County Code.

Figure 6. Preliminary DFIRM Map for Proposed Project Area

Note: FEMA flood map with preliminary flood zones shows project site within flood zone AE with a base flood elevation of 10 feet above mean sea level. Flood zones designated AE are special flood hazard areas that correspond to the one hundred-year floodplains.

Dr. John "Jack" Lockwood and Dr. Timothy Scheffler of Geohazards Consultants International, Inc. (GCI 2016) prepared an assessment of geologic and marine factors that affect shoreline erosion (Appendix E). This report documents the nature of erosion and shoreline migration at the Kona Reef property, basing this assessment on quantitative measurements and observations obtained through field inspection, aerial photography, satellite imagery and a review of the geologic literature. Additionally, this report assessed potential environmental impacts of the proposed project.

GCI described the shoreline area makai of the project site as being underlain by an irregular shelf of dense, nearly flat pahoehoe lavas that also underlie the Kona Reef Condominiums. The age of this flow is estimated to be 10,000 to 25,000 years old (Wolfe and Morris, 1996). GCI notes that the shoreline in front of the project site contains irregular pockets of unconsolidated sand and boulders. The sand deposits, which can be moved about by surging waves, are derived from the mechanical and biological erosion of offshore coral. GCI notes that a review of aerial photographs shows that there is significant variation in the quantity of sand in these deposits, and this variation is at least partly seasonal. GCI notes no evidence of lateral transport of sand

across the pahoehoe platform fronting the project site. Therefore, there is not a physical connection between the variable sand deposits on the pahoehoe shelf fronting the project site and other lateral areas beyond the project site, including Honl's Beach (Waiaha Bay).

GCI also evaluated the wave environment along the Kona Coast. Waves along the Kona Coast have three sources, south swells, Kona storms and northwesterly storms, in addition to tsunami and hurricane swells. Of these wave sources, south swells are the most common, but are also the weakest, with northwest (i.e., winter) swells being the largest. Hurricanes can produce much larger waves, although the average return period for them is about 40 years. GCI notes that of the major storms that have impacted West Hawaii over the past 60 years, four have occurred since the Kona Reef Condominiums were constructed in 1980, but none have caused serious damage. GCI observed that the rock fragments broken off of the pahoehoe shelf and transported to the shoreline are well-rounded, indicating that transport of these rocks outside of the weathering region is infrequent.

Of increasing importance with respect to land use in coastal regions throughout the world is the issue of sea level rise, which exacerbates the effects of wave erosion on the shoreline. The Earth is warming because of increases in human-produced "greenhouse" gases such as carbon dioxide and methane, which in turn has led to a rise in global sea level (Intergovernmental Panel on Climate Change 2017). The primary mode of warming of these "greenhouse" gases is due to their absorption of thermal infrared radiation from the warm Earth's surface, preventing escape of this heat energy to space and consequent cooling effects. According to the National Climate Data Center of the National Oceanic and Atmospheric Administration (NOAA), global mean sea level has been rising at an average rate of 1.7 mm/year (plus or minus 0.5 mm) over the past century, a rate which has increased over the last 10 years to 3.1 mm/year (Bindoff et al., 2007). NOAA forecasts an expected range of sea level rise over the next century of between 0.18 and 0.59 m, due mainly to thermal expansion and contributions from melting alpine glaciers. However, potential contributions from melting ice sheets in Greenland or Antarctica may yield much larger increases. On Hawai'i Island, global sea level rise is coupled with local effects of subsidence, so changes in sea level are a combination of the effects of global sea level rise and subsidence of the Island. Long-term (i.e., on a geologic timescale) subsidence of Hawaii Island, evidenced by a drowned reef terrace west of Kealakekua Bay 10 miles south of the project site formed about 13,000 years ago, which is now at 150 m of water depth, yields an absolute rate of subsidence of 1.8 - 3.0 mm/year (Moore 1984). However, given global warming produced sea level rise a somewhat higher annual rate is reasonable. (Huang 2005) use a figure of 4.0 mm/year for global sea level rise, but this does not consider subsidence of the Big Island. Therefore, GCI considers that a larger value of 6.0 – 7.0 mm/year is reasonable for Hawaii Island, resulting in an estimation of about 0.3 m, or about one foot, in 50 years as a rough estimate.

GCI observed unusually high storm wave surges reaching the margin of the lawn fronting the Kona reef property (Appendix D, GCI Figure 10) and noted that the surges do not move the boulders located within the shoreline area, and may transport already loosened sediments from the margin of the lawn area. In places, GCI estimate, this erosion has caused the lawn to retreat as much as six inches since construction. Overall, however, historic retreat of the shoreline is very minor, evidenced by the presence of the coconut palms planted in the 1980s. GCI concluded that the erosion abatement structure would protect the lawn area from surge waves that can reach the shoreline during times of storms or tsunami. GCI further concludes that the proposed project would have no environmental impact to shoreline processes, or shoreline or marine habitats. In the event of especially large surge waves, such as tsunami waves, they would overtop the proposed structure, which would prevent erosion.

Huang (2005), in the Coast Hazard Mitigation Guidebook, recommends that all hazards facing coastal areas, not just erosion, be considered when planning for land use and coastal construction in Hawaii. (Fletcher et al. 2002) evaluated general coastal zone hazards for much of the State of Hawaii. They rate the hazards for the project vicinity as represented in Table 1.

Table 1. Project Vicinity General Coastal Hazards Summary

Hazard Type	Relative Threat	Scale (1-4)
Tsunami	High	4
Stream Flooding	Medium-High	3
High Waves	Medium-Low	2
Storms	Medium-High	3
Erosion	Medium-low	2
Sea Level Change	Medium-High	3
Volcanic/Seismic	High	4
Overall Hazard Assessment	High	6 (on scale of 1-7)

3.1.3 Water Quality

Existing Environmental, Impacts, and Mitigation Measures

As discussed in the preceding section, the project site is adjacent to the shoreline. No water features such as streams, springs, or anchialine ponds are found on or near the subject property. Construction of the erosion abatement structure will have a minor, long-term positive impact on coastal water quality by reducing the rate at which soil enters the ocean from the Kona Reef property. In the event of a major tsunami, the proposed project is likely to have a significant positive impact on coastal water quality in the project site vicinity relative to the No Action Alternative.

Construction of the erosion abatement structure will include practices to minimize the potential for sedimentation, erosion and pollution of coastal waters. The bottom of the

structure would be well above sea level; therefore construction is not likely to reach groundwater.

As construction of the structure would disturb soil during the construction phase, the potential exists for polluted storm water runoff to leave the site and enter the ocean. No material will be stored or stockpiled within the shoreline setback, including excavated soil and rocks, which will be stored off-site by the contractor. Additionally, in order to minimize the potential for polluted stormwater runoff the contractor will implement Best Management Practices (BMPs), including covering all areas of disturbed soil with plastic sheeting during non-work hours and during periods of rain. Further, all concrete washing and cleaning of tools and equipment will be performed off-site and wash water will not be allowed to enter storm drains, or allowed to otherwise runoff to areas where it could eventually reach the ocean.

The applicant will ensure that his contractor performs all earthwork in conformance with the following ordinances:

(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.

No Action Alternative

The obvious costs of the No Action Alternative would be foreseeably adverse to water quality and shoreline/coastal habitats, and potentially significant adverse impacts during major coastal flooding events. Without stabilization the soil will enter the ocean and result in polluted storm water runoff. Furthermore, both the residents of the Kona Reef Condominiums and members of the public would lose some, or all, of the lawn area. As the project site is free to be used by members of the public for shoreline access, this resource would be degraded and possibly lost.

3.1.4 Flora and Fauna

Existing Environment, Impacts and Mitigation

The project site is located within the coastal strand, and in pre-contact or pre-settlement times would have contained plant species of the coastal strand habitat. However, as the project site has been highly modified by activities that include construction of the Kona Reef Condominiums, the project site now contains largely non-native and ornamental plants.

On March 5, 2016 Dr. Grant Gerrish performed a flora and fauna survey of the project site. A report documenting these surveys is attached as Appendix F. Table 2 lists the plant species observed within the project site.

Table 2. Plant Species Identified on the Project Site

Scientific name	Common name	Origin/Status
Axonopus compressus	Tropical Carpet Grass	Introduced
Bougainvillea sp.	Bougainvillea	Introduced
Cynodon dactylon	Manienie, Manienie Haole, Bermuda Grass	Introduced
Cyperus brevifolius	Kilioopu	Introduced
Cyperus polystachyos	No common name	Indigenous
Elusine indica	Goose grass	Introduced
Fimbrystilis dichotoma	Forked Fimbry	Indigenous
Poa sp.	Blue Grass	Introduced
Stenotaphrum secundatum	St. Augustine Grass, Buffalo Grass	Introduced

Of the ten plant species identified within the project site three are considered indigenous, or native, species. None of these three is considered rare, or threatened or endangered, and all three species are common (Smithsonian 2012). This is reflective of the fact that the species observed are landscaped ornamentals. Therefore, the project would not impact any plant species of concern, rare, threatened, or endangered.

Directly adjacent to the project site are three coconut palms whose root systems may extend into the project site, and may be impacted by the construction activities. These were planted as part of the Kona Reef Condominiums landscaping and are not representative of pre-existing habitat. As project design may include a buffer of 12 inches or more from the certified shoreline, the project would be moved a sufficient distance mauka so that one or more of the coconut trees present may not be impacted.

A number of common introduced bird species were observed within the project site and on adjacent areas. These included the House Sparrow (*Passer domesticus*), Saffron finch (*Sicalis flaveola*), Common Waxbill (*Estrilda astrild*), and Zebra Dove (*Geopilia striata*). All of these species are common and non-native bird species in urban environments on the Island of Hawaii. The fauna survey further noted that it is possible that the indigenous *Kolea*, or Pacific Golden Plover (*Pluvialis fulva*) would forage within the lawn area. The flora/fauna report further noted that no non-human mammals were observed on the project site, nor would any be expected to be found in the area due to its highly modified nature.

The shoreline area adjacent to the project site may occasionally be visited by sea turtles including the Pacific Green Sea Turtle (*Chelonia mydas*), the Hawksbill Turtle (*Eretmochelys imbricate*), and the Hawaiian Monk Seal (*Neomonachus schauinslandi*), species protected by the Marine Mammal Protection Act. Therefore, if these species use

the shoreline area during construction, work should halt until the animal leaves the area. The contractor will monitor for the presence of protected sea turtles and monk seals. As artificial lighting may adversely affect fauna, no artificial lighting would be used during construction, and construction activities would be limited to daylight hours.

3.1.5 Air Quality and Noise

Existing Environment, Impacts and Mitigation

Air pollution in West Hawaii is mainly derived from volcanic emissions containing sulfur dioxide, which convert into particulate sulfate and produce a volcanic haze, or "vog", that routinely blankets North and South Kona.

Noise on the project site is low and derived principal from natural sources such as surf and wind, as well as from residential activities, recreational activities and some traffic noise from Ali'i Drive.

Project construction would involve excavation with a small excavator, compressors, a portable concrete mixer, and vehicle traffic. These would produce short-term and minor noise and air-quality impacts. Such activities can generate noise exceeding 95 decibels at times, impacting nearby sensitive noise receptors in the immediate vicinity, including the residents of the Kona Reef Condominiums. Whenever construction noise is expected to exceed the Department of Health's (HDOH) "maximum permissible" property line noise levels, contractors will be required to consult with HDOH as per Title 11, Chapter 46, HAR (Community Noise Control) prior to construction. HDOH would then review the proposed activity, location, equipment, project purpose and timetable, in order to decide whether a permit is necessary and what conditions and mitigation measures, such as restriction of equipment type, maintenance requirements, restricted hours, and portable noise barriers, will be necessary. The contractor would consult with HDOH to determine what permit restrictions are necessary. However, due to the proximity to the Kona Reef Condominiums, the contractor will adhere to restrictions on work hours of 8:00 am to 5:00 pm Monday through Saturday.

The proposed project would have no long-term noise or air quality impacts.

3.1.6 Hazardous Substances, Toxic Waste and Hazardous Conditions

Existing Environment, Impacts, and Mitigation Measures

The proposed project is not likely to encounter any hazardous substances, toxic waste, or hazardous conditions. Construction activities would use small quantities of fuels and other chemicals (i.e., hydraulic fluid) for power generators and construction equipment. These would be stored away from equipment and potential sources of ignition in a secure location.

3.1.7 Scenic Resources

Existing Environment, Impacts, and Mitigation Measures

Due to the project site's proximity to the ocean, the vicinity is appreciated for its view planes of the ocean where not obstructed by structures. The project site itself affords impressive vistas of the ocean and of the shoreline towards the north towards Kailua Bay.

The Natural Resources Section of the Hawaii County General Plan (County of Hawaii Planning Department 2005) notes no sites known for their natural beauty in the immediate vicinity of the project site. However, viewplanes to the makai direction from the Kuakini Highway are noted.

As the project would produce no modification to surface features of the project site, it would not result in any modification of viewplanes from the project site, or from areas in the vicinity towards the ocean, and would not result in any adverse impact to scenic resources.

3.2 Social and Cultural Environment

3.2.1 Land Use, Designations, and Controls

Existing Setting, Impacts and Mitigation Measures

The property has a zoning designation of V-0.75 (Resort-Hotel) by the County of Hawaii and is located within the State Land Use Urban District. The County of Hawaii General Plan Land Use Pattern Allocation Guide (LUPAG) maps show the project site and vicinity designated as high density urban.

The project site is located within the shoreline setback area, which is defined by Hawai‘i Revised Statutes Section 205A-43(a) and Planning Department Rule 11-5, as extending inland from the shoreline a minimum distance of 40 feet. The proposed project would be located within the shoreline setback and would therefore require a shoreline setback variance. As a result, the proposed project triggers the environmental review requirements under Chapter 343, Hawai‘i Revised Statutes, known as the "Hawai‘i Environmental Policy Act." The authority to determine whether an Environmental Impact Statement is required is the accepting authority, the County of Hawaii Planning Department.

As a result of the certified shoreline survey, portions of the Kona Reef Condominium structures now are within the 40-foot shoreline setback. These encroachments are labeled in the certified shoreline survey presented in Appendix C. This encroachment will be addressed in the shoreline variance application. As noted in the coastal erosion evaluation (Appendix E), the shoreline margin, as defined by the edge of the lawn area, has moved little in the past few decades. Instead, this encroachment is more likely to be due to adoption of the certified shoreline rule in 2002, as stated in Hawaii Administrative Rules (HAR) Chapter 13-222, which defines the shoreline as, "the upper reaches of the wash of

the waves, other than storm or 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."

Activities by the Kona Reef Condominiums in the shoreline setback area fronting the property have involved a number of permitting actions. We summarize these actions as follows:

1979-1980 Kona Reef Condominiums Constructed with a total of 129 units.

1981 An HRS 343-compliant Environmental Assessment dated April 22, 1981 was prepared considering the environmental impacts of construction of a 3-foot high seawall, installation of a sprinkler system, and filling the area with approximately 800 cubic yards of topsoil for the landscaping of the 40-foot shoreline setback area. At the public meeting held on June 25, 1981 the request was withdrawn, and the project was not completed.

1981 Shoreline Setback Variance Permit No. 610 issued July 10, 1981, applicant Gentry Homes, Ltd. allowed for the following improvements within the shoreline setback area of the Kona Reef Condominiums:

- Retention of existing sections of the 3-foot high concrete reinforce masonry (CRM) wall at the mauka end of the shoreline parcel that encroached into the 40 foot setback area and related landscaping improvements within the shoreline setback area. This CRM wall was not a seawall but a landscaping and privacy wall constructed at the same time as the condominium structures. Portions of this wall encroached into the shoreline setback area.
- Implementation of a Shoreline Access Plan consisting of a delineated pedestrian easement along the north property line at least 10 feet wide, and provisions for lateral easement across the seaward portions of the subject area.

1981 SMA Minor permit 81-12 issued July 15, 1981 to applicant Gentry Homes, permitted landscaping improvements in the shoreline setback area for the Kona Reef Condominiums.

1985 Shoreline Setback Variance No. 610 amended January 22, 1985, as part of a negotiated settlement between Gentry Homes, Ltd and the County of Hawaii's Corporation Counsel regarding Shoreline Setback violations, allowed for amendment of the Shoreline Access Plan to include a public pedestrian access way to the shoreline along the northern property line of the property at least 10 feet wide. This amendment also eliminated the requirement to dedicate easements.

2011 Special Management Area Use Permit Application (SAA 11-000687) dated June 20, 2011 for the demolition and new construction replacement of a courtyard gazebo. SMA minor permit #SMM 11-00187 was issued on August 4, 2011.

2011 Special Management Area Use Permit Assessment Application (SAA 11-000708) for construction of a wall was later withdrawn by the applicant because it did not accurately depict or convey the property owners' desired results and scope of the project.

2012 As a requirement for a Shoreline Survey Certification, on dated March 20, 2012 the Hawaii State Surveyors office mandated the demolition and removal of a 3-foot by 3-foot concrete slab at the south end of the property and also removal of informational and warning signs that were approved under the existing Shoreline Setback Variance # 610. Work was completed on or about August 10, 2012. This certified shoreline survey was certified on August 17, 2012.

2012 Best Management Practices approved for the removal of a concrete and boulder revetment. This removal was required for the shoreline survey certification approval.

2013 Special Management Area Minor Permit (SMM-000995) was issued for the repair of concrete spalling and cracks.

2013 On August 6, 2013 permission was received from the Hawaii County Planning Department to address the requirement by the Hawaii State Land Survey Office to demolish and remove a concrete and boulder revetment that were encroaching onto state lands. This was a condition of certification of the shoreline survey. A bond was secured in 2012 which allowed the 2012 survey to be certified prior to completion of the demolition in 2013.

2014 Special Management Area Assessment Application (SAA-001112) was submitted for demolition and replacement of 13 garden trellises. It was determined by County of Hawaii Planning Department that a permit was not required for the project.

2015 An SMA permit was issued on March 10, 2015 for the removal of a 14-foot section of sea wall encroaching onto state lands. The Department of Land and Natural Resources required the removal as a condition for certification of a shoreline survey.

2015 A building permit was issued on March 25, 2015 for the removal of the 14-foot section of sea wall encroaching onto state land.

2015 A Wes Thomas Associates submitted shoreline survey was certified on June 18, 2015.

2016 Wes Thomas Associates contracted to do a new shoreline survey as the previous survey had expired.

2017 The current Shoreline Survey was certified on March 1, 2017.

3.2.2 Socioeconomic Characteristics and Recreation

Existing Setting, Impacts and Mitigation Measures

The project site is located within the district of North Kona in an area dominated by tourism and recreational activities. The North Kona District is a Census County Division

(CCD), and according to the United States Census (United States Census Bureau 2014), and was estimated to have a resident population of 40,480 in 14,374 households in 2014. Much of this population is resident in single-family homes, with condominiums being more typical of makai areas along Ali'i Drive and in central Kailua-Kona. Areas mauka of Ali'i Drive are predominantly residential.

The shoreline setback area fronting the Kona Reef Condominiums is a turf/lawn area used for sunbathing and public access to and from the shoreline as well as the adjacent Waiaha (Honl's) Beach Park. Popular surfing spots are found both in the ocean in front of the Kona Reef Condominiums and Honl's Beach Park.

The proposed project is expected to have a negligible effect upon the socioeconomic character of the project vicinity. However, as the proposed project would serve to protect the visual character of the turf/lawn area and its usefulness for recreation and shoreline access, it would also serve to protect the value of the Kona Reef Condominium property.

3.2.3 Cultural and Historic Resources

The cultural value of the project site, and potential impacts to that value resulting from the proposed project, was assessed as part of this EA. The purpose of this assessment was to determine whether the subject property supports any traditional gathering uses, was vital for access to traditional cultural sites, or has other important symbolic associations for native Hawaiians.

It should be emphasized that the proposed project is limited to a narrow corridor of about 220 feet of length of a landscaped lawn area, and that the proposed project would not appreciably modify the physical characteristics of the project site. As the project site is frequently used to access offshore surfing areas, this assessment included a records search for the ahupua'a of Wai'aha 1, as well as observations of the site.

Historical and Cultural Background

The Kona District, as well as the project vicinity, figures prominently in the history of the Hawaiian Islands. Kona became a residence of many of the alii (chiefs) of the Island of Hawaii beginning with Umi-a-liloa, who unified the island circa 1525. By this time, the island was divided into six districts or moku-o-loko (Fornander 1973 – Vol. II: 100-102). On Hawaii Island, the district of Kona is one of six major moku-o-loko within the island. Kona, like other large districts on Hawaii, was further divided into smaller land divisions (i.e., 'okana or kalana), including that of Kona 'akau (North Kona), which extended from Lanihau to Pu'uohau.

Like Umi-a-liloa centuries before upon unification of Hawai'i, Kamehameha I also moved his court to Kona after unification of all the islands to Kamakahonu in the *ahupua'a* of Lanihau (present-day Kailua-Kona). Here Kamehameha spent the last years of his life and died in 1819 (Menton 1994: pp. xv-xvii).

The project area is located within the ahupua‘a of Wai‘aha 1, meaning “gathering water” (Pukui, 1976). Haun & Henry (2016) state that this name is possibly derived from Ma‘o Heiau, a heiau located on the north side of *Wai‘aha Bay*. Rechtman (2002) stated that this ahupua‘a contained ceremonial complexes and high status residences with the majority of pre-contact and early post-contact sites situated in the coastal portion of Wai‘aha. Maly (1996) translated portions of the Hawaiian newspaper Ka Hoku o Hawaii between 1914 and 1977, including the following account that signifies the agricultural importance of Wai‘aha:

> The story is set in about the 13th century, in the time of Pili-a-Ka‘aiea (Pili), sovereign chief of all Kona, the narrative identifies the lands between Lanihau [Kailua] and Puapua‘a as an integral component of Pili’s royal domain. Pili was a great advocate of contests in debating, fighting and physical strength, and Hinakahua at Puapua‘a was the site of the chief’s longhouses and contest field which supported those activities. While Pili was at Hinakahua, he was supported by the agricultural and natural resources of the surrounding ahupua‘a including Kahului, Waiaha, Pua‘a, Auhaukea‘e, Hinaloli (Hienaloli), Honua‘la, Keopu, Moeauoa and Lanihau. Pili’s royal compound was at Niumalu, his canoe fleets were harbored at Oneo (and his wealth-houses, where tribute was kept until it was needed, were situated at Ahu‘ena.

Wai‘aha’s importance to the Hawaiian royalty continued after western contact, and Queen Emma, wife of Alexander Liholiho (Kamehameha II), had a residence and associated gardens in inland Wai‘aha.

A portion of the Kona Reef condominium property along Kahakai Road was formerly composed of Land Commission Award 7481, and was awarded to Kalae as Royal Patent 3682, a 1.61-acre claim comprised of two partially cultivated land sections.

The advent of tourism marked the next significant change for the Kona District, marked by the construction of Kona’s first major hotel, the Kona Inn, in 1928 (Menton 1994). The old Kona airport was constructed in 1945, abandoned in 1970, and made a State park in 1975.

As the project site is now developed and largely modified from pre-existing times, and to a greater degree, pre-contact times, and contains no surface archaeological sites (see *Existing Archaeological Resources* below) the cultural associations of this portion of Waiaha 1, are generally not evident. The project site’s location adjoining the shoreline suggests that the area may be used for the traditional activities of fishing and gathering of ocean resources within the coastal strand habitat. The project site, however, does not contain habitat that would be of interest to gatherers, however, and has not been used for Native Hawaiian ceremonial purposes, although the project site might be used by

individuals to access the shoreline for fishing or gathering of ocean resources. These practices would not be adversely impacted by the proposed project. It is anticipated that the proposed project would preserve shoreline access for those using the lawn area to access shoreline areas, as the proposed project would preserve the condition of the lawn area.

Commercial agriculture in the form of sugar cane cultivation came to Kona and Waiʻaha in the late 1800s and early 1900s (Kelly 1983), although remained above approximately 600 feet elevation. The Kona Sugar Company mill, constructed in 1902, was located in upland Waiaha, overlooking Kailua at about 700 feet of elevation. Haun & Henry (2016) stated that as the 1970's brought development related to tourism to North and South Kona, the use of the Kona Reef condominium site was probably limited to cattle ranching. In 1927, rancher Manuel Gomes brought tracts of land in Waiʻaha and Kahului and used these lands for cattle grazing until the 1960s (Rechtman 2002).

In an attempt to gather information concerning cultural uses of the project site and vicinity, Native Hawaiian cultural organizations were contacted including the Kona Hawaiian Civic Club and the Office of Hawaiian Affairs. However, no responses were received. It is apparent that traditional cultural practices of fishing and gathering of ocean resources such as limu and opihi, in addition to surfing, are likely to occur in the project vicinity.

3.2.4 Archaeology and Historic Sites

Environmental Setting, Impacts and Mitigation Measures

No sites are listed on the National and State Register of Historic Places either on or directly adjacent to the subject property, according to published lists of Register sites maintained by the State Historic Preservation Division. The nearest sites listed on the National and State Register of Historic places are Kamakahonu, located approximately 0.8 mile north-northwest of the project site, and the Kamoa point sites, located approximately two miles south-southeast of the project site.

In order to evaluate the potential for sub-surface archaeological resources to exist in the project site, Haun & Associates was retained to perform an archaeological inventory study (Appendix D). Haun & Associates excavated a set of square test shovel holes along the erosion abatement structure corridor. These holes revealed that a layer of fill of thickness varying from 0.16 m to 0.93 m, covered native beach sand deposits of thickness varying from 0.16 m to 0.89 m, over pahoehoe bedrock. Excavation of the native sand layer revealed the remnant of a subsurface cultural deposit (Site 50-10-28-30493), a deposit containing pre- and/or post-contact traditional Hawaiian material. Haun & Associates concluded that the site is significant for its information content and recommended no further work or preservation due to the disturbed nature of the deposit.

Sub-surface archaeological resources may exist in the projects site, and project construction may inadvertently reveal these resources. If archaeological resources or human are encountered during project construction, work in the immediate area of the discovery should be halted and DLNR-SHPD contacted as outlined in Hawaii Administrative Rules §13-275-12. Although DLNR-SHPD has not responded to the consultation by Hauna & Associates by the time of this writing, a period of approximately 10 months, the archaeological inventory survey has been prepared to fulfill the requirements of Hawai‘i Administrative Rule 13-13-276 and DLNR-SHPD implies concurrence with the findings and recommendations of the Archaeological Inventory Report.

3.3 Public Facilities, Public Access and Utilities

Environmental Setting, Impacts and Mitigation Measures

Kahakai Road passes along the north side of the Kona Reef Condominiums, and Ali’i Drive forms the eastern property boundary. The site is serviced by underground power and telephone lines from HELCO and Hawaiian Telcom. Water service is provided by the County of Hawai‘i Department of Water Supply. Wastewater disposal is through the County municipal sewage system. Waiaha County Beach Park is adjacent to the Kona Reef Condominiums property, and provides no services to users. No other public facilities are present. No adverse impact to public facilities or utilities would occur.

Shoreline Setback Variance No. 610, as amended, required preparation of a Shoreline Public Access Plan, which allows (1) public access at least 10 feet wide through the north Kona Reef property boundary to the shoreline; and (2) lateral public access through the lawn area. As the proposed project would preserve the lawn area and would therefore preserve lateral public access through the lawn area, it would therefore facilitate the preservation of public access to the shoreline and lateral access along the shoreline.

3.4 Secondary and Cumulative Impacts

The small scale of the proposed project would not produce any secondary impacts, such as population changes or effects on public facilities. Cumulative impacts result when several projects that individually have limited impacts combine to produce more significant impacts that may require coordination for mitigation. However, the scope of the proposed project is very limited in scale, and none of the impacts are expected to occur in areas outside of the project site and the Kona Reef Condominium property. Therefore, the proposed project is not of the type that would result in cumulative impacts.

The adverse effects of construction of the proposed erosion abatement structure on the subject property are very minor and include temporary disturbances to air quality, noise, and visual quality during construction. Other than the precautions for preventing any effects to water quality during construction listed above in Section 3.1.3, no special mitigation measures should be required to counteract any small, adverse cumulative

effect of nearby construction. It is particularly important to note that the project is expected to generate negligible scenic impact, no long-term adverse impact to public use and enjoyment of adjacent shoreline areas, and no effect to historic or cultural properties. There would thus be no risk of cumulative impact to these resources.

3.5 Required Permits and Approvals

County of Hawai‘i

Shoreline Setback Variance

Special Management Area Permit or Exemption

Plan Approval

Building Permit

State of Hawai‘i

Certified Shoreline Survey

3.6 Consistency with Government Plans and Policies

3.6.1 County of Hawai‘i General Plan

The *General Plan* for the County of Hawai‘i is the document expressing the broad goals and policies for the long-range development of the Island of Hawai‘i. The plan was adopted by ordinance in 2005. 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 each of the nine judicial districts comprising the County of Hawai‘i. Below are pertinent sections followed by a discussion of conformance of the proposed project to each.

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: Construction of the erosion abatement structure would not be out of balance with the County’s natural and social environments, would create temporary construction jobs for local residents, and would indirectly have a minor positive impact to the economy through construction industry use of local vendors for materials and equipment. 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 project would not have a significant adverse effect on the environment and would not diminish the valuable natural resources of the region. The erosion abatement structure would prevent adverse water quality impacts in the long-term, and short-term potential impacts would be mitigated with implementation of Best Management Practices during construction. The project would not cause pollution and adverse shoreline impacts would not occur.

FLOODING AND OTHER NATURAL HAZARDS GOALS

(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.

FLOODING AND OTHER NATURAL HAZARDS POLICIES

(d) Any development within the Federal Emergency Management Agency designated flood plain must be in compliance with Chapter 27.

Discussion: The proposed project would serve to prevent damage to the lawn area, would control sediment pollution of the ocean by preventing sediment runoff, and would prevent damage to the lawn area, in the event of inundation of the project site from storm surge or tsunami inundation.

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.

(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: It has been determined through consultation with the State Historic Preservation Division that no archaeological or cultural sites recommended for preservation appear to be present on the project site or would be affected by the proposed action.

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.

Discussion: The proposed project is consistent with land use and building structure regulations, and the erosion abatement structure will be anchored to underlying bedrock. The proposed project will result in no net increase in runoff. The proposed project would directly prevent damage from inundation and would control pollution by reducing sediment runoff.

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 project site is within the AE Zone, or areas within the 100-year Floodplain as determined by detailed methods in the community flood insurance study, according to the Flood Insurance Rate Maps (FIRM). The improvements are subject to review by the Hawai‘i County Department of Public Works to ensure that all relevant standards of Chapter 27 and Chapter 10 of the Hawai‘i County Code are addressed.

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 proposed project would maintain the integrity of the lawn area fronting the Kona Reef Condominiums, and would therefore maintain the natural beauty of the area. Maintenance of the lawn area would directly maintain public access to the shoreline and adjoining Wai‘aha Beach Park.

NATURAL RESOURCES AND SHORELINES GOALS

(a) Protect and conserve the natural resources from undue exploitation, encroachment and damage.

(b) Provide opportunities for recreational, economic, and educational needs without despoiling or endangering natural resources.

(c) Protect and promote the prudent use of Hawaii's unique, fragile, and significant environmental and natural resources.

(d) Protect rare or endangered species and habitats native to Hawaii.

(e) Protect and effectively manage Hawaii's open space, watersheds, shoreline, and natural areas.

(f) Ensure that alterations to existing land forms, vegetation, and construction of structures cause minimum adverse effect to water resources, and scenic and recreational amenities and minimum danger of floods, landslides, erosion, siltation, or failure in the event of an earthquake.

NATURAL RESOURCES AND SHORELINES POLICIES

(a) Require users of natural resources to conduct their activities in a manner that avoids or minimizes adverse effects on the environment.

(c) Maintain the shoreline for recreational, cultural, educational, and/or scientific uses in a manner that is protective of resources and is of the maximum benefit to the general public.

(d) Protect the shoreline from the encroachment of man-made improvements and structures.

(h) Encourage public and private agencies to manage the natural resources in a manner that avoids or minimizes adverse effects on the environment and depletion of energy and natural resources to the fullest extent.

(p) Encourage the use of native plants for screening and landscaping.

(r) Ensure public access is provided to the shoreline, public trails and hunting areas, including free public parking where appropriate.

(u) Ensure that activities authorized or funded by the County do not damage important natural resources.

Discussion: The proposed project would protect shoreline habitat by reducing long-term soil loss and sedimentation from the project site to the adjacent shoreline area.

LAND USE GOALS

(a) Designate and allocate land uses in appropriate proportions and mix and in keeping with the social, cultural, and physical environments of the County.

LAND USE POLICIES

(c) Allocate appropriate requested zoning in accordance with the existing or projected needs of neighborhood, community, region and County.

LAND USE, OPEN SPACE GOALS

(a) Provide and protect open space for the social, environmental, and economic well-being of the County of Hawai‘i and its residents.

(b) Protect designated natural areas.

LAND USE, OPEN SPACE POLICIES

(a) Open space [in the County of Hawai‘i] shall reflect and be in keeping with the goals, policies, and standards set forth in the other elements of the General Plan.

Discussion: The proposed project does not detract from the open space in the area (i.e. Wai‘aha Beach Park). Lateral access, frequently used by the public, would be maintained.

3.6.2 Special Management Area

The project site is located within the Special Management Area (SMA). After the conclusion of the EA process, Kona Reef AOAO will apply for a Special Management Area minor permit with this Environmental Assessment attached. However, the proposed action complies with provisions and guidelines contained in Chapter 205A, Hawaii Revised Statutes (HRS), entitled *Coastal Zone Management.* The proposed action would be consistent with Chapter 205A because it would not adversely affect historic resources, scenic and open space resources, economic uses, coastal hazards, or public access to recreation areas, as discussed below.

Recreational Resources: The project site is located mauka (i.e., uphill of) of the shoreline, and is currently maintained as a flat, lawn area used primarily by recreational users from the Kona Reef condominiums as well as members of the public. As the proposed project is intended to preserve this lawn area from degradation by erosion, it would serve to protect both recreational use of the project site itself, and access to recreational resources, including both the adjacent shoreline, Honl’s Beach, and offshore areas used for surfing and water sports.

Historic Resources: An archaeological inventory survey of the project site has been completed and no sites appear to be present on the surface. The archaeological inventory survey identified a subsurface cultural deposit, and the site consisting of this deposit was assessed as significant for its information content only, and no further work or preservation is recommended. DLNR-SHPD has implied its concurrence with the recommendations and findings of this work.

Scenic and Open Space Resources:

Rule 9 of the Hawaii County Planning Commission Rules intends to prevent development that would "substantially interfere with or detract from the line of sight toward the sea from the State Highway nearest the coast or from other scenic areas identified in the General Plan." As the proposed structure would be built flush to the existing ground surface it would not obstruct any views of the ocean or any other scenic areas.

Coastal Ecosystems:

The project site and property are adjacent to the shoreline. The proposed project would minimize the potential for soil and polluted storm water runoff to enter the ocean by stabilizing the soil underlying lawn area.

3.6.3 Shoreline Setback Rules

Rule 11 (Shoreline Setback) of the Hawaii County Planning Department Rules of Practice and Procedure governs uses within the Shoreline Setback Area. Pursuant to Rule 11-6(b), all structures and activities that do not qualify under section 11-7(a) through (c) are prohibited in the shoreline setback area, unless the applicant obtains a Shoreline Setback Variance or the Planning Director determines that it is a "minor activity…that does not adversely affect the shoreline" in the context of the rules and is thus exempt."

Planning Commission Rules of Practice and Procedure, which provide for the variance process in section 8-8 and defines the criteria for approving a variance in Section 8-10. Section 8 10 (b) (3) states that:

> (c) No variance shall be granted unless appropriate conditions are imposed as applicable:
> (1) To comply with Chapters 10 and 27 of the Hawaii County Code relating to Erosion and Sedimentation Control and Flood Control, respectively;
> (2) To maintain safe lateral access along the shoreline or adequately substitute for its loss;
> (3) To minimize risk of adverse impacts on beach processes;
> (4) To minimize risk of structures failing and becoming loose rocks or rubble on public property; and
> (5) To minimize adverse impacts on public views to, from, and along the shoreline. that conforms to the purpose of Rule 8, Section 8-2. The erosion

abatement structure would prevent any encroachment onto the shoreline area, the proposed structure is at grade and would not be perceived as "massing of concrete." The proposed action would not cause the loss of sand, coral or rocks from the shoreline. The proposed improvement would not endanger any residential dwellings. Section 8-10 (b) (3) continues:

Discussion: The erosion abatement structure will comply with Chapters 10 and 27 of the Hawaii County Code, pertaining to Erosion and Sedimentation Control and Flood Control, respectively. The proposed project will reduce the potential for adverse impacts on beach process, notable the potential for discharge of polluted storm water runoff to shoreline areas. The proposed project would not adversely impact public views to, from, and along the shoreline, as it would be built flush to the existing ground surface. The proposed project would have no encroachment on the shoreline area, and would be built above the certified shoreline, would not cause the loss of sand, coral, or rocks from the shoreline, and would not endanger any residential dwellings.

3.6.4 Kona Community Development Plan

The Kona Community Development Plan (CDP) encompasses the judicial districts of North and South Kona, 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, and to serve as forums for community input.

The General Plan now requires that a Community Development Plan shall be adopted by the County Council as an "ordinance," giving the CDP the force of law. This is in contrast to plans created over past years, adopted by "resolution" that served only as guidelines or reference documents to decision-makers. The Kona CDP was adopted in September 2008 by the County Council. The version referenced in this Environmental Assessment is at:

http://www.hawaiicountycdp.info/north-and-south-kona-cdp/cdp-final-drafts/Final%20KCDP_Sept%202008_text.pdf/view

The Plan has many elements and wide-ranging implications, but there are several major strategies that embody the guiding principles related to the economy, energy, environmental quality, flooding and other natural hazards, historic sites, natural beauty, natural resources and shoreline, housing, public facilities, public utilities, recreation, transportation and land use.

The erosion abatement structure is consistent with, or not inconsistent with, all aspects of the Kona CDP. The project's purpose reflects Section 4.3.2, Environmental Resources, which calls for managing the impacts of development on natural resources, and is detailed in Objective ENV-1: Managing Impacts:

> In order to minimize impacts on the land, make use of best management planning practices for any land-based endeavor by balancing public and private rights, and taking advantage of an ever-improving knowledge of resource sensitivity and natural processes.

The proposed project is consistent with this section of the Kona Community Development Plan as it preserves the lawn area used by the public, in a manner that also prevents potential future adverse impacts on the land and ocean.

4.0 DETERMINATION, FINDINGS AND REASONS

4.1 Determination

Based on the findings below, and upon consideration of comments to the Draft EA, the County of Hawai‘i Planning Department has determined that the proposed action will not have any significant effect in the context of Chapter 43, Hawaii Revised Statutes and section 11-200-12 of the State of Hawaii Administrative Rules, and has issued a Finding of No Significant Impact (FONSI). The findings below present the reasons the proposed project is not expected to have any significant effect in the context of Chapter 343, Hawai‘i Revised Statues and Section 11-200-12 of the State Administrative Rule.

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 involved, committed or lost. No native ecosystems or historic sites are present. No valuable cultural resources or practices such as coastal access, fishing, gathering, hunting, or access to ceremonial activities 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.

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 its impacts are negligible, 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 Kona community or State.

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.

6. *The proposed project will not involve substantial secondary impacts, such as population changes or effects on public facilities*.

As the project is minor, it would not involve any substantial secondary impacts, including population changes or effects on public facilities.

7. *The proposed project will not involve a substantial degradation of environmental quality*.

The project is minor, environmentally benign, and it would thus not contribute to environmental degradation.

8. *The proposed project will not substantially affect any rare, threatened or endangered species of flora or fauna or habitat.*

The project site has been previously modified, is landscaped, and supports almost entirely non-native plant species, with the exception of several coconut palms. No rare, threatened or endangered species of flora or fauna are known to exist on 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 constructing the erosion abatement structure are very minor and involve temporary disturbance to scenery and noise during construction, primarily affecting residents of the Kona Reef Condominiums. The project is not related to other activities in the region in such a way as to produce adverse cumulative effects or involve a commitment for larger actions. Other than the precautions for preventing any effects to water quality during construction listed above, no special mitigation measures would be required.

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 could occur during construction and will 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 project is inside the flood zone, according to FIRM maps, but all improvements will conform to appropriate regulations concerning development within such zones. Although

the proposed project would be located in a zone exposed to earthquake and volcanic hazards, there are no reasonable alternatives that would avoid such exposure. The proposed erosion abatement structure is unlikely to be damaged in the event of a tsunami.

12. *The project will not substantially affect scenic vistas and viewplanes identified in county or state plans or studies.*

The project is low-profile, would be build flush to the existing ground surface and would not impact views to, from or along the shoreline, nor any views listed in the Hawai‘i County General Plan or other plans.

13. *The project will not require substantial energy consumption*.

Small amounts of energy input would be required for construction and operation.

5.0 REFERENCES

Bindoff, N., et al. 2007. Observations: Oceanic climate and sea level, in Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, edited by S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K. B. Averyt, M. Tignor, and H. L. Miller, Cambridge Univ. Press, Cambridge, U. K.

County of Hawaii Planning Department. [February 2005 (as amended)]. The County of Hawaii General Plan. Hilo, Hawaii.

FEMA 2017. FEMA Flood Map Service Center. Downloaded April 5, 2017 from https://msc.fema.gov/portal

Fletcher, C.H., et al. 2002. Atlast of Natural Hazards in the Hawaiian Coastal Zone: USGS, Geologic Investigations Series Map I-2761. Washington, D.C.: U.S. Geological Survey.

Fornander, A. 1973 An Account of the Polynesian Race, Its Origin and Migrations. Rutland, Vermont and Tokyo: Charles E. Tuttle Company.

GCI 2016. Geologic and Marine factors that Affect Shoreline Erosion, Kona Reef Condominiums, North Kona District, Hawaii. Volcano, Hawaii.

Giambelluca, T. W., Q. Chen, A. G. Frazier, J. P. Price, Y.-L. Chen, P.-S. Chu, J. K. Eischeid, and D. M. Delparte. 2013. Online rainfall atlas of Hawaii. Bulletin of the American Meteorological Society 94:313–316.

Haun, A., & Henry, D. 2016. Draft Archaological Inventory Survey, Kona Reef Condominium Erosion Abatement Structure Project, Report 932-041516. Kailua-Kona: Haun & Associates.

Huang, D. 2005. Hawaii Coastal Zone Mitigation Handbook: Hawaii Coastal Zone Management Program. Honolulu: State of Hawaii, Department of Business and Economic Development.

Intergovernmental Panel on Climate Change. 2014. Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp.

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

Maly, K. 1996 Appendix A - Historical Documentary Research. Archeological Inventory Survey, Hienaloli 3 and 4, North Kona District, Island of Hawai’i (TMK: 7-5-11:2) by Henry, J.D., T.R. Wolforth, and P.H. Rosendahl. PHRI Report 1348-032996. Prepared for Maryl Development, Inc.

Menton, L.K. 1994. Kona in History: A Guide to Resources. Honolulu: History and Humanities Program of the State Foundation on Culture and the Arts in cooperation with the Kona Historical Society

Moore, J. A. 1984. Drowned Reefs as Indicators of the Rate of Subsidence of the Island of Hawaii. Journal of Geology v. 92, pp. 752-759.

Pukui, M. E. 1976. Place Names of Hawaii. Honolulu: University of Hawaii Press.

Rechtman, R. 2002 An Archaeological Inventory Survey of TMK: 3-7-5-18:08, Wai'aha 1st Ahupua'a, North Kona District, Island of Hawai'i. Prepared for Dan Bolton.

Smithsonian. 2017. Flora of the Hawaiian Islands. Downloaded April 5, 2017 from http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/

US Census. 2017. American Fact Finder. Downloaded April 5, 2017 from https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml.

USDA 2016. Web Soil Survey. United States Department of Agriculture Natural Resources Conservation Service. Downloaded April 5, 2017 from https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

USGS. 2016. Earthquakes in Hawaii: What you need to know. Downloaded April 5, 2017 from https://hvo.wr.usgs.gov/products/PPT_EQ%20in%20Hawaii_2015-2019.pdf

Wolfe, E. W., & Morris, J. 1996. Sample data for the geologic map of the island of Hawaii (No. 2524-B).

Wright, L.W., et al. 1992. Map Shoring Lava-Flow Hazard Zones, Island of Hawaii, USGS Miscellaneous Field Studies, Map MF-2193. Washington, D.C.

APPENDIX 1A: COMMENT LETTERS IN RESPONSE TO EARLY CONSULTATION

William P. Kenoi
Mayor

Duane Kanuha
Director

Bobby Command
Deputy Director

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

County of Hawai'i
PLANNING DEPARTMENT

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

August 20, 2014

Graham Paul Knopp, Ph.D.
P.O. Box 1310
Honoka`a, HI 96727

Dear Dr. Knopp:

SUBJECT: Accepting Agency for an Environmental Assessment
Shoreline Setback Variance for Erosion Abatement Project
Landowner: AOAO Kona Reef Inc.
Tax Map Key: (3) 7-5-018:071; North Kona, Hawai'i

This is to acknowledge receipt on August 11, 2014 of your request for confirmation that the County of Hawai'i will act as the accepting agency for an environmental impact assessment prepared per Chapter 343, Hawai'i Revised Statutes, as a requirement for a shoreline setback variance application. Per Planning Department Rules of Practice and Procedure, Rule 11-10, the Planning Department shall be the approving agency for all environmental assessments prepared in fulfillment of the requirements of a shoreline setback variance application. As such, this letter will confirm our responsibility as the accepting agency for the subject request.

Please direct further communications regarding the environmental assessment and shoreline setback variance application to our Planning Division manager, Mr. Daryn Arai, at 961-8142 or Daryn.Arai@hawaiicounty.gov.

Sincerely,

for DUANE KANUHA
Planning Director

LM:cs
P:\wpwin60\Luke\Letters\Inquiry re_7_5_018_071.doc

cc: Mr. Daryn Arai, Planning Department

DAVID Y. IGE
GOVERNOR OF
HAWAII

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

KEKOA KALUHIWA
FIRST DEPUTY

JEFFREY T. PEARSON, P.E.
DEPUTY DIRECTOR - WATER

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

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

DLNR:OCCL:NF

Correspondence HA-16-94

Graham P. Knopp, Ph.D.
GK Environmental, LLC
P.O. Box 1363
Honokaa, HI 96727

NOV 20 2015

SUBJECT: Early Consultation for the Kona Reef Condominium Erosion Abatement Structure Draft Environmental Assessment, Located at 75-5888 Alii Drive, Kailua-Kona, Hawaii, Tax Map Key: (3) 7-5-018:071

Dear Mr. Knopp,

The Department of Land and Natural Resources (DLNR), Office of Conservation and Coastal Lands (OCCL) is in receipt of your letter dated November 9, 2015 regarding an early consultation for the draft environmental assessment for a proposed project at the Kona Reef Condominiums located at TMK (3) 7-5-018:071. Your firm, GK Environmental, LLC, has been retained to perform the environmental assessment for the proposed project. As stated in your letter, the purpose of the proposed project is to prevent the erosion of soil into the ocean and maintain the lawn area fronting the subject property.

According to your letter, the proposed project involves constructing a 200-foot long concrete-rubble masonry erosion abatement structure that would match the existing grade, and would be located mauka of the previously determined shoreline. For half of the length of the proposed structure, the top surface would meet the existing grade on both sides, so that neither the mauka or makai faces would be exposed. In the makai areas where the grade is lower than the top of the structure, the lava rock veneer would be exposed. You included a map with your letter that shows the approximate size and location of the proposed structure. As stated in your letter, the environmental assessment will examine the impacts to shoreline resources, public access, flora and fauna, water quality, historic properties, cultural impacts, and other considerations.

While preparing the environmental assessment, OCCL recommends that you assess how the proposed structure will abide by the rules and objectives set forth in Hawaii Revised Statutes (HRS) Chapter 205A *Coastal Zone Management* and examine how the proposed structure will affect coastal resources and public access. In addition, OCCL recommends that you conduct a thorough analysis of alternative options for managing shoreline erosion.

Thank you for the opportunity to comment on the proposed project. OCCL kindly requests that you include us throughout the environmental assessment process and provide our office with a copy of the Draft Environmental Assessment.

Should you have any questions, please feel free to contact Coastal Lands Program Specialist Natalie Farinholt in the Office of Conservation and Coastal Lands at (808) 587-0399 or via email at Natalie.A.Farinholt@hawaii.gov.

Sincerely,

for SAMUEL J. LEMMO, Administrator
Office of Conservation and Coastal Lands

Cc: Hawaii LAND
County of Hawaii, Planning

William P. Kenoi
Mayor

Harry S. Kubojiri
Police Chief

Paul K. Ferreira
Deputy Police Chief

County of Hawai'i

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

December 4, 2015

Mr. Graham Paul Knopp, Ph.D.
GK Environmental LLC
P.O. Box 1363
Honoka'a, HI 96727
gpknopp@gmail.com

SUBJECT: EARLY CONSULTATION FOR KONA REEF CONDOMINIUM EROSION ABATEMENT STRUCTURE IN THE SHORELINE SETBACK DRAFT ENVIRONMENTAL ASSESSMENT, TMK (3rd) 7-5-018:071

Dear Dr. Knopp:

This is in response to your correspondence regarding a request for comments on the proposed project on the shoreline setback to prevent erosion of soil into the ocean at the above-mentioned location.

Thank you for allowing the Hawai'i Police Department to make comments regarding this project during this draft environmental assessment phase. At this time, the Hawai'i Police Department has no comments.

Should you have any questions or concerns please contact Captain Randal M. Ishii, Commander of our Kona District, at 326-4646, extension 299.

Sincerely,

HARRY S. KUBOJIRI
POLICE CHIEF

PAUL H. KEALOHA, JR.
ASSISTANT POLICE CHIEF
AREA II OPERATIONS

RMI/jaj
RS150763

DAVID Y. IGE
GOVERNOR OF HAWAII

SCOTT GLENN
INTERIM DIRECTOR

STATE OF HAWAI'I
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
Department of Health
235 South Beretania Street, Suite 702
Honolulu, Hawai'i 96813
Telephone (808) 586-4185
Facsimile (808) 586-4186
Email: oeqchawaii@doh.hawaii.gov

December 14, 2015

Graham Paul Knopp, Ph.D.
GK Environmental LLC
P.O. Box 1362
Honoka'a, Hawai'i 96727

Dear Dr. Knopp,

SUBJECT: Pre-Assessment Consultation for Draft Environmental Assessment (EA) re: proposed Kona Reef Condominium Erosion Abatement Structure, Kailua-Kona, Hawai'i

The Office of Environmental Quality Control (OEQC) has reviewed the brief information contained in your undated letter about the subject project, and offers the following comments for your consideration.

Pursuant to Chapter 343, Hawai'i Revised Statutes (HRS), and the implementing provisions of Chapter 11-200, Hawai'i Administrative Rules, the subject project appears to be an Applicant Action that presumably will be submitted to the County of Hawai'i Department of Planning. This agency would be considered the "Approving Agency" that implements the environmental review process for this project by either 1) anticipating a Finding of No Significant Impact and then preparing a Draft EA for public review and comment, or 2) based on their judgment and experience, deciding to by-pass the EA step and proceeding directly to the Environmental Impact Statement (EIS) Preparation Notice step if significant effects may occur from the project. In the event the Approving Agency makes a determination to require an EIS, either initially or if significant impacts are identified in the Final EA, then the same agency, as the "Accepting Authority," would determine the acceptability of the subsequent Final EIS.

As the letter provides little detail about the project, OEQC reserves substantive comments until the opportunity to review the Draft EA. In the Draft EA, please be sure to include clear and accurate information regarding the project's required permits and approvals, as well as its location relative to the property boundaries, State Land Use District Boundaries, Certified Shoreline, and relevant shoreline setback areas. Please also

include information indicating adjacent property ownership, the justification for the project, the HRS Chapter 343 trigger, and an objective consideration of alternatives available to accomplish the project's goals. Due to the project's shoreline location, an assessment of the impact of future climate change and rising sea level upon the project would be beneficial. Also, as your information indicated over 100 feet of the structure would be built so that neither the mauka nor the makai faces would be exposed (i.e., fully below grade), please provide information describing construction methods.

As you prepare to submit documents for publication and public review in The Environmental Notice, we appreciate your diligence in using the correct and recently revised publication forms available online. If you have any questions as you navigate this process, please consult our website at http://health.hawaii.gov/oeqc (see in particular the link to the Environmental Assessment Preparation Toolkit on the right panel) or contact our office at (808) 586-4185.

Sincerely,

Scott Glenn
Interim Director

TE/I-0259

William P. Kenoi
Mayor

Duane Kanuha
Director

Bobby Command
Deputy Director

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

County of Hawai'i
PLANNING DEPARTMENT

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

December 17, 2015

Graham Paul Knopp, Ph.D.
GK Environmental LLC
P.O. Box 1363
Honoka'a HI 96727

Dear Dr. Knopp:

SUBJECT: Pre-Consultation on Draft Environmental Assessment
Applicant: AOAO Kona Reef Inc.
Project: Kona Reef Condominium Erosion Abatement Structure
Tax Map Key: (3) 7-5-018:071, North Kona, Hawai'i

This is to acknowledge receipt of your letter received on November 16, 2015 requesting comments from this office regarding the preparation of a Draft Environmental Assessment (DEA) for the subject project.

Proposed is the construction of a 220-foot concrete-rubble masonry structure that would be located within the shoreline setback area. This would prevent further erosion of soil into the ocean and to protect the existing lawn area.

The subject 3.082 parcel is designated Urban by the State Land Use Commission and zoned Resort Hotel (V-.75) by the County. In addition, the Hawai'i County General Plan Land Use Allocation Guide (LUPAG) Map designates the parcel as Open and Resort Node. It is in the Special Management Area (SMA) and is located in a "shoreline area" as defined by Section 205A-41, Hawai'i Revised Statutes (HRS).

We have the following to offer:

1. Describe how the proposed use is consistent with the goals, policies and standards of the County of Hawai'i General Plan, as amended in 2005.

2. The project site is located in the Kona Community Development Plan (CDP) planning area. Review and include discussion of the proposed project's consistency with its overall goals, objectives, policies and actions.

3. The project must be reviewed against SMA rules and regulations. Further, as the project site will be located within the shoreline setback area, a current certified shoreline survey is required to be submitted with the SMA application.

4. If the structure is proposed seaward of the shoreline, the development will be under the jurisdiction of the Department of Land and Natural Resources, Office of Conservation and Coastal Lands.

5. Discuss how the proposed development will affect the approved Shoreline Public Access Plan required by amended Variance No. 610.

6. The subject parcel is adjacent to Honl's, a popular surfing and bodyboarding County Beach Park, on TMK: (3) 7-5-018:020. Therefore, the County of Hawai'i, Department of Parks and Recreation as well as the surfing community should be consulted.

Thank you for the opportunity to provide preliminary comments. Please provide us with a copy of the Draft Environmental Assessment for our review and file. Our email address is planning@co.hawaii.hi.us.

If you have questions, please contact Esther Imamura of our office at (808) 961-8139.

Sincerely,

DUANE KANUHA
Planning Director

ETI:klt
P:\Wpwin60\ETI\Eadraftpre-Consul\Knopp Kona Reef Seawall.Rtf

DAVID Y. IGE
GOVERNOR OF HAWAII

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH

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

In reply, please refer to:
File:

EPO 15-305

December 31, 2015

Graham Paul Knopp, Ph.D.
GK Environmental LLC
P.O Box 1363
Honokaa, Hawaii 96727

Dear Dr. Knopp:

SUBJECT: Early Consultation (EC) for Kona Reef Condominium Erosion Abatement Structure in the Shoreline Setback Draft Environmental Assessment

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your EC to our office on November 16, 2015. Thank you for allowing us to review and comment on the proposed project. EPO recommends that you review the standard comments and available strategies to support sustainable and healthy design provided at: http://health.hawaii.gov/epo/landuse. Projects are required to adhere to all applicable standard comments.

EPO also encourages you to examine and utilize the Hawaii Environmental Health Portal. The portal provides links to our e-Permitting Portal, Environmental Health Warehouse, Groundwater Contamination Viewer, Hawaii Emergency Response Exchange, Hawaii State and Local Emission Inventory System, Water Pollution Control Viewer, Water Quality Data, Warnings, Advisories and Postings. The Portal is continually updated. Please visit it regularly at: https://eha-cloud.doh.hawaii.gov

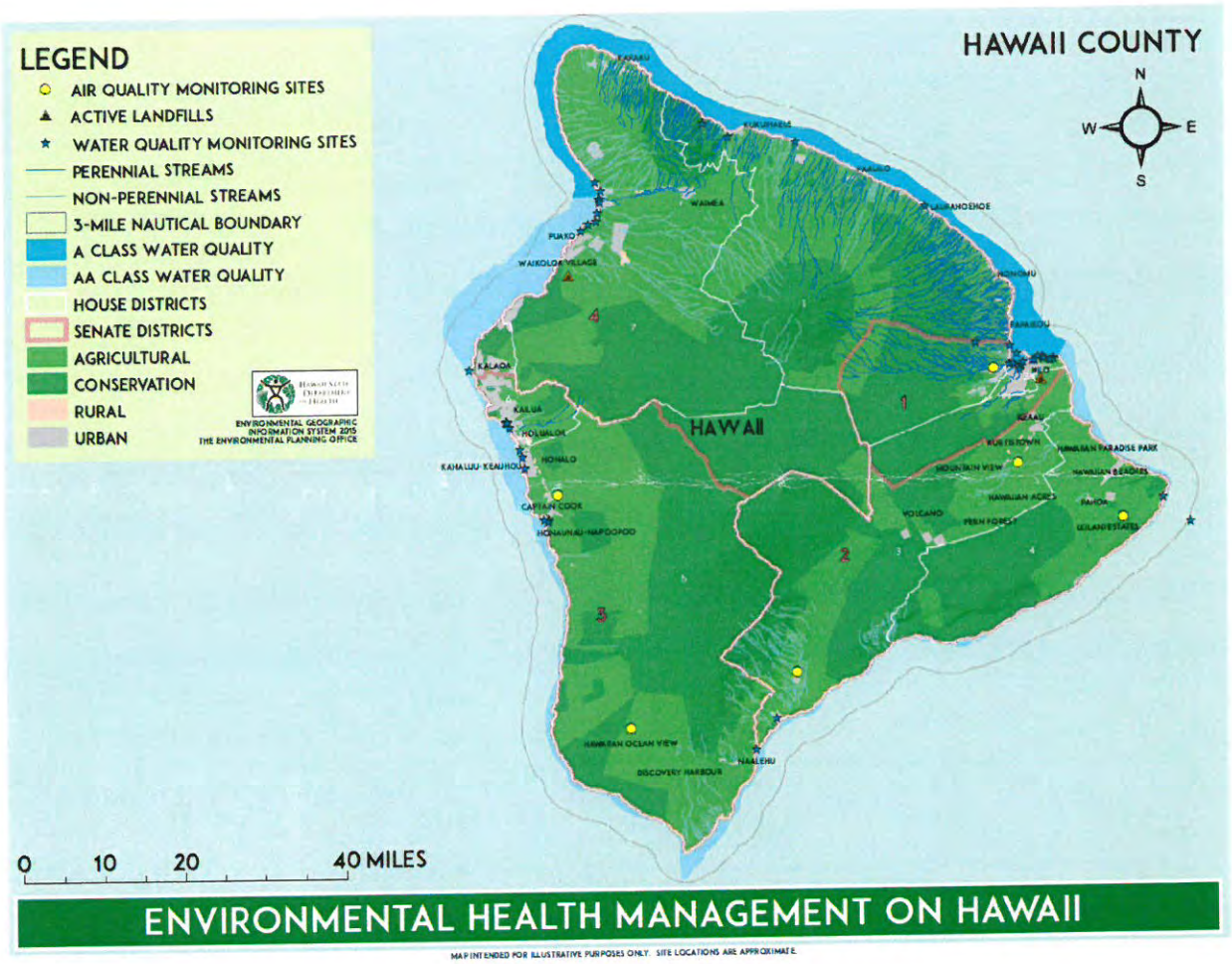
We request that you utilize all of this information on your proposed project to increase sustainable, innovative, inspirational, transparent and healthy design.

Mahalo nui loa,

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

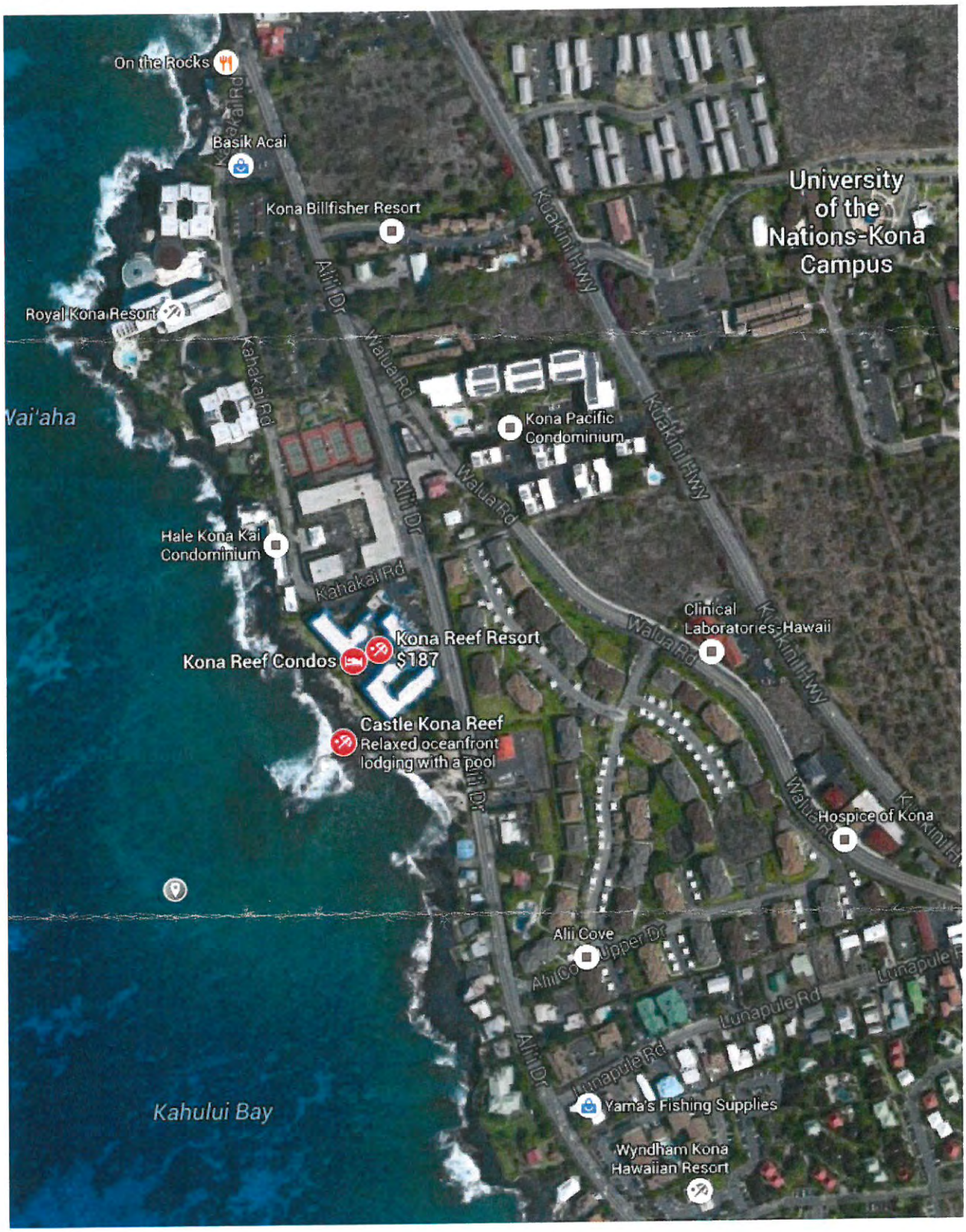
LM:nn

Attachments: Draft EPO Environmental Health Management Map for Hawaii Island
Google Map of Area
OEQC viewer - http://eha-web.doh.hawaii.gov/oeqc-viewer
U.S. EPA EJSCREEN Map 3 page report - http://www2.epa.gov/ejscreen



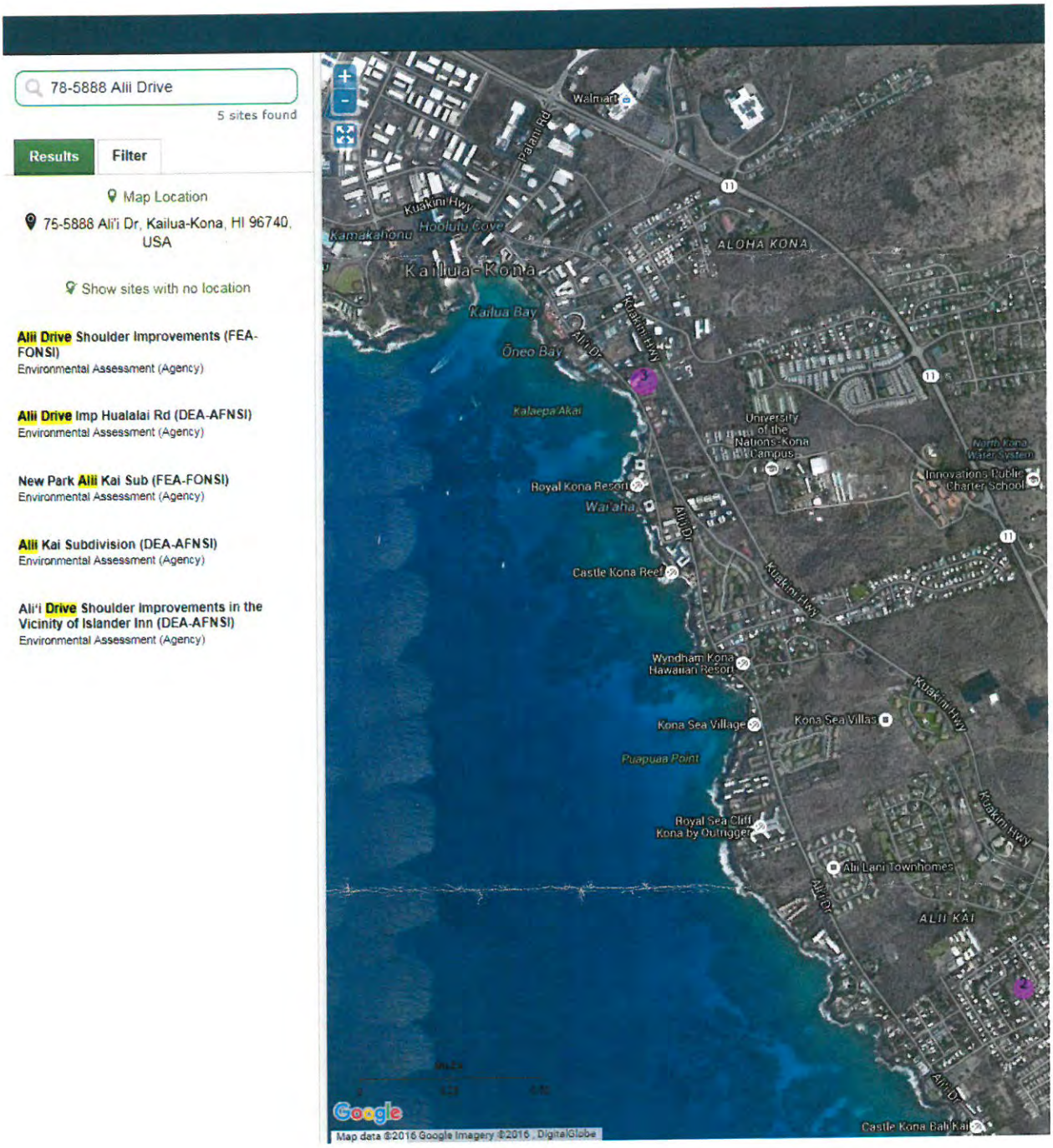
Attachment 1: Draft EPO Environmental Health Management Map for Hawaii Island
http://health.hawaii.gov/epo/files/2013/05/Environmental_Map_Hawaii_20151112.pdf

Google Map of Area:



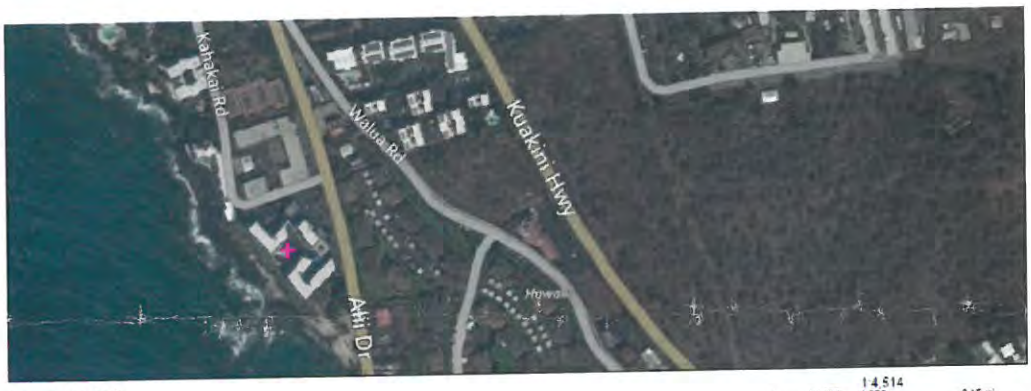
Attachment 3: OEQC viewer

http://eha-web.doh.hawaii.gov/oeqc-viewer/



Attachment 4: U.S. EPA EJSCREEN Map and Table

http://ejscreen.epa.gov/mapper/ejscreen_SOE.aspx



Selected Variables	Raw data	State Average	%ile in State	EPA Region Average	%ile in EPA Region	USA Average	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in µg/m³)	N/A	N/A	N/A	9.95	N/A	9.78	N/A
Ozone (ppb)	N/A	N/A	N/A	49.7	N/A	46.1	N/A
NATA Diesel PM (µg/m³)*	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NATA Air Toxics Cancer Risk (risk per MM)*	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NATA Respiratory Hazard Index*	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NATA Neurological Hazard Index*	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Traffic Proximity and Volume (daily traffic count/distance to road)	90	280	53	190	53	110	72
Lead Paint Indicator (% pre-1960s housing)	0.034	0.17	28	0.25	30	0.3	20
NPL Proximity (site count/km distance)	0.0033	0.092	10	0.11	0	0.096	0
RMP Proximity (facility count/km distance)	0.013	0.18	2	0.41	1	0.31	0
TSDF Proximity (facility count/km distance)	0.0034	0.092	10	0.12	0	0.054	4
Water Discharger Proximity (count/km)	0.0098	0.33	1	0.19	0	0.25	0
Demographic Indicators							
Demographic Index	42%	51%	21	46%	47	35%	67
Minority Population	58%	77%	16	57%	50	36%	74
Low Income Population	26%	25%	60	35%	42	34%	42
Linguistically Isolated Population	3%	6%	50	9%	36	5%	64
Population with Less Than High School Education	10%	10%	60	18%	40	14%	46
Population under Age 5	6%	6%	57	7%	50	7%	54
Population over Age 64	13%	14%	46	12%	65	13%	55

*The National-Scale Air Toxics Assessment (NATA) environmental indicators and EJ indexes, which include cancer risk, respiratory hazard, neurodevelopment hazard, and diesel particulate matter will be added into EJSCREEN during the first full public update after the soon-to-be-released 2011 dataset is made available. The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: http:// www.epa.gov/ttn/atw/natamain/index.html.

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

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

William P. Kenoi
Mayor

Darren J. Rosario
Fire Chief

Renwick J. Victorino
Deputy Fire Chief

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

November 17, 2015

Mr. Graham Paul Knopp, Ph.D
GK Environmental LLC
P.O. Box 1363
Honoka'a, Hawai'i 96727

Dear Mr. Knopp,

SUBJECT: EARLY CONSULTATION FOR KONA REEF CONDOMINIUM EROSION ABATEMENT STRUCTURE IN THE SHORELINE SETBACK DRAFT ENVIRONMENTAL ASSESSMENT

The Hawai'i Fire Department has no comments or issues with regards to the Early Consultation as noted above.

DARREN J. ROSARIO
Fire Chief

KT:ds

William P. Kenoi
Mayor

Walter K. M. Lau
Managing Director

Warren H. W. Lee
Director

Brandon A. K. Gonzalez
Deputy Director

County of Hawai'i
DEPARTMENT OF PUBLIC WORKS
Aupuni Center
101 Pauahi Street, Suite 7 · Hilo, Hawai'i 96720-4224
(808) 961-8321 · Fax (808) 961-8630
www.co.hawaii.hi.us

November 20, 2015

Graham Paul Knopp, Ph.D.
GK Environmental LLC
P.O. Box 1363
Honokaa, HI 96727

Subject: Early Consultation for an Environmental Assessment
Kona Reef Condominium Erosion Abatement Structure in the Shoreline Setback
TMK: (3) 7-5-018:071

We reviewed the subject, dated November 9, 2015 and have the following comments:

The environmental assessment should include a topography survey in the area of the proposed structure and a site plan that shows the proposed location, drawn to scale.

Development within a Special Flood Hazard Area may be subject to the requirements of Chapter 27 - Flood Plain Management, of the Hawaii County Code. The proposed structure will not be subject to regulation under Chapter 27, if it does not rise above existing grade as described in your 11/9/15 letter and is landward of mean high tide. No building permit is required for the structure if it retains less than 4 feet measured from finished grade to finished grade.

All earthwork and grading shall conform to Chapter 10, Erosion and Sediment Control, of the Hawaii County Code. A grading permit may be required.

Should there be any questions concerning this matter, please contact Kiran Emler of our Kona Engineering Division office at 323-4851.

Ben Ishii, Division Chief
Engineering Division

KE
Copy: Planning Director
ENG-Hilo/Kona

County of Hawai'i is an Equal Opportunity Provider and Employer.

APPENDIX 1B: COMMENTS TO DRAFT EA AND RESPONSES

Harry Kim
Mayor

Michael Yee
Director

Daryn Arai
Deputy Director

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

County of Hawai'i
PLANNING DEPARTMENT

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

November 8, 2017

Graham Paul Knopp, Ph.D.
GK Environmental LLC
P.O. Box 1363
Honoka'a, HI 96727

Dear Dr. Knopp:

SUBJECT: Consultation on Draft Environmental Assessment
Applicant: AOAO Kona Reef Inc.
Project: Kona Reef Condominium Erosion Abatement Structure
Tax Map Key: (3) 7-5-018:071, North Kona, Hawai'i

This is to acknowledge receipt of your Draft Environmental Assessment (DEA) requesting comments from this office for the subject project. We appreciate that you have incorporated the information in our pre-consultation letter within the DEA.

As mentioned in our pre-consultation letter, the proposed project is the construction of a 220-foot concrete-rubble masonry structure that would be located within the shoreline setback area. This would prevent further erosion of soil into the ocean and to protect the existing lawn area.

The subject 3.082 parcel is designated Urban by the State Land Use Commission and zoned Resort Hotel (V-.75) by the County. In addition, the Hawai'i County General Plan Land Use Allocation Guide (LUPAG) Map designates the parcel as Open and Resort Node. It is in the Special Management Area (SMA) and is located in a "shoreline area" as defined by Section 205A-41, Hawai'i Revised Statutes (HRS).

We have the following comments to offer after review of the DEA:

1. Please provide a section in the Final EA that provides a brief history of the Kona Reef Condominiums with construction dates and permitting history, including major building permits and land use permits, including the variances and Special Management Area (SMA) Minor Permits.

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

If you have questions, please contact Jeff Darrow of our office at (808) 961-8158.

Sincerely,

MICHAEL YEE
Planning Director

JWD:mad
P\wpwin60\CH343\2017\LKonaReefErosionAbatementStructure-DraftConsol.doc

OFFICE OF PLANNING
STATE OF HAWAII

235 South Beretania Street, 6th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

DAVID Y. IGE
GOVERNOR

LEO R. ASUNCION
DIRECTOR
OFFICE OF PLANNING

Telephone: (808) 587-2846
Fax: (808) 587-2824
Web: http://planning.hawaii.gov/

DTS201712121100NA

December 13, 2017

Mr. Graham Paul Knopp, Ph.D.
Proprietor
GK Environmental LLC
P.O. Box 1310
Honoka'a, Hawai'i 96727

Dear Mr. Knopp:

Subject: Draft Environmental Assessment for Kona Reef Condominiums Erosion Abatement Structure in the Shoreline Setback, Kailua-Kona, North Kona, Hawai'i; Tax Map Key: (3) 7-5-018: 071 (por.)

Thank you for the opportunity to provide comments on the subject Draft Environmental Assessment (Draft EA), transmitted via letter received November 28, 2017.

According to the Draft EA, Association of Apartment Owners of Kona Reef, Inc. proposes to build an erosion abatement structure within the shoreline area as defined in Hawaii Revised Statutes (HRS) §205A-41. The requirement of HRS Chapter 343 is triggered by such shoreline area use.

The subject structure is proposed to prevent erosion of soil underlying the lawn area fronting the Kona Reef Condominiums. The structure is expected to preserve the lawn area for the public and condominium residents' use, including sunbathing, whale watching, and lateral access to the shoreline Makai (seaward) of the lawn area, and the adjacent beach and surfing area.

As designed, the proposed concrete-rubble masonry structure is approximately 12 to 18 inches wide on the top-surface and 24 to 36 inches at the base, and would be built to grade surface at the same height as the surrounding lawn area. The structure would roughly parallel the certified shoreline for approximately 220 linear feet.

The Office of Planning has reviewed the Draft EA and has the following comments to offer.

1. The Draft EA, page 9, states that "without stabilization, the soil underlying the lawn area will enter the ocean and result in polluted storm water runoff." The Final EA should provide an assessment with sufficient information on the erosion of soil underlying the lawn area. Such assessment with supporting information is necessary

to support the purpose and need, and justify the size and linear scope of the proposed erosion abatement structure along the shoreline.

We note that the **Appendix E** – Coastal Resource and Erosion Assessment, June 2016, concluded that no significant erosion of the shoreline fronting the Kona Reef Condominiums has taken place in historical time. Minor erosion of a lawn fronting the subject property is caused by the infrequent storm surge or tsunami waves that reach or extend beyond the shoreline.

2. Page 17, the Draft EA states that the shoreline area adjacent to the project site may occasionally be visited by sea turtles and the Hawaiian Monk Seal, species protected by the Marine Mammal Protection Act. The Final EA should discuss the marine environment fronting and adjacent to the property, and assess the potential impacts of the erection of the proposed hardening structure on the habitat of these marine mammals. If necessary, the United States Fish and Wildlife Service should be consulted.

3. The project site is a narrow corridor located Mauka (inland) of the shoreline certified on March 1, 2017. The Draft EA, page 31, states that "[T]the proposed project would have no encroachment on the shoreline area, and would be built above the certified shoreline, would not cause the loss of sand, coral, or rocks from the shoreline, and would not endanger any residential dwellings." The Final EA should provide an assessment with supporting information to justify such statement, and specifically assess whether proposed hardening structure within the shoreline area will cause adverse impacts on the shoreline processes fronting and adjacent to the property, including at Wai'aha Beach Park.

4. One of the policies of Hawai'i's Coastal Zone Management (CZM) Law, HRS § 205A-2(c)(9)(A), is to "locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion." Pursuant to HRS §205A-46, the counties may grant a variance from the prohibition of structures within the shoreline area provided that private facilities or improvements are clearly in the public interest, or the authority finds that that shoreline erosion is likely to cause hardship to the applicant if the facilities or improvements are not allowed within the shoreline area.

   Please note that increasing the number and scope of shoreline hardening structures in a region would adversely affect beach processes, impact shoreline public access, and impact public views to, from, and along the shoreline.

5. Please note no artificial light associated with the subject property and the proposed action, except as provided in HRS §§205A-30.5(b) and 205A-71(b), shall be directed to travel across property boundaries toward the shoreline and ocean waters.

If you have any questions regarding this comment letter, please contact Shichao Li of our Coastal Zone Management Program at (808) 587-2841.

Sincerely,

Leo R. Asuncion
Director

OFFICE OF PLANNING
STATE OF HAWAII

235 South Beretania Street, 6th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

DAVID Y. IGE
GOVERNOR

LEO R. ASUNCION
DIRECTOR
OFFICE OF PLANNING

Telephone: (808) 587-2846
Fax: (808) 587-2824
Web: http://planning.hawaii.gov/

DTS201712121100NA

December 13, 2017

Mr. Graham Paul Knopp, Ph.D.
Proprietor
GK Environmental LLC
P.O. Box 1310
Honoka'a, Hawai'i 96727

Dear Mr. Knopp:

Subject: Draft Environmental Assessment for Kona Reef Condominiums Erosion Abatement Structure in the Shoreline Setback, Kailua-Kona, North Kona, Hawai'i; Tax Map Key: (3) 7-5-018: 071 (por.)

Thank you for the opportunity to provide comments on the subject Draft Environmental Assessment (Draft EA), transmitted via letter received November 28, 2017.

According to the Draft EA, Association of Apartment Owners of Kona Reef, Inc. proposes to build an erosion abatement structure within the shoreline area as defined in Hawaii Revised Statutes (HRS) §205A-41. The requirement of HRS Chapter 343 is triggered by such shoreline area use.

The subject structure is proposed to prevent erosion of soil underlying the lawn area fronting the Kona Reef Condominiums. The structure is expected to preserve the lawn area for the public and condominium residents' use, including sunbathing, whale watching, and lateral access to the shoreline Makai (seaward) of the lawn area, and the adjacent beach and surfing area.

As designed, the proposed concrete-rubble masonry structure is approximately 12 to 18 inches wide on the top-surface and 24 to 36 inches at the base, and would be built to grade surface at the same height as the surrounding lawn area. The structure would roughly parallel the certified shoreline for approximately 220 linear feet.

The Office of Planning has reviewed the Draft EA and has the following comments to offer.

1. The Draft EA, page 9, states that "without stabilization, the soil underlying the lawn area will enter the ocean and result in polluted storm water runoff." The Final EA should provide an assessment with sufficient information on the erosion of soil underlying the lawn area. Such assessment with supporting information is necessary

to support the purpose and need, and justify the size and linear scope of the proposed erosion abatement structure along the shoreline.

We note that the **Appendix E** – Coastal Resource and Erosion Assessment, June 2016, concluded that no significant erosion of the shoreline fronting the Kona Reef Condominiums has taken place in historical time. Minor erosion of a lawn fronting the subject property is caused by the infrequent storm surge or tsunami waves that reach or extend beyond the shoreline.

2. Page 17, the Draft EA states that the shoreline area adjacent to the project site may occasionally be visited by sea turtles and the Hawaiian Monk Seal, species protected by the Marine Mammal Protection Act. The Final EA should discuss the marine environment fronting and adjacent to the property, and assess the potential impacts of the erection of the proposed hardening structure on the habitat of these marine mammals. If necessary, the United States Fish and Wildlife Service should be consulted.

3. The project site is a narrow corridor located Mauka (inland) of the shoreline certified on March 1, 2017. The Draft EA, page 31, states that "[T]the proposed project would have no encroachment on the shoreline area, and would be built above the certified shoreline, would not cause the loss of sand, coral, or rocks from the shoreline, and would not endanger any residential dwellings." The Final EA should provide an assessment with supporting information to justify such statement, and specifically assess whether proposed hardening structure within the shoreline area will cause adverse impacts on the shoreline processes fronting and adjacent to the property, including at Wai'aha Beach Park.

4. One of the policies of Hawai'i's Coastal Zone Management (CZM) Law, HRS § 205A-2(c)(9)(A), is to "locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion." Pursuant to HRS §205A-46, the counties may grant a variance from the prohibition of structures within the shoreline area provided that private facilities or improvements are clearly in the public interest, or the authority finds that that shoreline erosion is likely to cause hardship to the applicant if the facilities or improvements are not allowed within the shoreline area.

   Please note that increasing the number and scope of shoreline hardening structures in a region would adversely affect beach processes, impact shoreline public access, and impact public views to, from, and along the shoreline.

5. Please note no artificial light associated with the subject property and the proposed action, except as provided in HRS §§205A-30.5(b) and 205A-71(b), shall be directed to travel across property boundaries toward the shoreline and ocean waters.

If you have any questions regarding this comment letter, please contact Shichao Li of our Coastal Zone Management Program at (808) 587-2841.

Sincerely,

Leo R. Asuncion
Director

phone: (808) 938-8583 P.O. Box 1310 Honoka'a, Hawai'i 96727
email: gpknopp@gkenvllc.com.com

Leo R. Asuncion, Director
State of Hawaii
Office of Planning
235 South Beretania Street, 6th Floor
Honolulu, Hawaii 96813
January 5, 2018

Dear Director Asuncion:

Thank you for your comments concerning the Kona Reef Condominiums Erosion Abatement Structure Draft Environmental Assessment, published in the Office of Environmental Quality Control's Environmental Notice on November 23, 2017. We respond to your specific comments individually below.

1. The coastal erosion study (Appendix F) prepared by Geohazards Consultants International, Inc. assesses erosion affecting the lawn area, and states, "The only active erosion that was observed was caused by storm wave surges that reach the margin of the lawn fronting the KR Property. This lawn is underlain by fine-grained fill material that was used as a substrate for lawn that was planted inshore from the shoreline about 35 years ago. Sapping of fine-grained material from under the lawn causes the lawn grass to subside and creep seaward." Further the Figure 9 reads, "Erosion of lawn margin fronting the KR Property. Storm surges are not capable of moving the boulders located here at the shoreline, but do erode the fine sediments underlying the lawn." And, Figure 10 states, "Detail of eroding lawn fronting the KR Property. Surges associated with the tsunami of March 11, 2011 removed fine materials surrounding the cobbles that underlie the lawn, and caused the lawn to retreat as much as six inches in places." The GCI report states that this erosion is "very minor" (Appendix F, page 15). The GCI report concludes that, "Minor erosion of a [sic] lawn fronting the KR Property is caused by the infrequent storm surge or tsunami waves that reach or extend beyond the shoreline. That erosion can be mitigated by the construction of a low stone wall (Erosion Abatement Structure) immediately mauka of the shoreline." The latter statement justifies the linear scope of the structure. The erosion abatement structure's length is limited because the lawn area slope change becomes smaller on the northern portion of the lawn area.
2. The GCI report makes the statement that, "Such a structure would have no negative environmental impacts or effects on adjoining areas." Inclusive of this statement is the idea that the erosion abatement structure would have no adverse effect upon the shoreline area fronting the project site, and would positively affect this area by reducing the potential for sediment from the lawn area to reach the shoreline area. The discussion in Section 3.1.2 is pertinent to your comment. Specifically, page 13, paragraph 2 states, "Therefore there is not a physical connection between the variable sand deposits on the pahoehoe shelf fronting the project site and other lateral areas beyond the project site, including Honl's Beach (Waiaha Bay). Also relevant is the discussion found on page 15 of the DEA, first paragraph, "GCI

further concludes that the proposed project would have no environmental impact to shoreline processes, or shoreline or marine habitats." So, as the proposed project would have no impact on shoreline process, it would have no impact on Waiaha Beach.

3. The proposed project would be constructed entirely within the shoreline setback, and would not be constructed within the shoreline area. Further, the purpose of the project is essentially to maintain the lawn area by preventing erosion, and would therefore not cause the loss of sand, coral, or rocks from the shoreline, but would result in the opposite effect.
4. Please note that the proposed project would not affect beach processes, and would not harden the shoreline, as it would not be constructed within the shoreline. Furthermore, the proposed project would positively affect shoreline public access through its maintenance, and would not adversely impact public views to, from, and along the shoreline.
5. The proposed action would not use artificial lighting as work would be conducted during daylight hours, as stated in Section 3.1.5 of the DEA. We have added a statement to Section 3.1.4 clarifying this.

Mahalo for your interest in the project.

Sincerely

Graham Paul Knopp, Ph.D.

GK Environmental LLC

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
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

December 28, 2017

GK Environmental LLC
Attention: Mr. Graham Paul Knopp, Ph.D. via email: gpknopp@gkenvllc.com
P.O. Box 1310
Honokaa, Hawaii 96727

Dear Mr. Knopp:

SUBJECT: Draft Environmental Assessment for the Kona Reef Condominiums Erosion Abatement Structure

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 (a) Division of Boating & Ocean Recreation, (b) Land Division – Hawaii District, (c) Engineering Division, (d) Division of Aquatic Resources and (e) Office of Conservation & Coastal Lands on the subject matter. Should you have any questions, please feel free to call Lydia Morikawa at 587-0410. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosure(s)
cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
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

RECEIVED
LAND DIVISION
2017 DEC 14 AM 11:55

December 1, 2017

MEMORANDUM

TO: **DLNR Agencies:**
X Div. of Aquatic Resources
X Div. of Boating & Ocean Recreation
X Engineering Division
__Div. of Forestry & Wildlife
__Div. of State Parks
X 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: Draft of Environmental Assessment for Erosion Abatement Structure in the Shoreline Setback of the Kona Reef Condominiums
LOCATION: 75-5888 Ali'i Drive, Kailua-Kona, Island of Hawaii; TMK: (3) 7-5-018: Por. 071
APPLICANT: GK Environmental LLC on behalf of **AOAO Kona Reef, Inc.**

Transmitted for your review and comment is information on the above-referenced subject matter. We would appreciate your comments on this project which can be found at:

1. https://hawaiioimt.sharepoint.com/sites/dlnr-ld (using the Chrome browser)
2. Username: your Hawaii.gov email address
3. Password: outlook password (if you do not know it, please contact IT by email to reset and get a new password)
4. Click on: Request for Comments, then click on the subject link.
5. If you cannot access the document, please scan this Memo and email to Quoc Le at quoc.le@hawaii.gov to grant you access.

Please submit any comments by **December 27, 2017**. 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 Darlene Nakamura at 587-0417. Thank you.

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

Signed: Edward R Underwood

Print Name: Edward R Underwood

Date: 12/12/17

Attachments
cc: Central Files

DEC 4'17PM 2:45BOR ADM

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
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

2017 DEC -6 P 12:46
RECEIVED
LAND DIVISION
HILO, HAWAII

December 1, 2017

MEMORANDUM

TO: **DLNR Agencies:**
X Div. of Aquatic Resources
X Div. of Boating & Ocean Recreation
X Engineering Division
__ Div. of Forestry & Wildlife
__ Div. of State Parks
X 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: Draft of Environmental Assessment for Erosion Abatement Structure in the Shoreline Setback of the Kona Reef Condominiums
LOCATION: 75-5888 Ali'i Drive, Kailua-Kona, Island of Hawaii; TMK: (3) 7-5-018: Por. 071
APPLICANT: GK Environmental LLC on behalf of **AOAO Kona Reef, Inc.**

Transmitted for your review and comment is information on the above-referenced subject matter. We would appreciate your comments on this project which can be found at:

1. https://hawaiioimt.sharepoint.com/sites/dlnr-ld (using the Chrome browser)
2. Username: your Hawaii.gov email address
3. Password: outlook password (if you do not know it, please contact IT by email to reset and get a new password)
4. Click on: Request for Comments, then click on the subject link.
5. If you cannot access the document, please scan this Memo and email to Quoc Le at quoc.le@hawaii.gov to grant you access.

Please submit any comments by **December 27, 2017.** 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 Darlene Nakamura at 587-0417. Thank you.

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

Signed: _____

Print Name: GORDON C. HELT

Date: 12/11/17

Attachments
cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

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

RECEIVED
2017 DEC 04 AM 11:07 ENGINEERING
LAND DIVISION
2017 DEC 14 AM 11:00
STATE OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 1, 2017

MEMORANDUM

TO:

DLNR Agencies:
X Div. of Aquatic Resources
X Div. of Boating & Ocean Recreation
X Engineering Division
__Div. of Forestry & Wildlife
__Div. of State Parks
X 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: Draft of Environmental Assessment for Erosion Abatement Structure in the Shoreline Setback of the Kona Reef Condominiums
LOCATION: 75-5888 Ali'i Drive, Kailua-Kona, Island of Hawaii; TMK: (3) 7-5-018: Por. 071
APPLICANT: GK Environmental LLC on behalf of **AOAO Kona Reef, Inc.**

Transmitted for your review and comment is information on the above-referenced subject matter. We would appreciate your comments on this project which can be found at:

1. https://hawaiioimt.sharepoint.com/sites/dlnr-ld (using the Chrome browser)
2. Username: your Hawaii.gov email address
3. Password: outlook password (if you do not know it, please contact IT by email to reset and get a new password)
4. Click on: Request for Comments, then click on the subject link.
5. If you cannot access the document, please scan this Memo and email to Quoc Le at quoc.le@hawaii.gov to grant you access.

Please submit any comments by **December 27, 2017**. 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 Darlene Nakamura at 587-0417. Thank you.

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

Signed: _____

Print Name: Cathy Chang

Date: 12/12/17

Attachments
cc: Central Files

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/Russell Y. Tsuji

Ref: Draft of Environmental Assessment for Erosion Abatement Structure in the Shoreline Setback of the Kona Reef Condominiums, 75-5888 Alii Drive, Kailua-Kona, Island of Hawaii; TMK: (3) 7-5-018: Por. 071

COMMENTS

The rules and regulations of the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44CFR), are in effect when development falls within a Special Flood Hazard Area (high risk areas). Be advised that 44CFR reflects the minimum standards as set forth by the NFIP. Local community flood ordinances may stipulate higher standards that can be more restrictive and would take precedence over the minimum NFIP standards.

The owner of the project property and/or their representative is responsible to research the Flood Hazard Zone designation for the project. Flood Hazard Zones are designated on FEMA's Flood Insurance Rate Maps (FIRM), which can be viewed on our Flood Hazard Assessment Tool (FHAT) (http://gis.hawaiinfip.org/FHAT).

If there are questions regarding the local flood ordinances, please contact the applicable County NFIP coordinating agency below:

- Oahu: City and County of Honolulu, Department of Planning and Permitting (808) 768-8098.
- Hawaii Island: County of Hawaii, Department of Public Works (808) 961-8327.
- Maui/Molokai/Lanai County of Maui, Department of Planning (808) 270-7253.
- Kauai: County of Kauai, Department of Public Works (808) 241-4846.

Signed: _____
CARTY S. CHANG, CHIEF ENGINEER

Date: 12/12/17

DAVID Y. IGE
GOVERNOR OF
HAWAII

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

ROBERT K. MASUDA
FIRST DEPUTY

JEFFREY T. PEARSON, P.E.
DEPUTY DIRECTOR - WATER

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF AQUATIC RESOURCES
1151 PUNCHBOWL STREET, ROOM 330
HONOLULU, HAWAII 96813

Date: 11 Dec 2017
DAR # 5651

MEMORANDUM

TO: Bruce S. Anderson, PhD
DAR Administrator

FROM: William Walsh WW, Aquatic Biologist

SUBJECT: Draft of Environmental Assessment for Erosion Abatement Structure in the Shoreline Setback of the Kona Reef Condominiums

Request Submitted by: Russell Y. Tsuji, Land Administrator

Location of Project: 75-5888 Ali'i Drive, Kailua-Kana, Island of Hawaii; TMK: (3) 7-5-018: Por

Brief Description of Project:

Association of Apartment Owners of Kona Reef, Inc. (Kona Reef AOAO) proposes to build an erosion abatement structure within the lawn area fronting the Kona Reef Condominiums, located mauka (i.e. uphill or inland) of the certified shoreline and within the shoreline setback. The purpose of the structure would be to prevent erosion of soil underlying the lawn area, and consequent loss of the use of the lawn area. The structure would parallel the certified shoreline for approximately 220 linear feet, would be anchored inbedrock, and would be built flush to grade (at the same height as the surrounding lawn area).

Comments:
☐ No Comments ☒ Comments Attached

Thank you for providing DAR the opportunity to review and comment on the proposed project. Should there be any changes to the project plan, DAR requests the opportunity to review and comment on those changes.

Comments Approved: Bruce S. Anderson Date: 12/12/17
Bruce S. Anderson, PhD
DAR Administrator

DAR# 5651

Comments

DAR's concerns mirror the recommendations made in the Flora and Fauna Study by Grant Gerrish, Ph.D, namely:

• Best Management Practices and all other necessary actions should be taken to ensure that no soil, fill or any other material from the proposed action enter the waters of the Pacific Ocean.

• In the unlikely event that a sea turtle or a seal is observed on the project site or on the beach or anywhere else near the project site, all construction activities should be stopped until the animal voluntarily returns to the ocean. Marine mammals and turtles should not be disturbed or harassed in any way. It is recommended that DOCARE and the US Fish and Wildlife Service be notified if any such animals are seen near the project site.

5651

DAVID Y. IGE
GOVERNOR OF HAWAII

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

RECEIVED
DEC - 4 2017
Division of Aquatic Resources
DAR 5651

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 1, 2017

MEMORANDUM

TO: **DLNR Agencies:**
X Div. of Aquatic Resources
X Div. of Boating & Ocean Recreation
X Engineering Division
___Div. of Forestry & Wildlife
___Div. of State Parks
X 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: Draft of Environmental Assessment for Erosion Abatement Structure in the Shoreline Setback of the Kona Reef Condominiums
LOCATION: 75-5888 Ali'i Drive, Kailua-Kona, Island of Hawaii; TMK: (3) 7-5-018: Por. 071
APPLICANT: GK Environmental LLC on behalf of **AOAO Kona Reef, Inc.**

Transmitted for your review and comment is information on the above-referenced subject matter. We would appreciate your comments on this project which can be found at:

1. https://hawaiioimt.sharepoint.com/sites/dlnr-ld (using the Chrome browser)
2. Username: your Hawaii.gov email address
3. Password: outlook password (if you do not know it, please contact IT by email to reset and get a new password)
4. Click on: Request for Comments, then click on the subject link.
5. If you cannot access the document, please scan this Memo and email to Quoc Le at quoc.le@hawaii.gov to grant you access.

Please submit any comments by **December 27, 2017**. 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 Darlene Nakamura at 587-0417. Thank you.

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

Signed: Bruce S. Anderson

Print Name: Bruce S. Anderson, PhD, DAR Administrator

Date: 12/12/17

Attachments
cc: Central Files

HA-18-114

DAVID Y. IGE
GOVERNOR OF HAWAII

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

RECEIVED
OFFICE OF CONSERVATION
AND COASTAL LANDS
2017 DEC -4 P 2:30
DEPT OF LAND & NATURAL RESOURCES
STATE OF HAWAII

RECEIVED
LAND DIVISION
2017 DEC 27 AM 8:

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 1, 2017

FROM

MEMORANDUM

~~TO:~~

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

DEC 27 2017

TO:

~~FROM~~: Russell Y. Tsuji, Land Administrator
SUBJECT: Draft of Environmental Assessment for Erosion Abatement Structure in the Shoreline Setback of the Kona Reef Condominiums
LOCATION: 75-5888 Ali'i Drive, Kailua-Kona, Island of Hawaii; TMK: (3) 7-5-018: Por. 071
APPLICANT: GK Environmental LLC on behalf of **AOAO Kona Reef, Inc.**

Transmitted for your review and comment is information on the above-referenced subject matter. We would appreciate your comments on this project which can be found at:

1. https://hawaiioimt.sharepoint.com/sites/dlnr-ld (using the Chrome browser)
2. Username: your Hawaii.gov email address
3. Password: outlook password (if you do not know it, please contact IT by email to reset and get a new password)
4. Click on: Request for Comments, then click on the subject link.
5. If you cannot access the document, please scan this Memo and email to Quoc Le at quoc.le@hawaii.gov to grant you access.

Please submit any comments by **December 27, 2017**. 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 Darlene Nakamura at 587-0417. Thank you.

ALL WORK MAUKA OF CERT SHORELINE (c. 2017) – NO WORK IN SLU CONSERVATION DIS.

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

Signed: _____

Print Name: ALEX ROY

Date: 12-27-17

Attachments
cc: Central Files

phone: (808) 938-8583 P.O. Box 1310 Honokaʻa, Hawaiʻi 96727
email: gpknopp@gkenvllc.com.com

Russell Y. Tsuji, Administrator
State of Hawaii
Department of Land and Natural Resource
PO Box 621
Honolulu, Hawaii 96809
January 5, 2018

Dear Mr. Tsuji:

Thank you for your comments concerning the Kona Reef Condominiums Erosion Abatement Structure Draft Environmental Assessment, published in the Office of Environmental Quality Control's Environmental Notice on November 23, 2017.

Engineering Division's comment regarding flood regulations is very pertinent, as the design of the proposed project was constrained by Hawaii County Code Chapter 27, which states that construction within flood zone AE cannot increase the water surface elevation of the base flood. The proposed erosion abatement structure, therefore, could not be constructed above grade. This is discussed in Section 3.1.2 of the DEA (page 12).

Regarding DAR's comments regarding BMPs to ensure than no soil, fill, or any other material from the proposed action reached the ocean, we agree that due to the proximity to the ocean it is especially important to prevent soil, fill, or any other material from reaching the shoreline and ocean. We believe that the DEA has addressed these issues adequately, as they are discussed in Section 3.l.2 of the DEA.

Further, we also believe that DAR's comments regarding the potential presence of fauna, in particular marine mammals and sea turtles, are definitely of serious concern, and have been addressed in Section 3.1.4 of the DEA, which states, "Therefore, if these species use the shoreline area during construction, work should halt until the animal leaves the area. The contractor will monitor for the presence of protected sea turtles and monk seals."

Mahalo for your interest in the project,

Graham Paul Knopp, Ph.D.

GK Environmental LLC

DAVID Y. IGE
GOVERNOR OF HAWAII

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH

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

In reply, please refer to:
File:

EPO 17-294

December 14, 2017

Graham Paul Knopp, Ph.D.
GK Environmental LLC
P.O. Box 1310
Honokaa, Hawaii 96727
Email: gpknopp@gkenvllc.com

Dear Dr. Knopp:

SUBJECT: Draft Environmental Assessment (DEA) for Kona Reef Condominiums Erosion Abatement Structure in the Shoreline Setback, North Kona, Hawaii
TMK: (3) 7-5-018:071

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your DEA to our office via the OEQC link:
http://oeqc2.doh.hawaii.gov/EA_EIS_Library/2017-11-23-HA-DEA-Kona-Reef-Condominiums-Erosion-Abatement.pdf

We understand from the OEQC publication form project summary that *"The purpose of the structure would be to prevent erosion of soil underlying the lawn area, and consequent loss of the use of the lawn area. The project would maintain the lawn area and protect it for users, who include both members of the public and Kona Reef condominium residents. The structure would parallel the certified shoreline for approximately 220 linear feet, would be anchored in bedrock, and would be built flush to grade (at the same height as the surrounding lawn area)"*

Hawaii's environmental review laws require Environmental Assessments (EAs) and Environmental Impact Statements (EISs) to consider health in the discussion and the mitigation measures to reduce negative impacts. In its definition of 'impacts,' §11-200-2, Hawaii Administrative Rules (HAR) includes health effects, whether primary (direct), secondary (indirect), or cumulative. Further, §11-200-12(b)(5), HAR, lists public health as one of the criteria for determining whether an action may have a significant impact on the environment.

We advocate that you consider health from a broad perspective; one that accounts for the social, economic, and environmental determinants of health and wellbeing. Community well-being can be impacted by access to physical activity, health care, feelings of social connectedness and safety. Design solutions that take these factors into consideration positively contribute to the social determinants of health in a community, improving the well-being of those who live there by influencing health promoting behaviors. Social determinants contribute to preventable chronic diseases such as asthma, diabetes, obesity, and cardiovascular disease.

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

We suggest you review the requirements of the Clean Water Branch (Hawaii Administrative Rules {HAR}, Chapter 11-54-1.1, -3, 4-8) and/or the National Pollutant Discharge Elimination System (NPDES) permit (HAR, Chapter 11-55) at: http://health.hawaii.gov/cwb. If you have any questions, please contact the Clean Water Branch (CWB), Engineering

Section at (808) 586-4309 or cleanwaterbranch@doh.hawaii.gov. If your project involves waters of the U.S., it is highly recommended that you contact the Army Corps of Engineers, Regulatory Branch at: (808) 835-4303.

If temporary fugitive dust emissions could be emitted when the project site is prepared for construction and/or when construction activities occur, we recommend you review the need and/or requirements for a Clean Air Branch (CAB) permit (HAR, Chapter 11-60.1 "Air Pollution Control"). Effective air pollution control measures need to be provided to prevent or minimize any fugitive dust emissions caused by construction work from affecting the surrounding areas. This includes the off-site roadways used to enter/exit the project. The control measures could include, but are not limited to, the use of water wagons, sprinkler systems, and dust fences. For questions contact the Clean Air Branch via e-mail at: Cab.General@doh.hawaii.gov or call (808) 586-4200.

Any waste generated by the project (that is not a hazardous waste as defined in state hazardous waste laws and regulations), needs to be disposed of at a solid waste management facility that complies with the applicable provisions (HAR, Chapter 11-58.1 "Solid Waste Management Control"). The open burning of any of these wastes, on or off site, is strictly prohibited. You may wish you review the Minimizing Construction & Demolition Waste Management Guide at: http://health.hawaii.gov/shwb/files/2016/05/constdem16.pdf Additional information is accessible at: http://health.hawaii.gov/shwb. For specific questions call (808) 586-4226.

If noise created during the construction phase of the project may exceed the maximum allowable levels (HAR, Chapter 11-46, "Community Noise Control") then a noise permit may be required and needs to be obtained before the commencement of work. Relevant information is online at: http://health.hawaii.gov/irhb/noise EPO recommends you contact the Indoor and Radiological Health Branch (IRHB) at (808) 586-4700 with any specific questions.

Owners/tenants must comply with State Law (HRS, Chapter 128D, "Environmental Response Law", Chapter 451, "State Contingency Plan"). To identify HEER records related to the property, visit http://eha-web.doh.hawaii.gov/eha-cma/Leaders/HEER/public-records. For information on site assessment and cleanup programs review: http://eha-web.doh.hawaii.gov/eha-cma/Leaders/HEER/site-assessment-and-cleanup-programs. Any specific questions should be directed to the HEER office at (808) 586-4249.

EPO also encourages you to examine and utilize the Hawaii Environmental Health Portal at: https://eha-cloud.doh.hawaii.gov. This site provides links to our e-Permitting Portal, Environmental Health Warehouse, Groundwater Contamination Viewer, Hawaii Emergency Response Exchange, Hawaii State and Local Emission Inventory System, Water Pollution Control Viewer, Water Quality Data, Warnings, Advisories and Postings.

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

- State of Hawaii Climate Adaptation Portal: http://climateadaptation.hawaii.gov
- University of Hawaii, Manoa, School of Ocean and Earth Sciences and Technology, Coastal Geology Group: http://www.soest.hawaii.edu/coasts/index.html

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

We hope this information is helpful. If you have any questions please contact us at DOH.epo@doh.hawaii.gov or call us at (808) 586-4337. Thank you for the opportunity to comment.

Mahalo nui loa,

Laura Leialoha Phillips McIntyre, AICP
Environmental Planning Office

LM:nn

c: Ray Pieri, Association of Apt Owners of Kona Reef, Inc. (via email: pierir001@hawaii.rr.com)
Michael Yee, County of Hawaii Planning Dept. (via email: planning@hawaiicounty.gov)
DOH: DHO HI, CWB, IRHB, CAB {via email only}

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

Please be advised:
The Environmental Planning Office (EPO), along with the Clean Air, Clean Water, and Wastewater Branches have moved to Waimano Ridge. The new address, for EPO, **as of December 1, 2017**, is:
Environmental Planning Office, DOH, Hale Ola, 2827 Waimano Home Road #109, Pearl City, Hawaii 96782
Please feel free to come and visit our new offices anytime. Please note that there is a security guard at the bottom of the hill (before entering DOH property). Our office phone numbers, email and website will all remain the same.

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

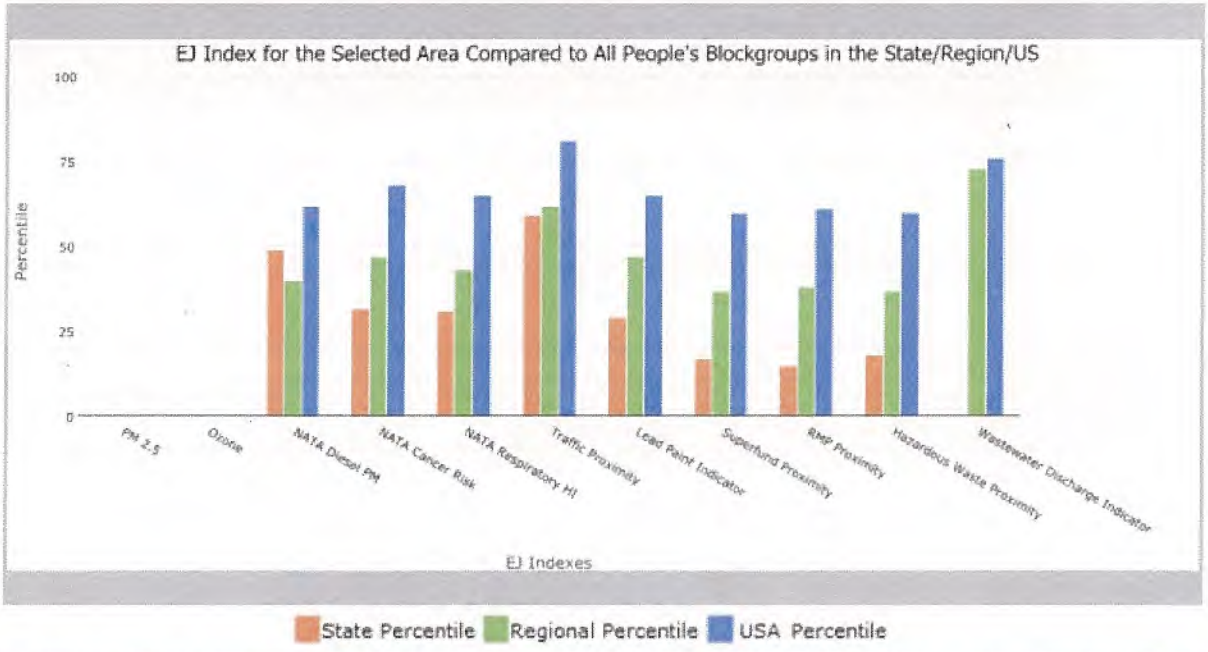
EJSCREEN Report (Version 2017)

1 mile Ring Centered at 19.629088,-155.988865, HAWAII, EPA Region 9

Approximate Population: 6,528

Input Area (sq. miles): 3.14

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	N/A	N/A	N/A
EJ Index for Ozone	N/A	N/A	N/A
EJ Index for NATA* Diesel PM	49	40	62
EJ Index for NATA* Air Toxics Cancer Risk	32	47	68
EJ Index for NATA* Respiratory Hazard Index	31	43	65
EJ Index for Traffic Proximity and Volume	59	62	81
EJ Index for Lead Paint Indicator	29	47	65
EJ Index for Superfund Proximity	17	37	60
EJ Index for RMP Proximity	15	38	61
EJ Index for Hazardous Waste Proximity	18	37	60
EJ Index for Wastewater Discharge Indicator	N/A	73	76



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

EJSCREEN Report (Version 2017)

1 mile Ring Centered at 19.629088,-155.988865, HAWAII, EPA Region 9

Approximate Population: 6,528

Input Area (sq. miles): 3.14

Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0

EJSCREEN Report (Version 2017)

1 mile Ring Centered at 19.629088,-155.988865, HAWAII, EPA Region 9

Approximate Population: 6,528

Input Area (sq. miles): 3.14

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in µg/m³)	N/A	N/A	N/A	9.9	N/A	9.14	N/A
Ozone (ppb)	N/A	N/A	N/A	41.8	N/A	38.4	N/A
NATA* Diesel PM (µg/m³)	0.133	0.149	69	0.978	<50th	0.938	<50th
NATA* Cancer Risk (lifetime risk per million)	29	34	33	43	<50th	40	<50th
NATA* Respiratory Hazard Index	0.72	1	32	2	<50th	1.8	<50th
Traffic Proximity and Volume (daily traffic count/distance to road)	240	1000	55	1100	47	590	65
Lead Paint Indicator (% Pre-1960 Housing)	0.021	0.16	25	0.24	26	0.29	17
Superfund Proximity (site count/km distance)	0.0035	0.1	10	0.15	0	0.13	0
RMP Proximity (facility count/km distance)	0.03	0.39	2	0.98	1	0.73	1
Hazardous Waste Proximity (facility count/km distance)	0.0036	0.1	10	0.12	0	0.093	0
Wastewater Discharge Indicator (toxicity-weighted concentration/m distance)	0	0.04	N/A	13	59	30	40
Demographic Indicators							
Demographic Index	45%	51%	29	47%	48	36%	68
Minority Population	57%	77%	15	59%	47	38%	72
Low Income Population	33%	26%	71	36%	50	34%	52
Linguistically Isolated Population	3%	6%	51	9%	36	5%	64
Population With Less Than High School Education	12%	9%	73	17%	47	13%	55
Population Under 5 years of age	4%	6%	26	7%	26	6%	28
Population over 64 years of age	22%	16%	81	13%	87	14%	86

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

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

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

phone: (808) 938-8583 P.O. Box 1310 Honokaʻa, Hawaiʻi 96727
email: gpknopp@gkenvllc.com.com

Laura Leialoha Phillips McIntyre, AICP
Environmental Planning Office
Department of Health
State of Hawaii
PO Box 3378
Honolulu, Hawaii 96801-3378
January 5, 2018

Dear Ms. McIntyre:

Thank you for your general comments concerning the Kona Reef Condominiums Erosion Abatement Structure Draft Environmental Assessment, published in the Office of Environmental Quality Control's Environmental Notice on November 23, 2017. We have reviewed the EPOs standard comments, and the DEA has adequately addressed all of these, including potential impacts including, but not limited to, wastewater, temporary fugitive dust emissions, solid and hazardous waste, and noise,

Mahalo for your interest in the project.

Sincerely,

Graham Paul Knopp, Ph.D.

GK Environmental LLC

comments on June 2017 Draft Environmental Assessment for
Erosion Abatement Structure in the Shoreline Setback, Kona Reef Condominiums
comments due December 26, 2017
from Cory Harden, Hilo 333cory@gmail.com

Approving Agency: Countv Of Hawaii Planning Department, Michael Yee, *Planning@Hawaiicounty.Gov*
(808) 323-4770, 101 Pauahi Street, Suite 3, Hilo, Hi 96720

Applicant: Association Of Apartment Owners Of Kona Reef, Inc.C/O Ray Pieri, *Pieriool@Hawaii.Rr.Com*
(808) 989-7439, 75-1029 Henry Street, #202,Kailua-Kona, Hawaii 96740

Consultant: Graham Paul Knopp, Ph.D., Gk Environmental LLC, *Gpknopp@Gkenvllc.Com*
(808) 938-8583, Po Box 1310, Honokaa, Hi 96727

I am sympathetic to the difficult choices faced by owners of seaside properties as sea levels rise.

Please consider these comments:

Though the stated intent of the project is to prevent erosion from foot traffic, storms and rising sea levels may cause it to function as a sea wall, reflecting waves which then erode other shoreline areas. Approving this may set a precedent for projects elsewhere.

The DEA should utilize these sources:

- *2017 Hawai'i Sea Level Rise Vulnerability and Adaptation Report https://climateadaptation.hawaii.gov/wp-content/uploads/2017/12/SLR-Report_Dec2017.pdf*
- *January 2017 Sea Level Viewer from National Oceanic and Atmospheric Administration at https://coast.noaa.gov/data/digitalcoast/pdf/slr-faq-hi.pdf .*

  General information from the Sea Level Rise Report states:
  "…it is vital that the magnitude and rate of sea level rise is tracked as new projections emerge, plan for 3.2 feet of sea level rise now, and be ready to adjust that projection upward…. global sea level rise will not stop at the year 2100, but will likely continue on for centuries."
  Hawai'i Sea Level Rise Vulnerability and Adaptation Report, 2017, p. vi

  Parts of the project will only be about 9 ½ inches above this sea level rise.
  "The elevation of the project site is approximately 4-8 feet above mean sea level." *DEA p. 12*

  The DEA seems to assume less sea level rise:
  "…GCI [Geohazards Consultants International, Inc.] considers that a larger value of 6.0 – 7.0 mm/year is reasonable for Hawaii Island, resulting in an estimation of about 0.3 m [of sea level rise], or about one foot, in 50 years as a rough estimate." *DEA p. 14*

The DEA should analyze how large storm waves reflecting off the project area will affect Waiaha Beach and other shoreline areas.

" In the event of a major storm surge or tsunami, it is possible that much of the volume of the soil underlying the lawn area may be eroded and transported to the shoreline area and ocean." *DEA p. 2*

"…on approximately [110 feet] the northern ½ of its length the structure would be exposed on the makai side." *DEA p. 9*

"GCI concluded that the erosion abatement structure would protect the lawn area from surge waves that can reach the shoreline during times of storms or tsunami." *DEA p. 15*

###

phone: (808) 938-8583 P.O. Box 1310 Honokaʻa, Hawaiʻi 96727
email: gpknopp@gkenvllc.com.com

Cory Harden
Hilo, Hawaii
333cory@gmail.com
January 5, 2018

Dear Ms. Harden:

Thank you for your comments concerning the Kona Reef Condominiums Erosion Abatement Structure Draft Environmental Assessment, published in the Office of Environmental Quality Control's Environmental Notice on November 23, 2017.

We acknowledge that you believe that the erosion abatement wall may effectively function as a sea wall apparently at some point in the indefinite future. This is not the intent of the wall whatsoever, the wall would not be designed to receive wave energy, and given reasonable expectations of sea level rise, the point at which wave energy would be normally received by the wall would be well past the expected lifetime of the Kona Reef Condominiums. The data sources you mention all agree that sea level rise for Hawaii Island has been approximately 3 mm/year, or about one foot in 50 years. Please note that sea level rise is site-specific and varies widely as it is the combination of local and global (i.e., isostatic and eustatic) sea level rise factors. So, assuming twice this value, we find that the value assumed in the GCI report, for the next 50 years is reasonable.

The DEA evaluates how large storm waves, "reflecting off the project area will affect Waiaha Beach and other shoreline areas." Due to the extensive pahoehoe shelf fronting the project site storm wave energy is largely dissipated before reaching the shoreline margin. During periods of extraordinary waves incident on the project area fraction of wave energy incident, and therefore also reflected from the erosion abatement wall, would be very small compared to the wave energy incident from such a powerful ocean swell. While you are entirely correct that wave energy is reflected off of hard structures, this would only occur during extraordinary conditions such as a tsunami, and during these events, wave energy would be reflected from the entire coastline, in addition to other structures impacted by such a tsunami.

Mahalo for your interest in the project.

Sincerely,

Graham Paul Knopp, Ph.D.

GK Environmental LLC

APPENDIX B: ENGINEERING DRAWINGS
ENGINEERING PARTNERS, INC.

SITE IMPROVEMENT PLAN

FOR

KONA REEF CONDOMINIUMS

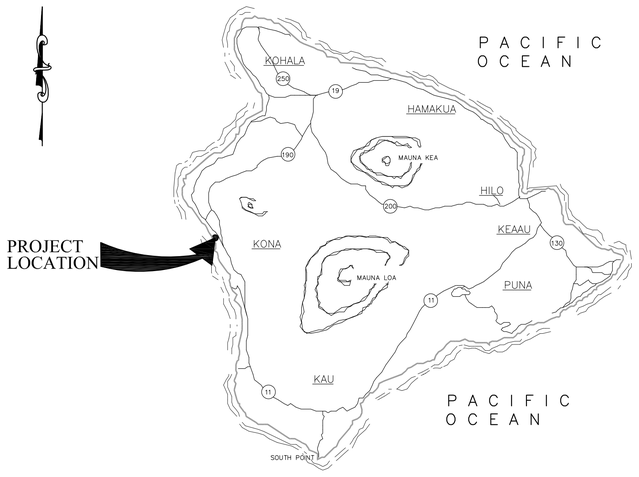
EROSION ABATEMENT PROJECT

NORTH KONA, ISLAND OF HAWAII, HAWAII

TMK: (3) 7-5-018: 071

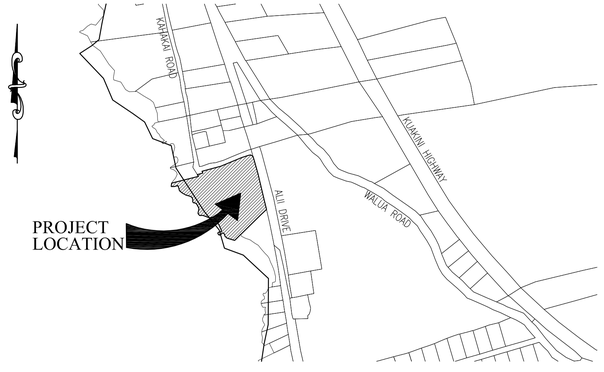
ENGINEERING PARTNERS

455 E. Lanikaula St.
Hilo Hawai`i 96720
Main (808) 933-7900
www.epinc.pro
Hawai`i | Las Vegas



BIG ISLAND MAP

ISLAND OF HAWAII NOT TO SCALE
STATE OF HAWAII

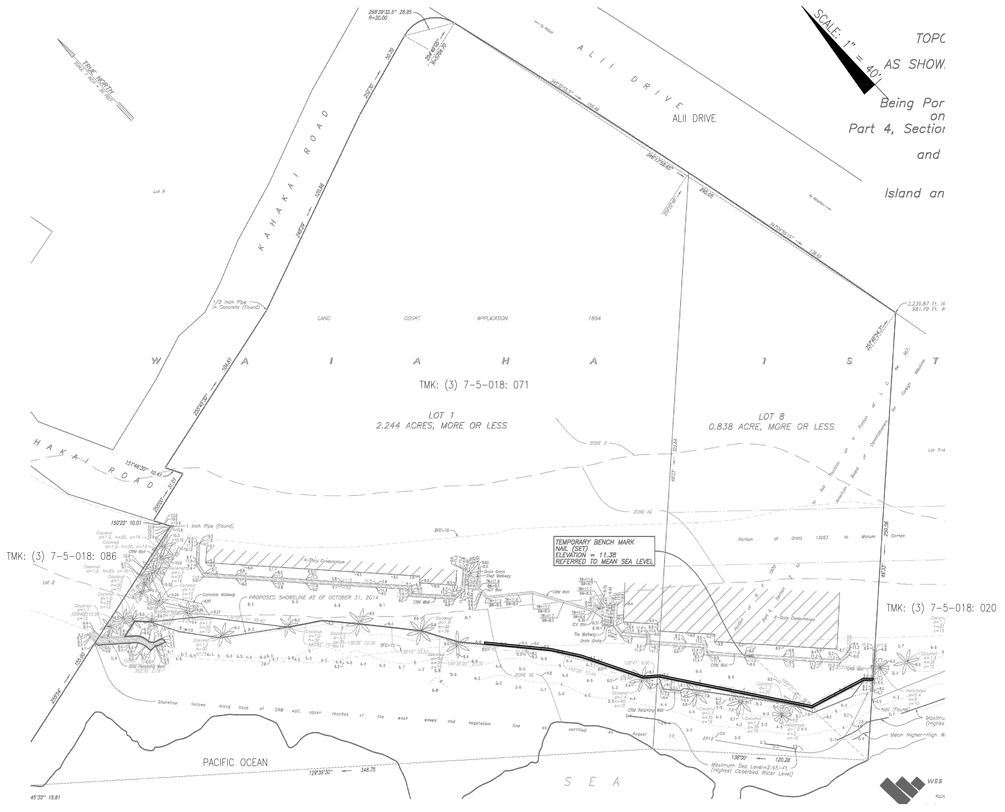


A VICINITY MAP

SCALE: 1" = 400' 0 400' 800'

APPROVED:

DIRECTOR, PLANNING DEPARTMENT DATE
COUNTY OF HAWAII



B PLOT PLAN

SCALE: 1" = 40' 0 40' 80'

DRAWING INDEX

DWG. NO.	DESCRIPTION
T-1	TITLE SHEET
C-1	SITE PLAN

PROJECT TEAM:

CIVIL ENGINEERING

NAME: ENGINEERING PARTNERS, INC
PHONE: (808) 933-7900
ADDRESS: 455 E. LANIKAULA ST., HILO, HAWAII 96720

ENVIRONMENTAL CONSULTING

NAME: GK ENVIRONMENTAL, LLC
PHONE: (808) 938-8583
ADDRESS: P.O. BOX 1363, HONOKAA, HAWAII 96727

TITLE SHEET

DATE: REV. REV. REV. REV.

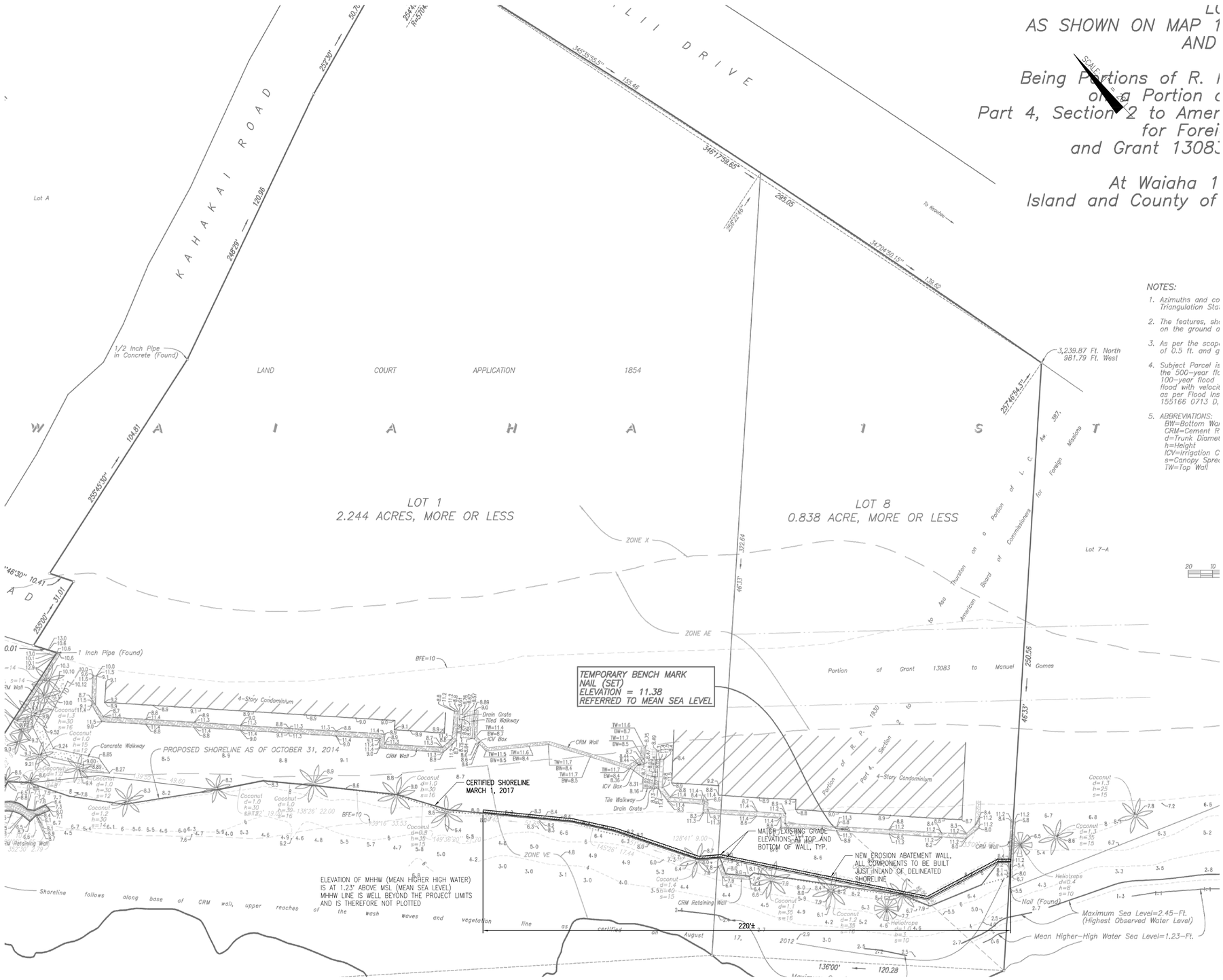
SITE DEVELOPMENT PLANS FOR:
KONA REEF CONDOMINIUMS
EROSION ABATEMENT PROJECT
NORTH KONA, HAWAI'I, HAWAI'I
TMK: (3) 7-5-018: 071

DRAWN BY: DESIGNED BY:
CHECKED BY: QC'D BY:

JOB NO.
18000-14-39

DWG. NO.
T-1
SHEET NO. OF X

05/04/2017 9:34 am
M:\EP PROJECTS\2014 PROJECTS\18000-14-39 EROSION WALL KONA REEF APPS\DWG\C-X.REVLDWG

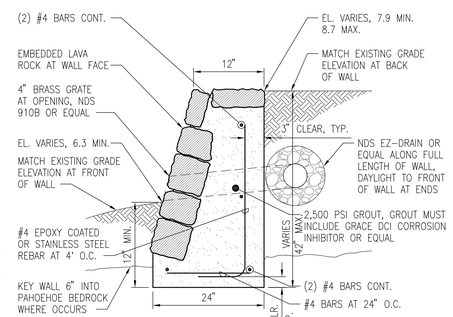


A **SITE PLAN**
SCALE: 1" = 20'

NOTES:

1. Azimuths and co Triangulation Sta
2. The features, sh on the ground a
3. As per the scap of 0.5 ft. and g
4. Subject Parcel is the 500-year flo 100-year flood flood with velocit as per Flood Ins 155166 0713 D,
5. ABBREVIATIONS:
   BW=Bottom Wa
   CRM=Cement R
   d=Trunk Diamet
   h=Height
   ICV=Irrigation C
   s=Canopy Sprea
   TW=Top Wall

NOTE:
WHERE THE DETAIL BELOW CANNOT BE FOLLOWED DUE TO EXISTING SITE CONDITIONS, THE ENGINEER MUST BE NOTIFIED IMMEDIATELY TO PROVIDE REVISED DETAILS PRIOR TO CONTINUATION WITH THE WORK.



NOTE:
EXCAVATION BELOW EL.=3.0' IS PROHIBITED
ALL REINFORCING BARS MUST BE EPOXY COATED OR STAINLESS STEEL

1 **EROSION WALL DETAIL**
SCALE: NOT TO SCALE

ENGINEERING PARTNERS
455 E. Lanikaula St.
Hilo Hawai`i 96720
Main (808) 933-7900
www.epinc.pro
Hawai`i | Las Vegas

SITE PLAN

DATE: REV. REV. REV. REV. REV.

SITE DEVELOPMENT PLANS FOR:
KONA REEF CONDOMINIUMS
EROSION ABATEMENT PROJECT
NORTH KONA, HAWAI'I, HAWAI'I
TMK: (3) 7-5-018: 071

DRAWN BY: DESIGNED BY:
CHECKED BY: QC'D BY:

JOB NO.
18000-14-39

DWG. NO.
C-1

SHEET NO. OF X

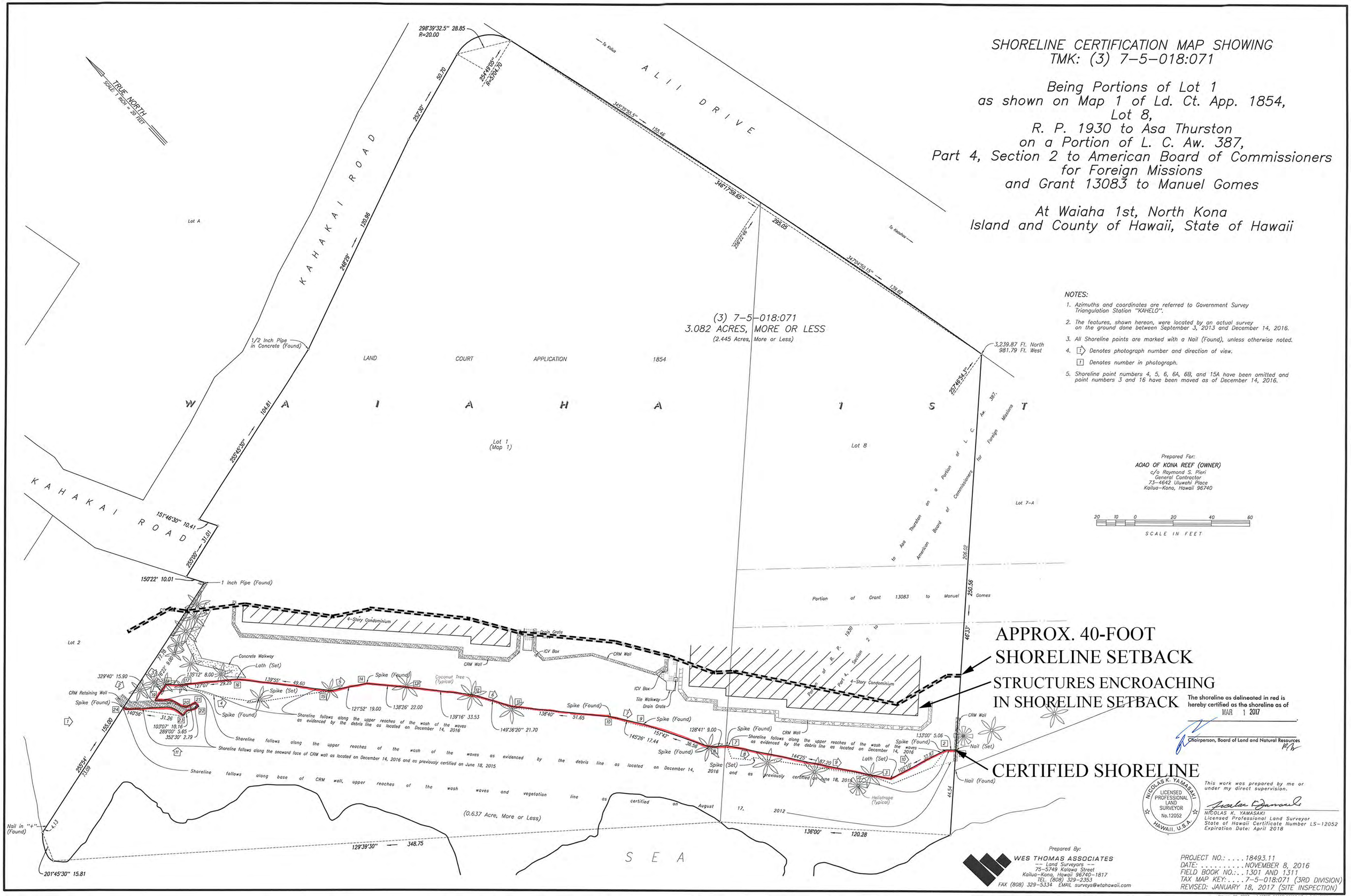
05/04/2017 9:35 am
M:\EO PROJECTS\2014 PROJECTS\18000-14-39 EROSION WALL KONA REEF APTS\DWG\C-X_REV.DWG

APPENDIX C: STATE CERTIFIED SHORELINE SURVEY AND PHOTOGRAPHS
WES THOMAS ASSOCIATES

SHORELINE CERTIFICATION MAP SHOWING
TMK: (3) 7-5-018:071

Being Portions of Lot 1
as shown on Map 1 of Ld. Ct. App. 1854,
Lot 8,
R. P. 1930 to Asa Thurston
on a Portion of L. C. Aw. 387,
Part 4, Section 2 to American Board of Commissioners
for Foreign Missions
and Grant 13083 to Manuel Gomes

At Waiaha 1st, North Kona
Island and County of Hawaii, State of Hawaii



NOTES:

1. Azimuths and coordinates are referred to Government Survey Triangulation Station "KAHELO".
2. The features, shown hereon, were located by an actual survey on the ground done between September 3, 2013 and December 14, 2016.
3. All Shoreline points are marked with a Nail (Found), unless otherwise noted.
4. [1] Denotes photograph number and direction of view.
   [1] Denotes number in photograph.
5. Shoreline point numbers 4, 5, 6, 6A, 6B, and 15A have been omitted and point numbers 3 and 16 have been moved as of December 14, 2016.

The shoreline as delineated in red is hereby certified as the shoreline as of MAR 1 2017

Chairperson, Board of Land and Natural Resources

This work was prepared by me or under my direct supervision.

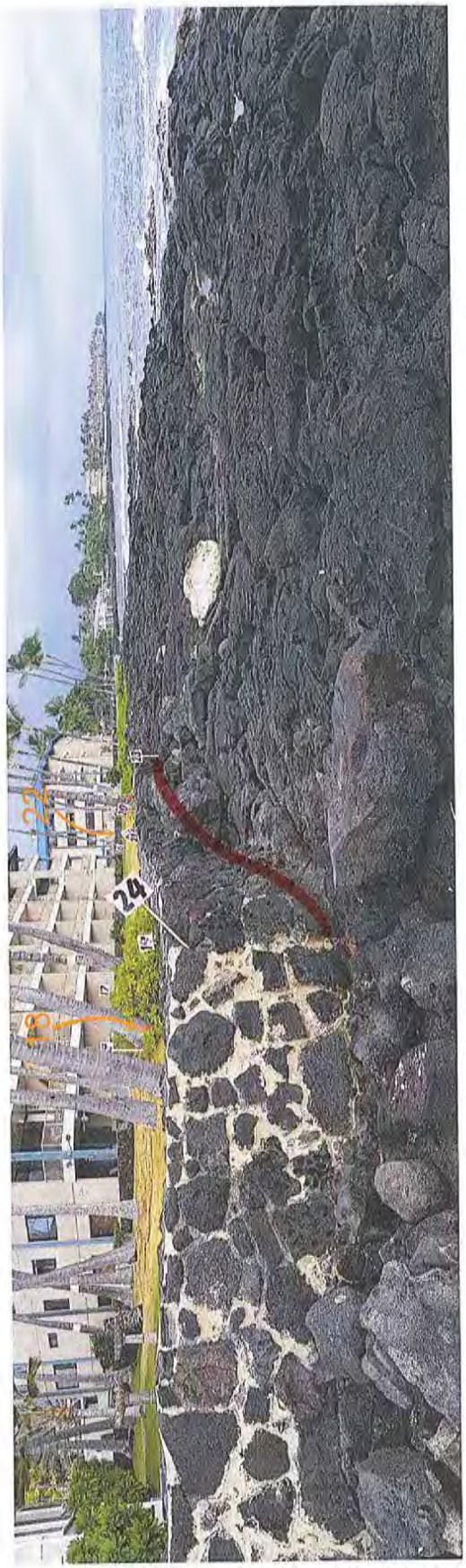
NICOLAS K. YAMASAKI
LICENSED PROFESSIONAL LAND SURVEYOR
No.12052
HAWAII, U.S.A.

NICOLAS K. YAMASAKI
Licensed Professional Land Surveyor
State of Hawaii Certificate Number LS-12052
Expiration Date: April 2018

Prepared By:
WES THOMAS ASSOCIATES
-- Land Surveyors --
75-5749 Kalawa Street
Kailua-Kona, Hawaii 96740-1817
TEL. (808) 329-2353
FAX (808) 329-5334 EMAIL surveys@wtahawaii.com

PROJECT NO.: 18493.11
DATE: . . . . . NOVEMBER 8, 2016
FIELD BOOK NO.: . . 1301 AND 1311
TAX MAP KEY: . . . . 7-5-018:071 (3RD DIVISION)
REVISED: JANUARY 18, 2017 (SITE INSPECTION)

January 18, 2017 p:\18000-18499\18493.11\dgn\18493.11st-r1.dgn



PHOTOGRAPH NUMBER 1

DATE OF PHOTOGRAPHS:
OCTOBER 28, 2016

TIME OF PHOTOGRAPHS:
3:50 P.M.

WES THOMAS ASSOCIATES
-- Land Surveyors --
75-5749 Kalawa Street
Kailua-Kona, Hawaii 96740-1817
TEL. (808) 329-2353 FAX (808) 329-5334 EMAIL surveys@wtahawaii.com

PROJECT NO.: 18493.11
TAX MAP KEY: 7-5-018:071
(3RD DIVISION)

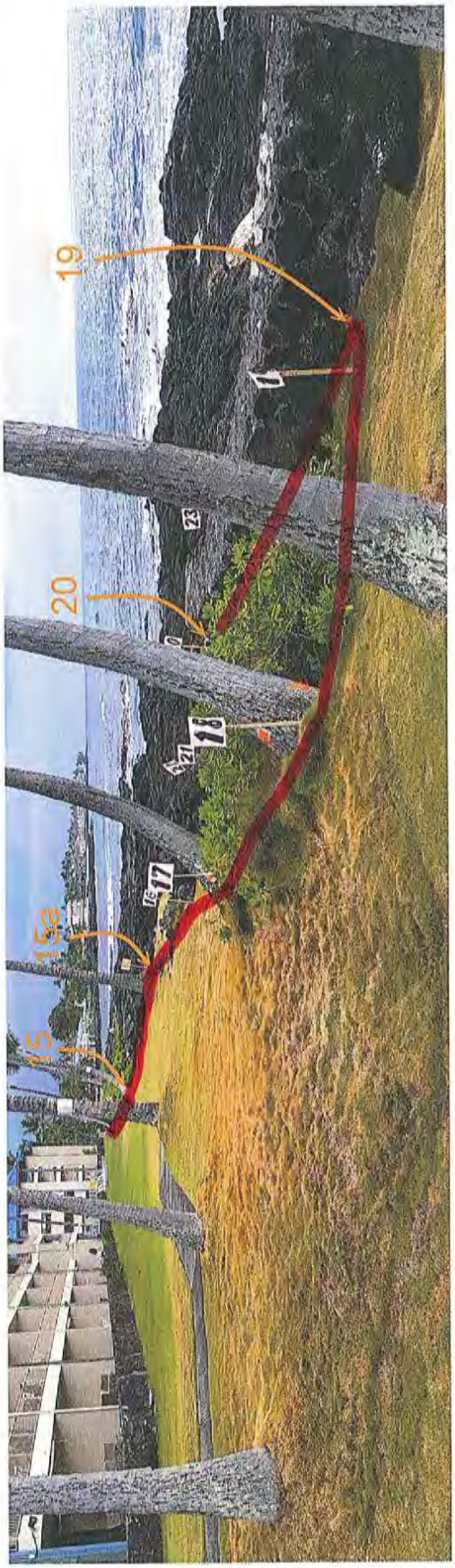
PHOTOGRAPH NUMBER 2

DATE OF PHOTOGRAPHS:
OCTOBER 28, 2016

TIME OF PHOTOGRAPHS:
3:50 P.M.

WES THOMAS ASSOCIATES
-- Land Surveyors --
75-5749 Kalawa Street
Kailua-Kona, Hawaii 96740-1817
TEL. (808) 329-2353 FAX (808) 329-5334 EMAIL surveys@wtahawaii.com

PROJECT NO.: 18493.11
TAX MAP KEY: 7-5-018:071
(3RD DIVISION)



PHOTOGRAPH NUMBER 3

DATE OF PHOTOGRAPHS:
OCTOBER 28, 2016

TIME OF PHOTOGRAPHS:
3:50 P.M.

WES THOMAS ASSOCIATES
-- Land Surveyors --
75-5749 Kalawa Street
Kailua-Kona, Hawaii 96740-1817
TEL. (808) 329-2353 FAX (808) 329-5334 EMAIL surveys@wtahawaii.com

PROJECT NO.: 18493.11
TAX MAP KEY: 7-5-018:071
(3RD DIVISION)

PHOTOGRAPH NUMBER 4

DATE OF PHOTOGRAPHS:
OCTOBER 28, 2016

TIME OF PHOTOGRAPHS:
3:50 P.M.

WES THOMAS ASSOCIATES
-- Land Surveyors --
75-5749 Kalawa Street
Kailua-Kona, Hawaii 96740-1817
TEL. (808) 329-2353 FAX (808) 329-5334 EMAIL surveys@wtahawaii.com

PROJECT NO.: 18493.11
TAX MAP KEY: 7-5-018:071
(3RD DIVISION)

PHOTOGRAPH NUMBER 5

DATE OF PHOTOGRAPHS:
OCTOBER 28, 2016

TIME OF PHOTOGRAPHS:
3:50 P.M.

WES THOMAS ASSOCIATES
-- Land Surveyors --
75-5749 Kalawa Street
Kailua-Kona, Hawaii 96740-1817
TEL. (808) 329-2353 FAX (808) 329-5334 EMAIL surveys@wtahawaii.com

PROJECT NO.: 18493.11
TAX MAP KEY: 7-5-018:071
(3RD DIVISION)

PHOTOGRAPH NUMBER 6

DATE OF PHOTOGRAPHS:
OCTOBER 28, 2016

TIME OF PHOTOGRAPHS:
3:50 P.M.

WES THOMAS ASSOCIATES
-- Land Surveyors --
75-5749 Kalawa Street
Kailua-Kona, Hawaii 96740-1817
TEL. (808) 329-2353 FAX (808) 329-5334 EMAIL surveys@wtahawaii.com

PROJECT NO.: 18493.11
TAX MAP KEY: 7-5-018:071
(3RD DIVISION)

PHOTOGRAPH NUMBER 7

DATE OF PHOTOGRAPHS:
OCTOBER 28, 2016

TIME OF PHOTOGRAPHS:
3:50 P.M.

WES THOMAS ASSOCIATES
-- Land Surveyors --
75-5749 Kalawa Street
Kailua-Kona, Hawaii 96740-1817
TEL. (808) 329-2353 FAX (808) 329-5334 EMAIL surveys@wtahawaii.com

PROJECT NO.: 18493.11
TAX MAP KEY: 7-5-018:071
(3RD DIVISION)

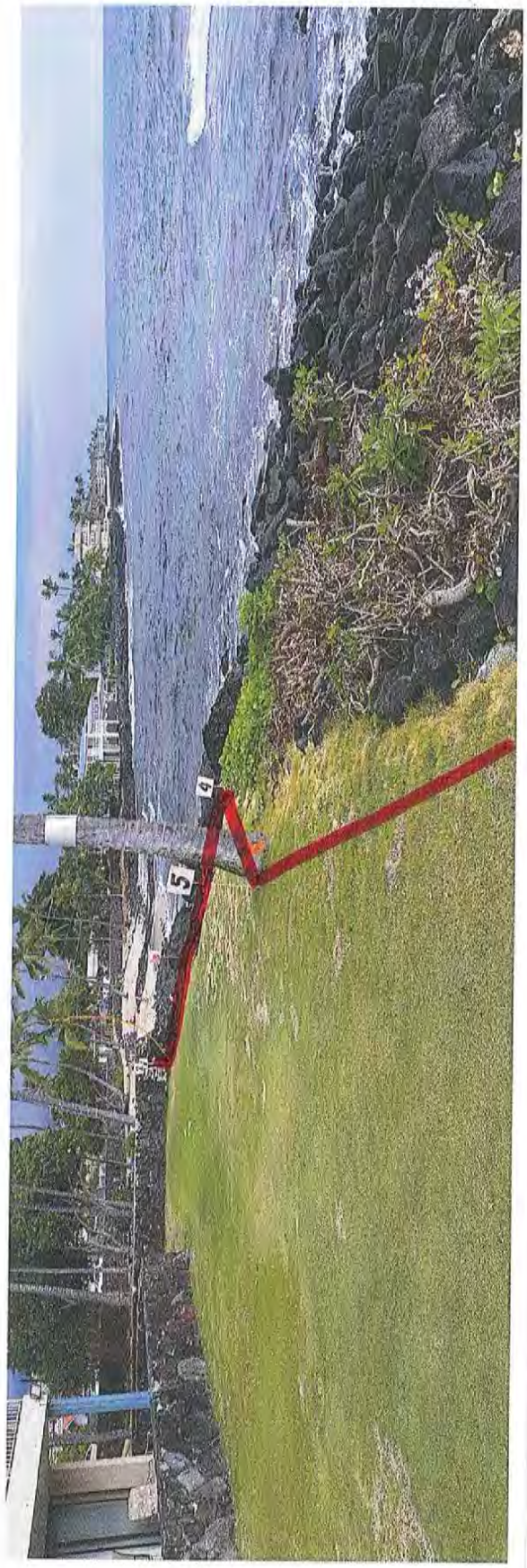
PHOTOGRAPH NUMBER 8

DATE OF PHOTOGRAPHS:
OCTOBER 28, 2016

TIME OF PHOTOGRAPHS:
3:50 P.M.

WES THOMAS ASSOCIATES
-- Land Surveyors --
75-5749 Kalawa Street
Kailua-Kona, Hawaii 96740-1817
TEL. (808) 329-2353 FAX (808) 329-5334 EMAIL surveys@wtahawaii.com

PROJECT NO.: 18493.11
TAX MAP KEY: 7-5-018:071
(3RD DIVISION)



PHOTOGRAPH NUMBER 9

DATE OF PHOTOGRAPHS:
OCTOBER 28, 2016

TIME OF PHOTOGRAPHS:
3:50 P.M.

WES THOMAS ASSOCIATES
-- Land Surveyors --
75-5749 Kalawa Street
Kailua-Kona, Hawaii 96740-1817
TEL. (808) 329-2353 FAX (808) 329-5334 EMAIL surveys@wtahawaii.com

PROJECT NO.: 18493.11
TAX MAP KEY: 7-5-018:071
(3RD DIVISION)

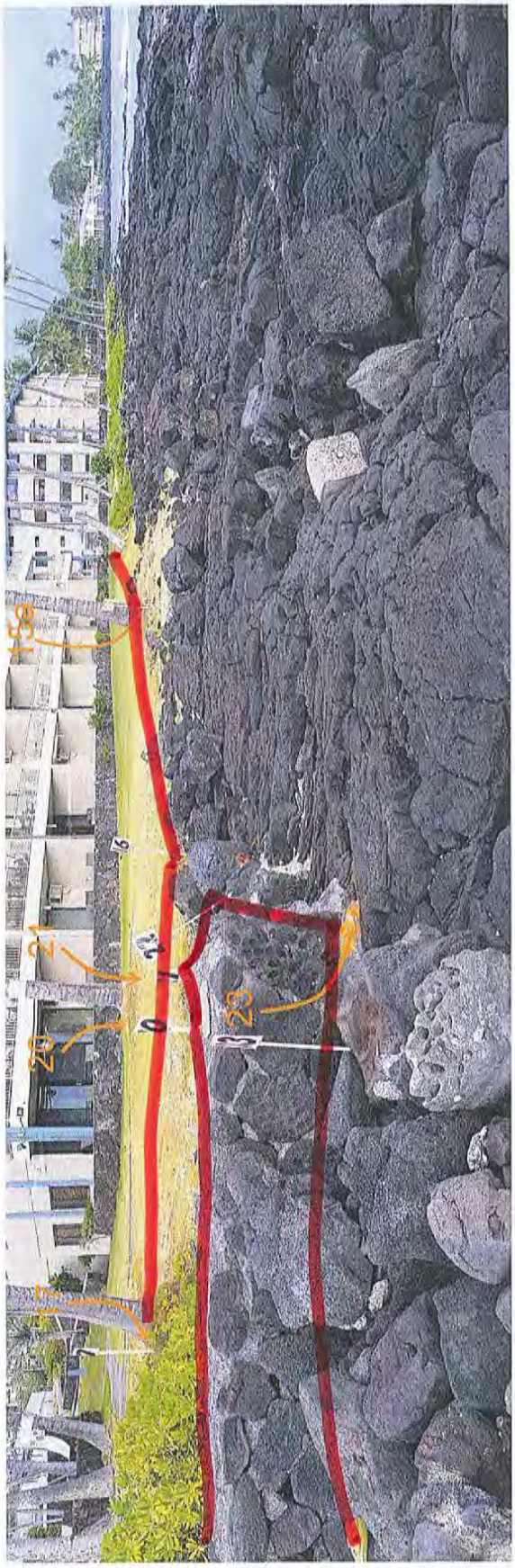
PHOTOGRAPH NUMBER 10

DATE OF PHOTOGRAPHS:
OCTOBER 28, 2016

TIME OF PHOTOGRAPHS:
3:50 P.M.

WES THOMAS ASSOCIATES
-- Land Surveyors --
75-5749 Kalawa Street
Kailua-Kona, Hawaii 96740-1817
TEL. (808) 329-2353 FAX (808) 329-5334 EMAIL surveys@wtahawaii.com

PROJECT NO.: 18493.11
TAX MAP KEY: 7-5-018:071
(3RD DIVISION)



PHOTOGRAPH NUMBER 11

DATE OF PHOTOGRAPHS:
OCTOBER 28, 2016

TIME OF PHOTOGRAPHS:
3:50 P.M.

WES THOMAS ASSOCIATES
-- Land Surveyors --
75-5749 Kalawa Street
Kailua-Kona, Hawaii 96740-1817
TEL. (808) 329-2353 FAX (808) 329-5334 EMAIL surveys@wtahawaii.com

PROJECT NO.: 18493.11
TAX MAP KEY: 7-5-018:071
(3RD DIVISION)

APPENDIX D: ARCHAEOLOGICAL INVENTORY SURVEY
HAUN & ASSOCIATES

Report 932-041216

DRAFT

ARCHAEOLOGICAL INVENTORY SURVEY

KONA REEF CONDOMINIUM

SEAWALL REPLACEMENT PROJECT

WAIʻAHA 1 AHUPUAʻA, NORTH KONA DISTRICT

ISLAND OF HAWAI'I

(TMK: [3] 7-5-018: POR. 071)

HAUN & ASSOCIATES

ARCHAEOLOGICAL, CULTURAL, AND HISTORICAL RESOURCE MANAGEMENT SERVICES

73-1168 KAHUNA AʻO ROAD, KAILUA-KONA HI 96740

PHONE: 808-325-2402 FAX: 808-325-1520

Report 932-041216

DRAFT

KONA REEF CONDOMINIUM

SEAWALL REPLACEMENT PROJECT

ARCHAEOLOGICAL INVENTORY SURVEY

WAIʻAHA 1 AHUPUAʻA, NORTH KONA DISTRICT

ISLAND OF HAWAI'I

(TMK: [3] 7-5-018: POR. 071)

By:

Alan E. Haun, Ph.D.
and
Dave Henry, B.S.

Prepared for:
Kona Reef Condominium
c/o Dr. Graham Knopp
P.O. Box 1363
Honokaa, HI
96727

April 2016

HAUN & ASSOCIATES

ARCHAEOLOGICAL, CULTURAL, AND HISTORICAL RESOURCE MANAGEMENT SERVICES
73-1168 KAHUNA AʻO ROAD, KAILUA-KONA HI 96740
PHONE: 808-325-2402 FAX: 808-325-1520

MANAGEMENT SUMMARY

Haun & Associates has completed an archaeological assessment of a 0.314 acre portion of the Kona Reef Condominium development in TMK: (3) 7-5-018:071, Wai'aha 1 Ahupua'a, North Kona District, Island of Hawai'i. The objective of the AIS was to satisfy current historic preservation regulatory review inventory requirements of the Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD), as contained within Hawai'i Administrative Rules, Title 13, DLNR, Subtitle 13, Chapters 276 and 284, State Historic Preservation Rules (DLNR 2003).

The survey identified the disturbed remnant of a subsurface cultural deposit (Site 50-10-28-30493) during shovel testing within the project area. This deposit contains pre- and/or early post-contact cultural material, mixed with historic and modern materials. Documentary research and consultation with an adjacent landowner indicates that the Site 30493 deposit represents the original ground surface prior to the introduction of fill material that occurred during multiple episodes between the 1960s and 1980s.

The site is assessed as significant for its information content. It has yielded information important for understanding prehistoric habitation in the area. The documentation of the Site 30493 cultural deposit has adequately recorded it. No further work or preservation is recommended because of the disturbed nature of the deposit and the limited potential to obtain additional archaeological information,

Cover photo: Overview of project area (view to north-northwest)

Contents

MANAGEMENT SUMMARY i
INTRODUCTION 1
Scope of Work 1
Project Area Description 1
Methods 5
BACKGROUND 8
Historical Documentary Research 8
Previous Archaeological Work 12
PROJECT EXPECTATIONS 18
CONSULTATION 18
FINDINGS 19
CONCLUSION 25
Discussion 25
Significance Assessments 25
Treatment Recommendations 25
TRANSLATION OF HAWAIIAN WORDS 26
REFERENCES 26
APPENDIX A – SHPD LETTER 31

Figures

Figure 1. Portion of USGS 1998 7.5' USGS Kailua Quadrangle showing project area 2
Figure 2. Tax Map Key 7-5-16 showing project area 3
Figure 3. March 8, 2013 Aerial view of project area (from Google earth) 4
Figure 4, Project area overview (view to northwest) 6
Figure 5. Project area overview (view to south) 6
Figure 6. Plan map of proposed seawall improvements and shovel tests 7
Figure 7. Ahupua'a boundaries and Land Commission Awards 9
Figure 8. Portion of Emerson's 1880 map of Kailua 10
Figure 9. Portion of 1928 USGS Kailua Quadrangle showing project area 13
Figure 10. Profiles of STs 1-6 21
Figure 11. Profiles of ST-7-10 22
Figure 12. Coral file from ST-8 24

Tables

Table 1. Land Commission Awards in Wai'aha 11
Table 2. Previous archaeological work 14
Table 3. Summary of Shovel Test Stratigraphy 20
Table 4. Summary of cultural material from shovel testing 23

INTRODUCTION

At the request of Dr. Graham Knopp on behalf of the Kona Reef Condominium, Haun & Associates has prepared an archaeological inventory survey of a 0.314 acre portion of the 3.082 acre TMK: [3] 7-5-018:071 located in Waiʻaha 1 Ahupuaʻa, North Kona District, Island of Hawaiʻi (**Figure** 1 and **Figure 2**). The project objective is to comply with historic preservation regulatory review requirements of the Department of Land and Natural Resources - State Historic Preservation Division (DLNR-SHPD), as contained within Hawai'i Administrative Rules, Title 13, DLNR, Subtitle 13, State Historic Preservation Rules (HAR, Chapters 276 and 284; DLNR 2003).

The current project was done in response to a January 5, 2012 letter from SHPD to Mr. Peter Dahlberg (Log No. 2011.3365, Doc. No. 1112MV27 - **Appendix A**). A Grading Permit Application had been submitted in November 2011 for the construction of a proposed seawall along the seaward side of the Kona Reef. SHPD archaeologist Michael Vitousek subsequently examined the location of the proposed seawall in December 2011 and identified a possible archaeological cultural deposit along the shoreline in the northern portion of the development. According to Mr. Vitousek, "The deposit consists of a darkened anthropogenic sandy layer that includes marine shell, echinoidea, and charcoal. The cultural layer appears to be eroding out of the face of the shoreline bank and, while most noticeable in the north end of the project area, may extend the entire length of the ocean frontage." Based on this inspection, SHPD requested that an archaeological inventory survey be conducted to further examine this cultural deposit and determine if it had been impacted by the construction of the Kona Reef Condominium.

Scope of Work

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

1. Conduct background review and research of existing archaeological and historical documentary literature relating to the project area and its immediate vicinity--including examination of Land Commission Awards, *ahupua'a* records, historic maps, archival materials, archaeological reports, and other historical sources;
2. Conduct 100% pedestrian survey coverage of the project area;
3. Conduct detailed recording of all potentially significant sites including scale plan drawings, written descriptions, and photographs, as appropriate;
4. Conduct limited subsurface testing (manual excavation) at selected sites to determine feature function;
5. Analyze background research and field data; and
6. Prepare and submit Final Report.

Project Area Description

The Kona Reef Condominium complex is a 3.082 acre development located along the seaward side of Aliʻi Drive in the coastal portion of Waiʻaha 1 Ahupuaʻa. **Figure 3** is an aerial view of the project area vicinity taken on March 8, 2013. The Kona Reef Condominium is located south of Kahakai Road and the Hale Kona Kai Condominium, and north of Waiʻaha Bay and Honi's Beach. The development is a 129-unit complex comprised of condominium buildings, a swimming pool and parking areas. A maintained grass lawn extends along the seaward side of the development, with scattered coconut palms (*Cocos*

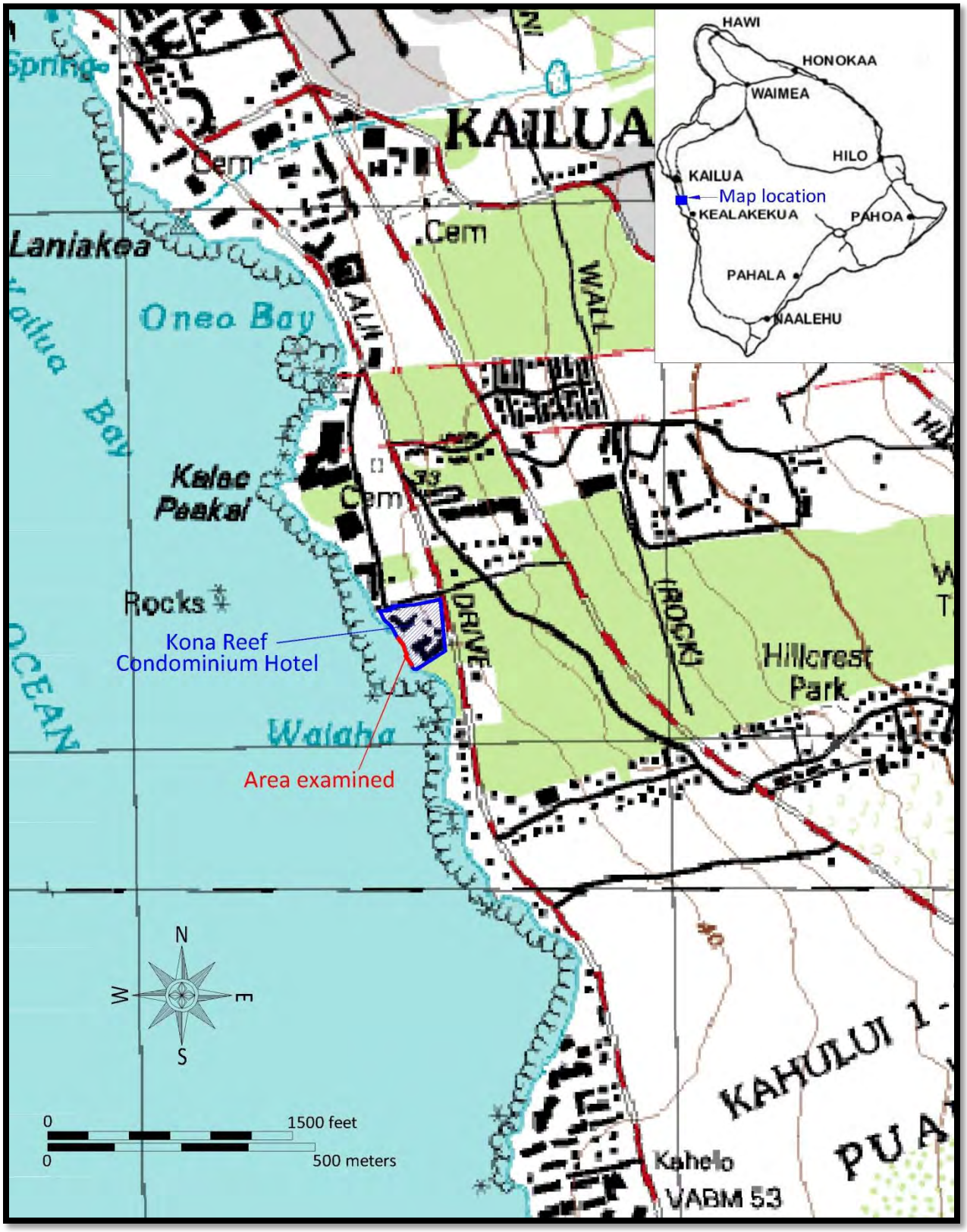


Figure 1. Portion of USGS 1998 7.5' USGS Kailua Quadrangle showing project area

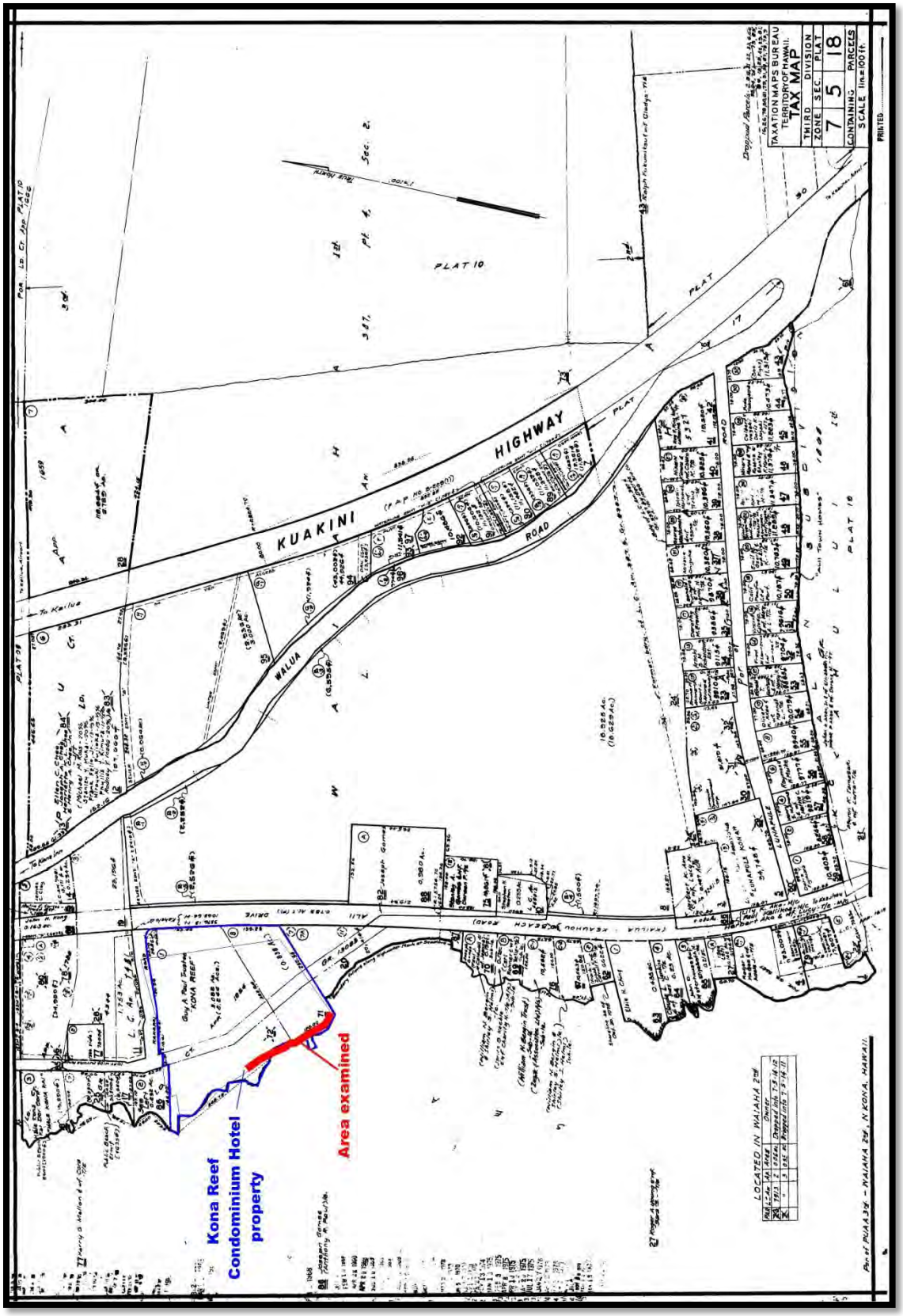


Figure 2. Tax Map Key 7-5-16 showing project area

Figure 3. March 8, 2013 Aerial view of project area (from Google earth)

nucifera) and bougainvillea (*Bougainvillea* spp.), bushes. Examples of the project area are presented on the cover of this report and in **Figure 4** and **Figure 5**.

The proposed project consists of the installation of a new seawall along the certified shoreline, in the southern portion of the development. This approximately 0.314 acre area is located seaward of the existing condominium buildings. The location of the proposed seawall improvements is shown in **Figure 6**.

According to Sato et al. (1973:52 and Sheet 85), the soil in the project area is Waiaha extremely stony silt loam on 6-12% slopes. It has a 4" surface layer of very dark brown extremely stony silt loam, over a 14" thick subsoil of dark brown very stony silt loam, over pahoehoe bedrock. It has a moderately rapid permeability, a slow runoff and a slight erosion hazard. It is classified as suitable for pasture. The underlying pahoehoe lava was deposited more than 10,000 years ago from Hualalai Volcano (Wolfe and Morris 2001). Annual rainfall in the vicinity of the project area ranges from 750 to 1,350 mm (29.5 to 53 inches – Giambelluca et al. 2013). The mean average temperature in this general area is c. 75 degrees F (Juvik and Juvik 1989:51). There are no other apparent surface water sources on the property.

Methods

The survey fieldwork was conducted March 2 through March 7, 2016 by Haun & Associates Project Supervisor Solomon Kailihiwa, M.A and a crew of three archaeologists, under the direction of Dr. Alan Haun. Approximately 9 labor-days were required to complete the fieldwork portion of the project. The area of the proposed seawall improvements was carefully examined, with no surface archaeological remains present.

The project consisted of excavating ten shovel tests spaced 6.4 to 7.8 meters apart (average 6.9 meters apart). The location of the shovel tests is depicted in **Figure 6**. The shovel tests were excavated in stratigraphic layers and were terminated on bedrock. Standardized excavation records were prepared after the completion of each stratigraphic layer. The soil removed during excavation was screened through ¼ inch mesh hardware cloth. Portable remains collected were placed in paper bags labeled with the appropriate provenience information. Following the excavation, a section drawing depicting the stratigraphy was prepared and post-excavation photographs were taken. The tests were described using standard terminology, referencing Munsell Soil and Rock color notation. Texture and inclusion content were also noted. Following documentation the tests were backfilled.

Recovered cultural material was transported to Haun & Associates' office for analysis. The recovered artifacts and food remains were qualitatively and quantitatively analyzed. Artifacts were analyzed to determine morphological type, condition, degree of completion and material. Standard typological classifications were used for all artifacts. Food remains were identified to the family level, or to the genus and species level when possible. Quantitative analysis included a determination of total weight and total number of identified fragments (TNF) per taxon.

Figure 4, Project area overview (view to northwest)

Figure 5. Project area overview (view to south)

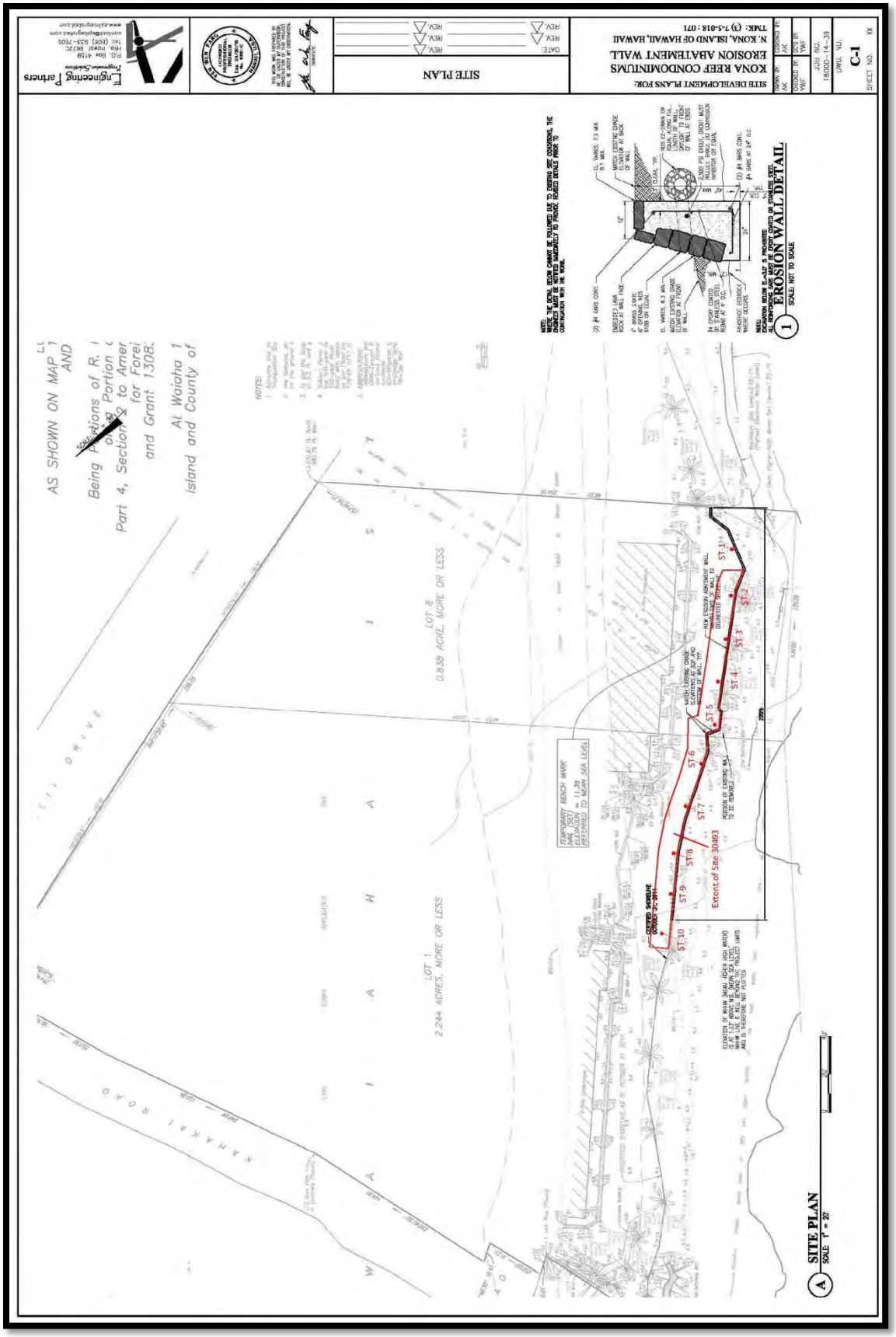


Figure 6. Plan map of proposed seawall improvements and shovel tests

ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

Historical Documentary Research

The project area is located within the *ahupua'a* of Wai'aha 1 (**Figure 7**). This Kona *ahupua'a* means "gathering water" (Pukui et al. 1976:219), a name potentially derived from Ma'o Heiau, a *heiau* located on the north side of Wai'aha Bay. According to Pukui et al., this *heiau* was built to start or stop the rain. Thrum's examination of the *heiau* identified holes in the upper portion of the *heiau's* platform where rain was said to have been cooked (1908:43).

The *ahupua'a* contained ceremonial complexes and high status residences with the majority of pre-Contact and early post-Contact sites situated in the coastal portion of Wai'aha (Rechtman 2002:5). Maly (1996) translated portions of the Hawaiian newspaper *Ka Hoku o Hawai'I* between 1914 and 1917. The following account written in the newspaper by Hawaiian historians John Wise and J.W.I. Kihe included, cites the agricultural importance of Wai'aha:

> The story is set in about the 13th century, in the time of Pili-a-Ka'aiea (Pili), sovereign chief of all Kona, the narrative identifies the lands between Lanihau [Kailua] and Puapua'a as an integral component of Pili's royal domain. Pili was a great advocate of contests in debating, fighting and physical strength, and Hinakahua at Puapua'a was the site of the chief's longhouses and contest field which supported those activities. While Pili was at Hinakahua, he was supported by the agricultural and natural resources of the surrounding ahupua'a including Kahului, Waiaha, Pua'a, Auhaukea'e, Hinaloli (Hienaloli), Honua'la, Keopu, Moeauoa and Lanihau. Pili's royal compound was at Niumalu, his canoe fleets were harbored at Oneo (and his wealth-houses, where tribute was kept until it was needed, were situated at Ahu'ena (1996: A-2).

The importance of Wai'aha to the Hawaiian royalty continued into the post-Contact period. In her later years, Queen Emma, wife of Alexander Liholiho (Kamehameha II), had a residence and associated gardens in inland Wai'aha. **Figure 8** is a portion of Emerson's 1880s map of Kailua. This map depicts Queen Emma's house in the inland portion of the *ahupua'a*.

Hawai'i was first unified under the rule of 'Umi-a-Liloa and Kona was selected as a dwelling place of chiefs (Kamakau 1961). The area lies within the realm of the traditional Hawaiian political authority that was centered in the Kailua-Keauhou area from at least the 15th century to the reign of Kamehameha I.

Schilt (1984) summarizes Kailua's early historic period. In the late 1700s to early 1800s, Kamehameha monopolized foreign commerce including the provisioning of trading and whaling ships and beginning in 1811 the sandalwood trade. The first missionaries arrived in Kailua in 1820, but only stayed a few months. They returned in 1823 and were given land to establish missions and by 1825 schools in Wai'aha. According to Soehren, "A large part of Wai'aha 1st was subsequently awarded to the American Board of Commissioners for Foreign Missions during the Mahele to most likely provide rental income for the support of mission schools" (1981:4).

The gradual shift from subsistence farming to a market economy began with the introduction of coffee, corn, pumpkins, cotton, pineapple, and Irish potatoes in the 1820s to 1840s. Introduced early historic crops cultivated in the vicinity of Kailua below 500 ft elevation included melons, cabbage, onions, oranges, and tobacco. The introduction of cattle ranching and commercial coffee production in the mid-1800s caused further change to the traditional agricultural system. The Kuakini Wall (Site 6302), which was built to control the movement of livestock, extends through Wai'aha, at approximately 85 to 100 ft elevation (see **Figure 7**). The wall's construction began in the early 1800s. Its completion in the mid-1850s is attributed to Governor Kuakini.

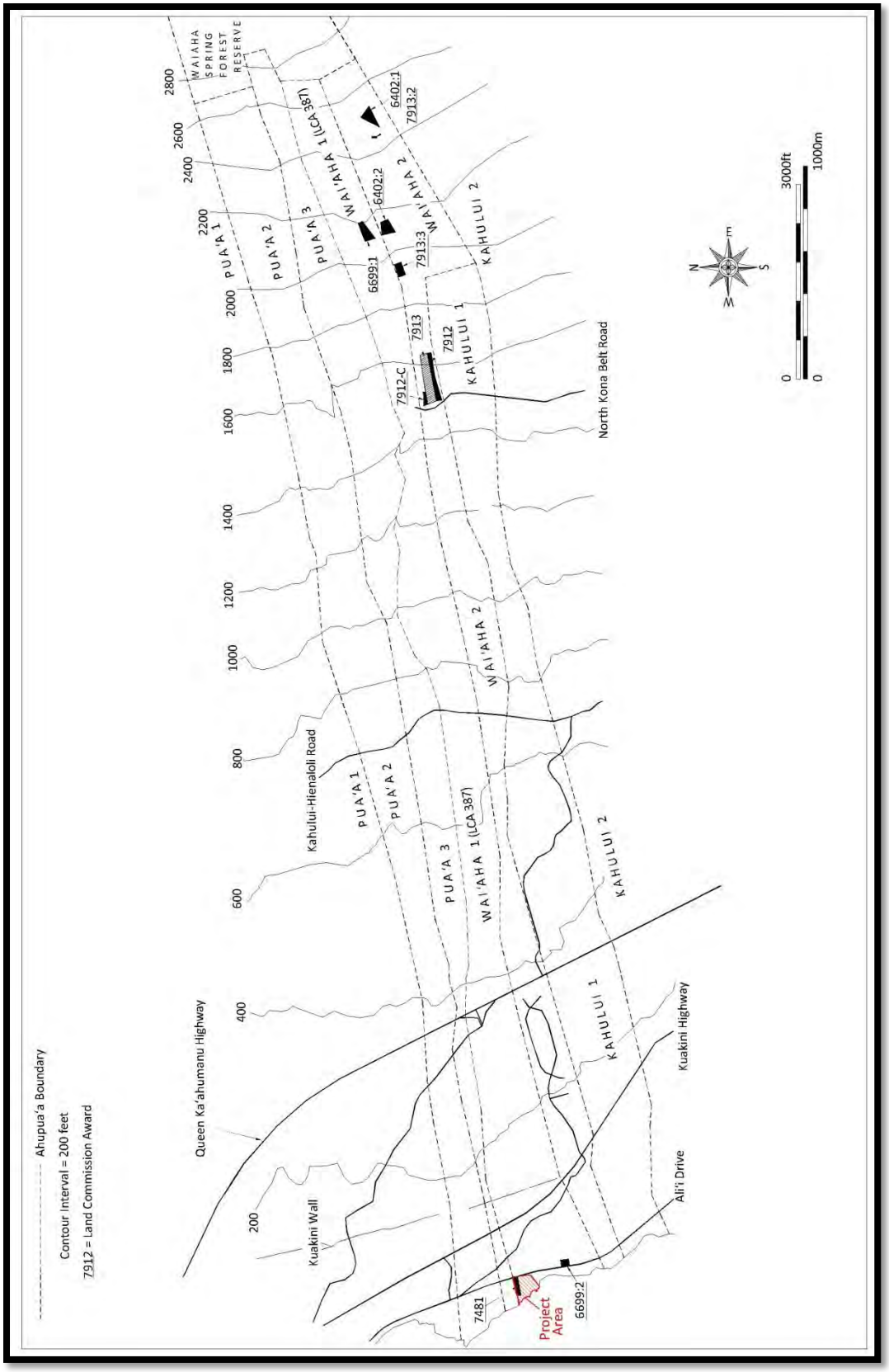


Figure 7. Ahupua'a boundaries and Land Commission Awards

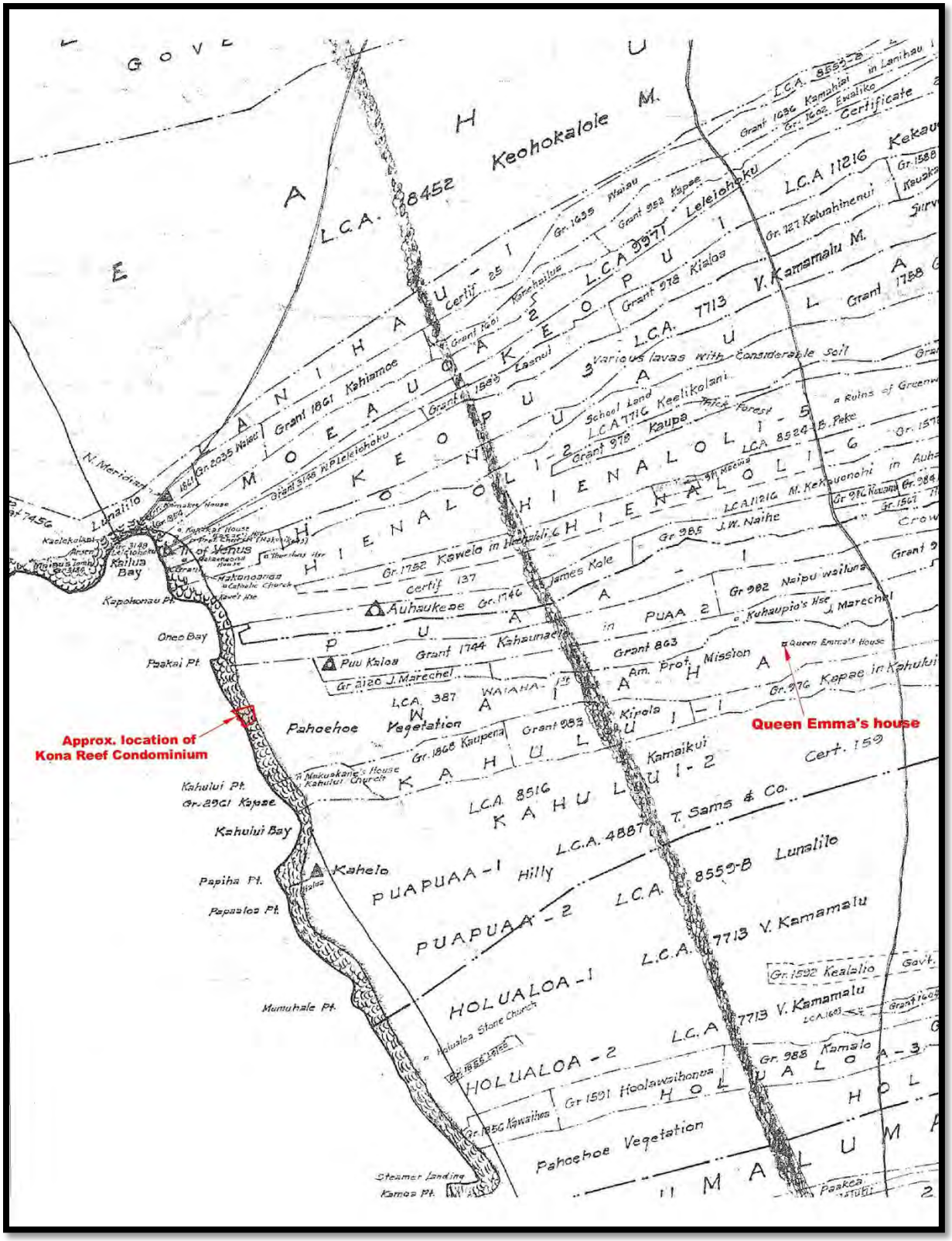


Figure 8. Portion of Emerson's 1880 map of Kailua

In the 1840s, a political act of the Hawaiian Kingdom government would forever change the land tenure system in Hawai`i and have far-reaching effects on its people. The historic land transformation process was an evolution of concepts brought about by fear, growing concerns of takeovers, and western influence regarding land possession. King Kamehameha III, in his mid-thirties, was persuaded by his *kuhina nui* and other advisors to take a course that would assure personal rights to land. All lands were segregated into one of three categories including the "Crown Lands" owned by the occupant of the throne, "Government Lands" controlled by the state, and "*Konohiki* Lands" controlled by the chiefs and "were all subject to the rights of native tenants" (Chinen 1958:29). The Kuleana Act of 1850 allowed for fee simple land ownership by commoners. In 1846, King Kamehameha III appointed a Board of Commissioners, commonly known as the Land Commissioners, to "confirm or reject all claims to land arising previously to the 10th day of December, AD 1845." Notices were frequently posted in *The Polynesian* (Moffat and Kirkpatrick, 1995); however, the legislature did not acknowledge this act until June 7, 1848 (Chinen 1958:16; Moffat and Kirkpatrick 1995:48-49) and the act is known today as *The Great Māhele*. In 1850, the Kingdom government passed laws allowing foreigners to purchase fee simple lands (Speakman 2001:91).

A review of the Waihona 'Aina (2000) Mahele Database; which is a compilation of data from the Indices of Awards (Indices 1929), Native Register (NR n.d.), Native Testimony (NT n.d.), Foreign Register (FR n.d.) and Foreign Testimony (FT n.d.); indicates that the majority of the *ahupua'a* of Wai'aha 1 was awarded to Seth Andrews as Land Commission Award (LCA) 387 (see **Figure 7**). Ten claimants registered for parcels within Wai'aha, although it appears that only eight of the ten received awards (excluding LCA 6376 and 7714-B). The awarded *kuleana* parcels ranged from 0.06 acres to the large unstated acreage of LCA 387.

Table 1. Land Commission Awards in Wai'aha

LCA	Claimant	Ahupuaa	Ili	Land Use	Date Rec'd	Giver	Acreage
387	Seth Andrews	Waiaha 1	-	Majority of ahupua'a - 1 house lot and cow yard	-	-	N/A
6376*	Lono	Waiaha	-	House lot	-	-	-
6699	Lumaawe	Waiaha 1	Puuko	5 sections of cultivated land and one house lot with 2 houses and 1 enclosure	-	-	0.75
			Muku	2 kihipai	-	-	0.25
6402	Kanahele	Waiaha 2	-	1 section of cultivated land *mauka*	-	-	0.8
			-	2 house lots			0.77
7241-B	Kalama	Waiaha 1	-	1 House Lot and *kula* land	-	-	0.46
7481	Kalae	Waiaha 1	Kamuku	2 partially cultivated land sections	-	-	1.61
7714-B*	Kekuaiwa	Waiaha	-	N/A	-	-	-
7912	Kanio	Waiaha 2	Kauailo	1 land section	1839	Laiwahine	1.08
			Kanailoa	1 land section	-	-	-
7912-C	Liawahine		Hauamauuloa	1 land section	1824	Kaaea	0.29
			Waiaha 2	1 land section			
7913	Kaanehe	Waiaha 2	-	House lot	-	-	1.77
			-	1 land section	-	-	0.06
			-	1 land section	-	-	0.55

** = Claim not awarded*

The awarded parcels are concentrated in two areas. One cluster of two parcels is situated at the coast. The other cluster of eight parcels is located in the inland portion of Wai'aha situated between 1,500 ft and 2,600 ft elevation. Seven claims included house lots with at least 8 houses. The claims also list one enclosure and one cow yard. The testimonies refer to 13 cultivated sections or kihapai.

LCA 7481 is located in the northeastern portion of the Kona Reef Condominium development. This was awarded to Kalae as Royal Patent 3682 and consisted of a 1.61 acre claim comprised of two partially cultivated land sections. This area is currently covered by an asphalt parking area (see **Figure 3**).

Emerson's 1880s map of Kailua (see **Figure 8**) shows the seaward boundary of the inland forest was at approximately 600 ft elevation in Waiʻaha. Commercial sugar cane cultivation in the Kailua area was attempted in the late 1800s and early 1900s (Kelly 1983). The Kona Sugar Company was established in 1899 and built the first mill in 1901, in upland Waiʻaha overlooking Kailua. The mill was situated above the Kahului-Hienaloli Road at c. 700 ft elevation. The mill is shown on the 1928 USGS Kailua Quadrangle (**Figure 9**). According to Maly, the sugarcane fields "... extended south from Waiʻaha to Hōlualoa-Kaumalumalu, on fee and leasehold lands. With the success of the sugar crop, the plantation fields were soon expanded south in favorable localities, including the *kula* lands between Honalo and Kalukalu-Onouli" (2001:283).

A railroad line, constructed to transport sugar cane to the mill originated at the mill and extended 11 miles to the south where it terminated in Keopuka in South Kona (see **Figure 9**). Construction of this substantial railroad line began in 1901 by the West Hawai'i Railway Company (Condé and Best 1973). According to Burtchard:

> …during its short life span the sugar line was most impressive, at least architecturally. The stone work used to span ravines and other irregularities in Hualalai's rough western slope provides a number of excellent examples of dry-laid dressed stone masonry over a rubble core berm. The constructed berm ranges from less than one to as much as 15 m (50 feet) in height. The stone work in this feature is uniformly well executed. In recognition of the historical significance of the rail line, the site is listed on the Hawaiʻi Register of Historic Places (Site 50-10-37-37-7214). (1996:49)

Despite the efforts required to construct the mill and railroad line, the venture was not successful. "The railroad record disappears in 1918 and the sugar company went into receivership in 1926" (Burtchard 1996:49).

By the 1970s, the rapidly developing tourism industry began to transform the region's land use from ranching and commercial agriculture, except coffee production, to subdivisions, resorts, and commercial establishments. The use of the present Kona Reef Condominium area was probably limited to cattle ranching. In 1927, rancher Manuel Gomes bought tracts of land in Waiʻaha and Kahului and used these lands for cattle grazing until the 1960s (Rechtman 2002).

Previous Archaeological Work

Limited archaeological research has been conducted within the Land of Waiʻaha. A search of the DLNR archives indicates that 14 archaeological projects have been conducted in the Land of Waiʻaha. **Figure 7** shows the locations of the projects and **Table 2** summarizes the projects. Not included in the figure are the general studies by Thrum (1908) and Stokes (cited in Stokes and Dye 1991), which focused on major sites, primarily *heiau*, throughout Hawaiʻi Island, and the West Hawaiʻi survey by Reinecke (1930). These researchers each identified Maʻo Heiau, located along the shoreline on the north side of Waiʻaha Bay. This *heiau* would have been in close proximity to the present project area; however according to Stokes, it had been partially destroyed by the construction of the coastal government road (1991:8-9). According to Thrum (1908), the *heiau* was constructed by Kiwalaʻo. As previously discussed, Maʻo Heiau functioned as a rainmaking *heiau* used to start or stop the rain (Pukui et al. 1976:219).

Figure 9. Portion of 1928 USGS Kailua Quadrangle showing project area

Table 2. Previous archaeological work

Author	Land	Study Type*	Elevation (ft AMSL)	Area (ac)	Total sites	Sites per acre	Total features	Features per acre	Habitation features	Habitation features per acre	Permanent habitation features	Temporary habitation features	Agricultural features	Agricultural features per acre	Burial Feas	Ritual Feas	Historic Feas	Misc. Feas
Soehren (1981)	Wai'aha 1	RN	0-10	0.67	0													
Soehren (1979)	Wai'aha 2	RN	10-15	0.79	0													
Head et al. (1994), Rechtman (2002), Haun et al. (2007)	Wai'aha 1	IN/DR	40-60	19	29	0.66	42	2.21	18	1.06	12	5	10	0.53	2	1	12	
Corbin and Gothar (2001), Head et al. (1994), Berrigan et al. (2007)	Wai'aha 1	IN/DR	60-90	5.4	27	0.20	41	7.59	8	0.68		8	13	2.41	3	1	11	5
Barrera (1991)	Wai'aha 2	RN	85-90	0.67	0													
Schilt (1984)	Wai'aha 1-2 portion	IN	320-400	26.8	5	5.36	7	0.26									7	
Haun and Henry (2015)	Wai'aha 1-2	IN	360-447	1.94	6	0.32	6	3.09	2	0.97			1	0.52			3	
Haun (2008)	Wai'aha 2	IN	640-700	2	6	0.33	6	3.00	1	2.00	1						5	
Bevan et al. (2004)	Wai'aha 1-2	IN	720-1490	13.2	2	6.60	53	4.02									54	
Kouneski et al. (2006)	Wai'aha 1	IN	880-1180	1.09	3	0.36	18	16.51					17	15.60			1	
Total/Average				**71.56**	**78**	**13.84**	**173**	**5.24**	**29**	**1.18**	**13**	**13**	**41**	**4.76**	**5**	**2**	**93**	**5**

** - IN = Inventory Survey , RN - Reconnaissance, EX = Excavation, AS = Assessment, DR=Data Recovery*

The majority of the archaeological studies have been conducted in the seaward portion of the *ahupua'a.* These include three reconnaissance surveys conducted by Soehren (1979, 1981) and Barrera (1991) below 100 ft elevation. These studies each examined parcels that had been bulldozed and in which no sites were present. The Soehren (1981) survey was located adjacent to the present project area to the south.

Head et al. (1994) conducted a survey of the Ali'i Drive Sewer project that consisted of a 0.34-acre corridor in Puaa 3 and a 2.06-acre parcel located in Wai'aha 1. The survey identified 20 sites and 38 features comprised of one permanent habitation, 11 temporary habitations, eight agricultural, five probable burials, four ritual, one trail, seven livestock control and three indeterminate. Charcoal was submitted from two sites yielding date ranges from AD 1640-1955.

Rechtman (2002) undertook an inventory survey of a 19-acre parcel of coastal Wai'aha 1, situated inland of Ali'i Drive and seaward of Walua Road. The study identified 28 sites with 42 individual features, consisting of 18 identified during this survey and 10 sites previously noted by Head et al. (1994). Probable prehistoric to early historic traditional Hawaiian sites were identified consisting of a *heiau,* five permanent habitations, five temporary habitations and two agricultural sites. Human remains were observed in two of the habitation sites. The remaining sites consisted of historic period sites consisting of ranch walls and corral enclosures. Most of the walls and corrals were interpreted as facilities of the Gomes Ranch, active from 1927 to the 1960's. Subsurface testing was undertaken at seven sites by Rechtman (2002) during the inventory survey. Radiocarbon dates were obtained for two sites, indicating use of the parcel from A.D. 1640 through 1955 (Rechtman 2002:13, 21).

Data recovery was subsequently conducted in the Rechtman (2002) parcel by Haun et al. (2007). This project consisted of hand-excavating a total of 27.0 sq m at nine sites. Ten radiocarbon samples were analyzed. The radiocarbon age determinations indicate that prehistoric use of the parcel post-dates A.D. 1280 and that the majority of the surface features investigated were constructed after A.D. 1635.

Four sites containing human remains were identified during the data recovery excavations. Following consultation with the DLNR-SHPD Burial Sites Program staff the human remains from three of these sites were re-interred to a crypt constructed at the *heiau* site. The remaining site with human remains was preserved in place.

Corbin and Gothar (2001) conducted an archaeological inventory survey of 5.4-acres located below the Kuakini Highway and inland of Walua Road, above the Rechtman (2002) parcel. The survey identified 27 sites and 41 features with functional types consisting of agriculture (13), temporary habitation (8), animal husbandry (7), boundary (4), possible burial (3), storage (2), indeterminate (2), recreation (1) and ceremonial (1). The 27 sites consisted of 19 identified by Corbin and Gothar (2001) and 8 previously recorded by Head et al. (1994). Corbin and Gothar (2001) assessed all of the sites as significant for their information content. Two sites, a possible shrine and a cave containing possible burial mounds were provisionally assessed as significant for their cultural value pending further investigation.

Data Recovery was subsequently conducted within the Corbin and Gothar (2001) study area by Berrigan et al. (2007). Six sites were remapped and a total of 17.75 sq m was excavated in ten features at five sites. During the mapping phase at one site, human remains were identified on the lava tube floor and in consultation with SHPD it was determined that the proposed data recovery excavations were likely to disturb additional shallowly buried human remains, so no excavation was undertaken. Scattered and fragmentary human skeletal elements were encountered in a surface and subsurface context at another lava tube. These were left *in situ* or replaced in their original locations in consultation with SHPD staff. Five charcoal samples were submitted for analysis. One site was determined to be in use by the mid-15th Century and was continuously used into the early historic period. A lava blister was in use between AD 1450 and 1650, and a large platform was constructed between AD 1670 and 1780.

Schilt (1984) conducted an inventory survey of the Kuakini Highway Realignment Corridor. This survey extended between Lanihau Ahupua‘a in the north and Holualoa in the south and documented hundreds of archaeological features. An estimated 10.5 acres of the Schilt (1984) survey area were located within Wai‘aha 1 and 2. Schilt documented five sites in Wai‘aha, all of which are livestock control walls.

A portion of the wall on the boundary between Wai‘aha 1 and Pua‘a 3 was also noted by Barnette (2011) during a survey of a 4.2 acre parcel located adjacent to the present project area to the north, in Pua‘a 3 (see **Figure 7**). This survey documented four historic livestock control walls, including the one located on the Wai‘aha 1/Pua‘a 3 boundary.

Four studies are situated in the interior portion of Wai‘aha. Haun and Henry (2015) conducted an archaeological inventory survey of two easement corridors in Wai‘aha 1 and 2 Ahupua‘a that total 1.98 acres in area. The survey documented six single feature sites consisting of an agricultural modified outcrop, a surface and subsurface cultural deposit, a scatter of surface remains, and three ranch walls.

Bevan et al. (2004) conducted an inventory survey of a 1,750m long proposed roadway that extended between the Kahului-Hienaloli Road and the North Kona Belt Road. This survey identified two sites consisting of a portion of the West Hawai‘i Railroad and an agricultural and ranching complex with 52 features. Two water tank sites situated adjacent to the proposed roadway were subsequently examined by Kouneski et al. (2006). This study identified three sites consisting of two pre-contact agricultural complexes with a total of 17 features and an historic water pipeline.

Haun (2008) conducted an inventory survey of a 2.0 acre parcel in Wai‘aha 2 just seaward of the Kahului-Hienaloli Road. This survey identified six single features sites comprised of four livestock control walls, an historic habitation artifact scatter and a permanent habitation terrace

The projects in **Table 2** cover more than 70 acres of Wai‘aha identifying 78 sites with 173 features. To aid in reconstructing settlement patterns, features were quantified by probable age and function, and the studies are ordered by elevation. Traditional Hawaiian features were categorized as habitation, agricultural, burial (including possible burials), and ritual. Features not assignable to these categories were

categorized as miscellaneous/ indeterminate. Traditional sites in this category include *ahu* and features with indeterminate functions. Habitation sites are further subdivided into temporary and permanent for studies making this distinction.

Density values are given for sites, features, and habitation and agricultural features. The studies have identified 29 habitation features, 41 agricultural features, five burials and two ritual features. The majority of the features (93) are historic features were not segregated by function. The majority of the historic features are ranch walls. Overall feature density values range from 0.26 to 16.51 features per acre with an average of 5.24.

The project area lies within the *kula* zone of the Kona Field System, SIHP Site 6601 (Newman 1970, Kelly 1983, Schilt 1984, Cordy 1995). This site extends north to Kā'u Ahupua'a, south to Honaunau, and from the coastline to the forested slopes of Hualalai. The area was intensively cultivated and served as the resource base for the large number of chiefs and retainers that occupied the Kailua-Keauhou coast. The characteristics and general locations of the elevation zones of the system described by Newman (1970) have been confirmed and elaborated on by subsequent ethnohistorical investigations (Kelly 1983). The system is subdivided into four elevation zones.

The *kula* zone extends from sea level to 500 ft elevation. Cordy (1995) has suggested that the upper limit of this zone may be higher between 600-700 ft elevation. This lower elevation zone traditionally was used for habitation and cultivation of sweet potatoes, paper mulberry (*wauke*), and gourds. Agricultural features, including clearing mounds, planting mounds, planting depressions, modified outcrops, and planting terraces, are common in this zone (Hammatt and Clark 1980; Hammatt and Folk 1980; Schilt 1984). Habitations are scattered throughout the *kula*, but they are concentrated along the shoreline portion of the zone (Cordy 1995). The shoreline portion, extending approximately 200 m inland, was the focus of permanent habitation and activities such as burial, canoe storage, ritual, and marine exploitation. Royal centers and chiefly residences were also situated near the shoreline. These complexes included residences for high status individuals and their supporters and attendants, *heiau*, places of refuge, *holua* slides, and other structures.

The *kalu'ulu* zone extends from 500 to 1000 ft elevation. The zone was used for cultivating sweet potatoes, paper mulberry, and especially breadfruit. Archaeologically, this zone is not distinguishable from the adjacent *'apa'a* zone (Cordy 1995). The *'apa'a* zone is situated between 1000 and 2500 ft elevation. This zone traditionally was used for dryland cultivation of taro, sugar cane, sweet potato, and ti. Permanent habitations were present in the *'apa'a* zone, but were infrequent (Cordy 1995, Burtchard 1996). Dwellings were observed by early historic chroniclers, but most were probably for temporary use in conjunction with agriculture, bird hunting, and collecting of plant resources. Burials and ritual sites are rare in the upper elevation zones (Kawachi 1989).

Kua'iwi are prominent agricultural features of the *kalu'ulu and 'apa'a*, zones (Cordy 1995, Newman 1970). These are broad, linear piles of rocks built from stones cleared from the adjacent slopes that also served as field boundaries. *Kua'iwi* are oriented inland-seaward often interconnected with perpendicular, soil-retaining walls and terraces forming rectangular grid patterns of fields. *Kua'iwi* also served to control rainfall runoff (Kirch 1985). These formal fields contrast with more informal garden areas characterized by scattered agricultural features in very rocky areas, such as young lava flows, and much of the *kula* zone.

The *'ama'u* zone extends from 2500 ft to 4000 ft elevation. The zone was associated with banana and plantain cultivation. The archaeological traits of the zone have not been well defined, but temporary habitations were probably present associated with agriculture and exploitation of forest resources (Allen 1984).

No previous archaeological work has been conducted within the project area; however an Environmental Assessment was conducted by Fuke (1981) that provides insight into the development history of the Kona Reef Condominium. According to Fuke:

> Kona Reef Condominium submitted preliminary plans in February 1974 for the development of a 129-unit condominium and its related improvements. Final plan approval was granted in June 1975 for the proposed development. A Building Permit to construct the foundation was issued in November 1975. Work was continued on the project site and in February 1979, the Building Permit to construct the condominium building itself was issued. (1981:1)

A coastal seawall was constructed in the early 1980s, following the completion of the condominium development. Currently all that remains of this seawall is a discontinuous berm of boulders and cobbles. The installation of the seawall along with other improvements was requested in the 1981 Environmental Assessment. These improvements consisted of:

> 1. Construction of a 2-foot wide by 3-foot high concrete rock masonry (CRM) wall along approximately 400-feet of the shoreline within one (1) foot of the makai property line as determined by the certified shoreline survey of December 11, 1980, and as delineated on the submitted plans.
>
> 2. The installation of a sprinkler system.
>
> 3. The installation of two (2) outdoor light fixtures.
>
> 4. Topsoiling the area with approximately 800 cubic yards of soil. Final grade on the property will be 2-feet below the top of the CRM wall.
>
> 5. Landscaping of the area with flora to include palms, naupaka and lawn grass (1981:2).

According to Fuke, a seawall was already present prior to the construction of the new seawall in the 1980s. “An existing 3-foot high CRM wall meanders through the inland extent of the 40-foot setback area” (1981:3). This seawall was apparently dismantled prior to the construction of the new seawall. Fuke’s assessment of the project concluded the proposed improvements would have no negative affects to the cultural resources in the parcel:

> No impacts are likewise anticipated by the proposed project on archaeological/cultural resources in the area. The subject property is not listed in the State or National Register of Historic places as having a site of historic significance. In addition, the area was extensively altered during the construction of the condominium. (1981:5)

Fuke also indicates that the seaward portion of the subject parcel was extensively impacted during the construction of the Kona Reef Condominium. This account states the following:

> Portions of the 40-ft setback had also been used as a depository for various kinds of debris from the construction of the 129-unit condominium. On June 23, 1980, the applicant was cited for conducting work within the shoreline setback area in violation of the Shoreline Setback Rules and Regulations and was further given notice that no further filling, stockpiling, or depositing of earth and/or construction material shall occur along the shoreline setback area and that the area be returned to its original condition. (1981:3)

PROJECT EXPECTATIONS

The project area is situated in the coastal portion of the *kula* zone of the Kona Field System. Based on previous archaeological research and historical documentary research, evidence of permanent habitation, burial, canoe storage, ritual, and marine exploitation are typically expected in the coastal areas. Royal centers and chiefly residences were also situated near the shoreline; however, because the project area was extensively impacted by the development of the Kona Reef Condominium, it is unlikely that any surface sites would be encountered during the present project. It is possible that subsurface cultural deposits, similar to those identified during the SHPD December 2011 inspection, would be present.

CONSULTATION

Haun & Associates Project Supervisor Solomon Kailihiwa, M.A. conducted an interview with longtime Kona resident Mr. James Paul on March 11, 2016. Mr. Paul is the former owner of the land where the Kona Reef Condominium is situated. He currently lives in a house located adjacent to the Kona Reef Condominium to the northwest. He purchased the property in the 1950s and at that time it was all pasture. He built his house in 1958 and bulldozed the Kona Reef lot during the 1960s. During the bulldozing he made two large piles of *kiawe*, *koa haole*, and grass, and burned them in a large bonfire. Mr. Paul was friends with everyone in the fire department who were on hand to ensure that the blaze did not get out of control. They used material from the upslope portion of the property to fill in the seaward portion. This material was placed on top of a beach deposit that covered the seaward portion of the area. After the lot was bulldozed he leased the land to Mr. Tom Gentry, who eventually constructed the Kona Reef Condominium. Mr. Paul recalls that Mr. Gentry also bulldozed the lot.

FINDINGS

Surface survey of the proposed seawall improvements project area did not identify any surface sites or cultural material. This area is currently a grass lawn on the seaward side of the condominium buildings (see **Figure 4** and **Figure 5**). As discussed in the preceding section, two seawalls once existed in the area; one built in the early 1980s following the completion of the condominium development, and an older one that was dismantled to build it. Currently all that remains of these seawalls is a discontinuous berm of boulders and cobbles.

The area of proposed seawall improvements was examined by excavating ten 0.5 by 0.5 meter shovel tests on the inland side of the vegetation along the certified shoreline. These shovel tests were spaced 6.4 to 7.8 meters apart (average 6.9 meters) and were excavated to bedrock. The shovel test locations are depicted on **Figure 6**.

The shovel test excavations revealed similar soil stratigraphy. This stratigraphy is summarized in **Table 3**, with profiles of the shovel tests shown in **Figure 10** and **Figure 11**. All ten shovel tests encountered a surface layer of fill with roots from the grass lawn (Layer I). This deposit ranges in thickness from 0.09 to 0.36 meters, with an average thickness of 0.13 meter. Layer I varies in texture from silt to silty sandy clay and in color from black to very dark grayish brown.

Table 4 summarizes the cultural material recovered from shovel testing. Cultural material from Layer I consists of bottle glass fragments, fragments of porcelain ceramics, a wire nail or spike, volcanic glass and waterworn marine shell reef rubble.

Layer IIa is an underlying fill deposit present in nine of the ten shovel tests (excluding ST-1). This deposit is 0.1 to 0.78 meters thick (average 0.32 meters) and is a silt to silty sand that varies in color from dark brown to dark yellowish brown. In ST-2 and ST-3 the cultural material from the upper portions of Layer IIa were mixed with the remains from Layer I. The mixed remains from Layer I/IIa in these units consist of a corroded penny of indeterminate date, bottle glass fragments, clear plastic, a brass cylinder, volcanic glass, and waterworn marine shell reef rubble. Cultural material recovered exclusively from the Layer IIa deposit consists of bottle glass fragments, an aluminum beverage can, a wire nail, charcoal, and waterworn marine shell reef rubble.

Layer IIb is an underlying fill deposit present in only ST-10 and is overlain by the Layer IIa fill. This deposit is a yellowish brown silty sand with no cultural material.

Layer III is a layer of coarse beach sand present in nine of the ten STs (excluding ST-1). This deposit is a 0.16 to 0.89 meter thick (average 0.56 meters) of a yellowish brown to very dark grayish brown coarse sand. An intrusive PVC pipeline is present in Layer III in ST-9. Cultural material recovered from the Layer III deposit consists of a Coca Cola bottle, a Miller High Life bottle, bottle glass fragments, an aluminum ring pull tab, iron nail fragments, volcanic glass, charcoal, a *Cellana talcosa* shell, waterworn marine shell reef rubble, an sea urchin spine, and a coral file. The file is 41.2 mm long, 16.6 mm wide and 11.3 mm thick (**Figure 12**).

Layer IV is a deposit of dark brown silt present beneath Layer II in ST-8 and ST-9. This layer is 0.18 to 0.53 meters in thickness and overlies bedrock. No cultural material is present in Layer IV.

The results of the subsurface testing indicates that the upper deposits (Layers I, IIa and IIb) are imported fill material. This material represents either the fill material the prior landowner (Mr. James Paul) bulldozed into the area during the 1960s, and/or portions of the 800 cubic yards of soil that were used to

Table 3. Summary of Shovel Test Stratigraphy

Layer	Soil type	Unit	Depth (cmbs)	Thickness (cm)	Soil Color	Munsell	Texture	Inclusions
I	Fill deposit with roots from lawn	ST-1	0-36	36	Very dark grayish brown	10YR 3/2	Silt	35% pebbles
		ST-2	0-9	9	Very dark brown	10YR 2/2	Silty sandy clay	10% cobbles and pebbles
		ST-3	0-10	10	Dark brown	7.5YR 3/2	Silty sandy clay	80% cobbles and pebbles
		ST-4	0-13	13	Very dark brown	10YR 2/2	Silty sand	3% cobbles
		ST-5	0-10	10	Very dark grayish brown	10YR 3/2	Sandy loam	15% cobbles
		ST-6	0-13	13	Very dark brown	10YR 2/2	Silty sandy clay	15% boulders and cobbles
		ST-7	0-7	7	Black	10YR 2/1	Silt	10% cobbles
		ST-8	0-16	16	Very dark brown	10YR 2/2	Silty sandy clay	10% boulders and cobbles
		ST-9	0-12	12	Black	10YR 2/1	Silt	10% cobbles
		ST-10	0-7	7	Dark brown	10YR 3/3	Silty sand	15% cobbles
IIa	Fill deposit	ST-2	8-40	31	Very dark grayish brown	10YR 3/2	Silty sand	15% cobbles and pebbles
		ST-3	9-44	35	Dark brown	7.5YR 3/2	Silt	15% cobbles and pebbles
		ST-4	11-25	13	Very dark grayish brown	10YR 3/2	Silty sand	60% boulders and cobbles
		ST-5	9-27	18	Dark brown	7.5YR 3/2	Silt	80% boulders, cobbles and pebbles
		ST-6	13-53	39	Very dark grayish brown	10YR 3/2	Silty sand	60% boulders and cobbles
		ST-7	6-41	35	Dark brown	10YR 3/3	Silt	50% boulders and cobbles
		ST-8	15-93	78	Very dark grayish brown	10YR 3/2	Silty sand	70% boulders and cobbles
		ST-9	9-43	34	Dark brown	10YR 3/3	Silt	76% boulders and cobbles
		ST-10	7-16	10	Dark yellowish brown	10YR 3/4	Silty sand	10% cobbles
IIb	Fill deposit	ST-10	16-31	14	Yellowish brown	10YR 5/4	Silty sand	10% cobbles
III	Beach sand deposit	ST-2	38-106	67	Light yellowish brown	10YR 6/4	Coarse sand	3% cobbles
		ST-3	44-110	66	Very dark grayish brown	10YR 3/2	Coarse sand	30% pebbles
		ST-4	21-112	89	Light yellowish brown	10YR 6/4	Coarse sand	40% boulders and cobbles
		ST-5	26-110	82	Yellowish brown	10YR 5/4	Coarse sand	25% cobbles and pebbles
		ST-6	53-129	75	Light yellowish brown	10YR 6/4	Coarse sand	10% pebbles
		ST-7	36-108	69	Very dark grayish brown	10YR 3/2	Coarse sand	30% boulders, cobbles and pebbles
		ST-8	93-113	19	Light yellowish brown	10YR 6/4	Coarse sand	20% boulders and cobbles
		ST-9	42-111	68	Very dark grayish brown	10YR 3/2	Coarse sand	30% boulders, cobbles and pebbles
		ST-10	29-46	16	Very dark brown	10YR 2/2	Coarse sand	20% boulders and cobbles
IV	Colluvial silt	ST-8	112-133	22	Dark brown	7.5YR 3/3	Silt	15% boulders and cobbles
		ST-9	110-129	18	Dark brown	10YR 3/3	Silt	35% boulders, cobbles and pebbles

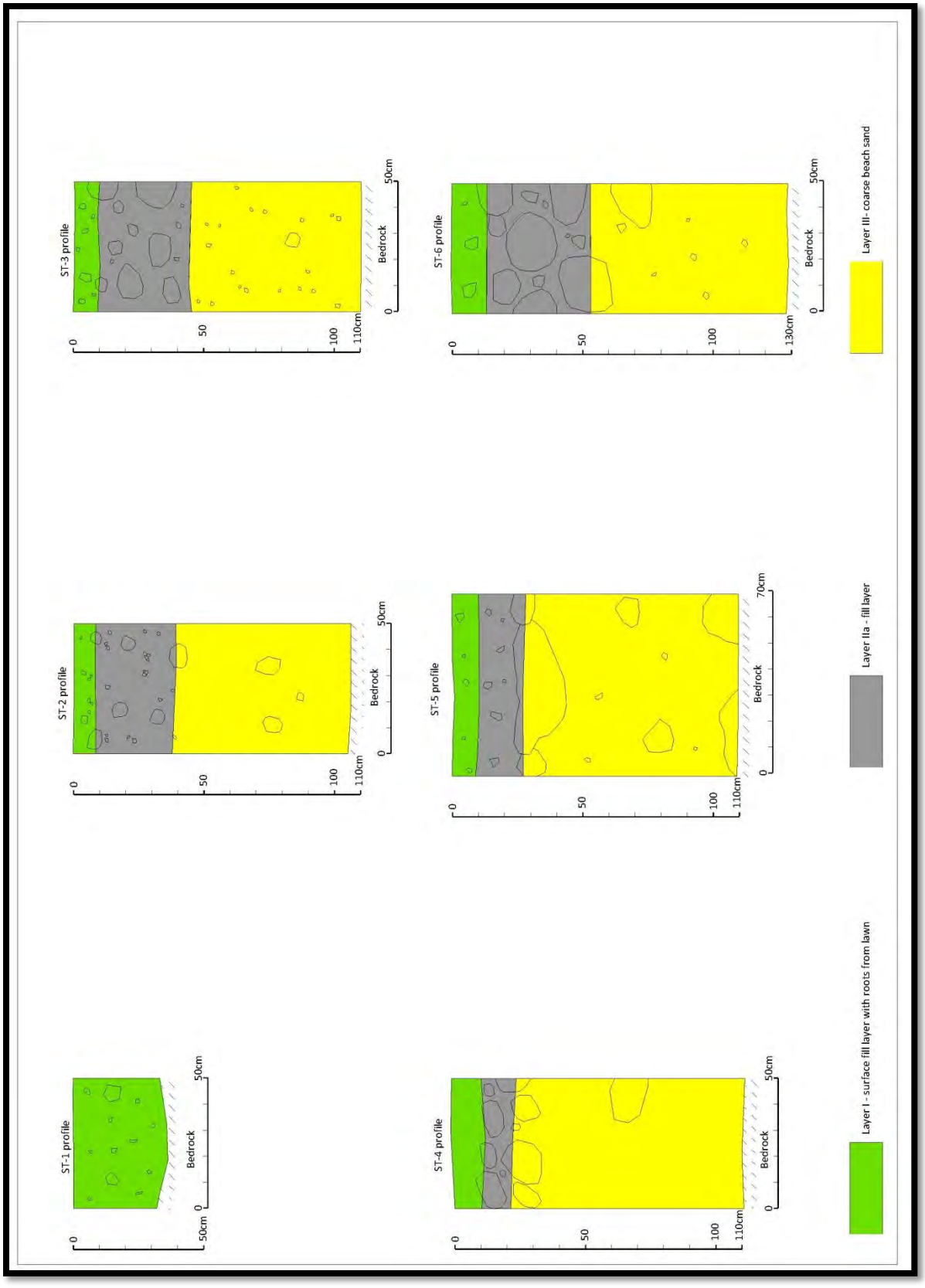


Figure 10. Profiles of STs 1-6

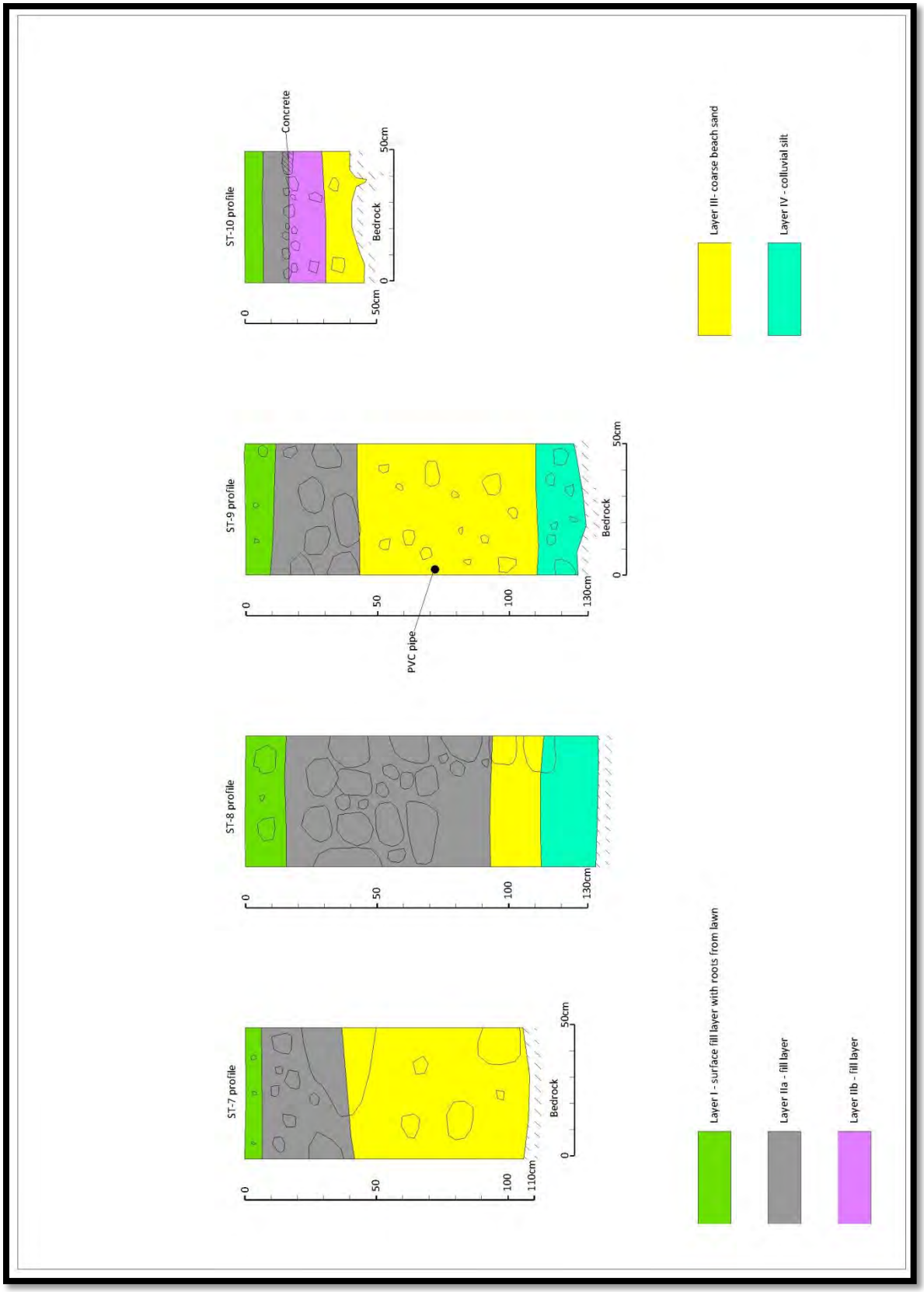


Figure 11. Profiles of ST-7-10

Table 4. Summary of cultural material from shovel testing

Acc. No.	Shovel test	Layer-Level	Depth cmbd	Specimen	Material	Type	TNF	Weight	Length mm	Width mm	Thickness mm	Comment
1.001	1	I-1	0-20	Waterworn Marine Shell	Mixed	reef rubble	6	4.6				
2.001	1	I-2	20-36	Green Bottle Fragments	Glass	historic container	2	2.3				
2.002	1	I-2	20-36	Porcelain	Ceramic	historic tableware	1	0.2				thin walled vessel, possible saucer
2.003	1	I-2	20-36	Wire Nail/Spike	Steel	historic hardware	1	17.9				3" length
2.004	1	I-2	20-36	Tertiary Flake	Volcanic Glass	debitage	1	0.2				
2.005	1	I-2	20-36	Waterworn Marine Shell	Gastropod Shell	reef rubble	1	0.3				
3.001	2	I/IIa-1	0-20	Penny	Copper/Zinc	historic money	1	2.4				indeterminate year, very corroded
3.002	2	I/IIa-1	0-20	Metal Cylinder	Brass	historic hardware	1	46.9				1.5" length of 1.5" diameter tube
3.003	2	I/IIa-1	0-20	Tertiary Flake	Volcanic Glass	debitage	1	0.3				
4.001	2	IIa-2	20-40	Colorless Bottle Fragment	Glass	historic container	1	2.7				
4.002	2	IIa-2	20-40	Charred Wood	Charcoal		1	0.1				
5.001	3	I/IIa-1	0-20	Colorless Bottle Fragment	Glass	historic container	1	1.1				
5.002	3	I/IIa-1	0-20	Amber Bottle Fragment	Glass	historic container	1	0.8				
5.003	3	I/IIa-1	0-20	Clear Plastic	Plastic	historic packaging	4	0.3				
5.004	3	I/IIa-1	0-20	Waterworn Marine Shell	Mixed	reef rubble	3	0.9				
6.001	3	IIa-2	20-40	Colorless Bottle Fragments	Glass	historic container	3	5.6				
6.002	3	IIa-2	20-40	Amber Bottle Fragments	Glass	historic container	10	10.1				
6.003	3	IIa-2	20-40	Green Bottle Fragments	Glass	historic container	4	2.8				
6.004	3	IIa-2	20-40	Beverage Can	Aluminum	historic container	1	12.9				
6.005	3	IIa-2	20-40	Wire Nail	Steel	historic hardware	1	4.7				3.5" length
6.006	3	IIa-2	20-40	Waterworn Marine Shell	Gastropod Shell	reef rubble	1	0.2				
7.001	4	IIa-2	20-40	Unidentified Mammal Bone	Bone		7	1.7				
7.002	4	IIa-2	20-40	Waterworn Beach Glass	Glass	reef rubble	1	3.8				
8.001	4	III-5	80-100	Nacellidae *Cellana talcosa*	Gastropod Shell		1	11.8				
9.001	5	III-3	35-110	Hobbleskirt Coke Bottle	Glass	historic container	2	14.6				embossed "--MAR--/--ONTENT--"
9.002	5	III-3	35-110	Amber Bottle Fragments	Glass	historic container	6	6.6				
9.003	5	III-3	35-110	Green Bottle Fragment	Glass	historic container	1	2.3				
9.004	5	III-3	35-110	Tertiary Flake	Basalt	debitage	1	0.7				
9.005	5	III-3	35-110	Waterworn Marine Shell	Mixed	reef rubble	2	0.7				
10.001	6	III-3	40-60	Tertiary Flake	Volcanic Glass	debitage	1	0.2				
10.002	6	III-3	40-60	Charred Wood	Charcoal		3	0.8				
11.001	7	III-3	42-110	Miller High Life Pony Bottle	Glass	historic container	1	128.2				Miller began bottling ponies (7 oz. bottles) in 1972
11.002	7	III-3	42-110	Colorless Bottle Fragment	Glass	historic container	1	0.1				
11.003	7	III-3	42-110	Amber Bottle Fragments	Glass	historic container	5	11.1				
11.004	7	III-3	42-110	Green Bottle Fragment	Glass	historic container	1	0.8				
11.005	7	III-3	42-110	Waterworn Marine Shell	Bivalve Shell	reef rubble	1	0.3				
12.001	8	III-5	80-100	Ring Pull Tab	Aluminum	historic container	1	0.4				
12.002	8	III-5	80-100	Nail Fragments	Iron	historic hardware	2	0.9				
13.001	8	III-6	100-120	*Porites* sp. File	Coral	informal tool	1	5.1	41.2	16.6	11.3	
14.001	9	III-3	44-110	Colorless Bottle Fragment	Glass	historic container	1	0.9				
14.002	9	III-3	44-110	Amber Bottle Fragments	Glass	historic container	11	81.4				
14.003	9	III-3	44-110	Green Bottle Fragment	Glass	historic container	1	0.5				
14.004	9	III-3	44-110	*Heterocentrotus mammillatus*	Urchin Spine		1	1.9				

Figure 12. Coral file from ST-8

topsoil the area in the 1980s. The mixed historic, modern and pre- and/or early post-contact cultural material confirms that these deposits are not intact cultural layers.

The Layer III coarse sand deposit is interpreted as a naturally deposited sand layer. This sand was present on the surface of the area in the 1960s, before it was disturbed by bulldozer activity. This deposit has been designated as Site 50-10-28-30493[1] and interpreted as a pre- and/or early post-contact cultural deposit that was disturbed by the historic use of the area. This interpretation is based on the presence of the volcanic glass, the coral file, marine shells, and sea urchin spine present in the Layer III deposit. The abundance of historic materials recovered from this deposit indicates it has been significantly impacted.

As discussed, the present project was conducted because an apparent cultural deposit was observed at the northern end of the Kona Reef Condominium by SHPD staff. This area was not examined during the current project as it is outside the area to be impacted by the proposed seawall improvements. Based on the results of subsurface testing, the Site 30493 cultural deposit originates between ST-1 and ST-2 in the south, and extends 61.5 meters to the north, beyond ST-10. It is likely that the deposit continues to the north to the area observed by SHPD staff. The extent of Site 30493 in the area examined is shown in **Figure 6**. The site is altered and in poor condition. It is assessed as significant per HAR §13-284-6 under Criteria d (information content).

[1] 50 = State of Hawai'i, 10= Island of Hawai'i, 28= Kailua quadrangle

CONCLUSION

Discussion

The survey identified the disturbed remnant of a subsurface cultural deposit (Site 30493) during shovel testing within the project area. This deposit contains pre- and/or early post-contact cultural material, mixed with historic and modern materials. Documentary research and consultation with an adjacent landowner indicates that the Site 30493 deposit represents the original ground surface prior to the introduction of fill material that occurred during multiple episodes between the 1960s and 1980s.

Significance Assessments

The sites identified during the survey are assessed for significance based on Hawai'i Administrative Rules (HAR) §13-284-6. According to (HAR) §13-284-6 (b), a site must possess integrity of location, design, setting, materials, workmanship, feeling, and association and shall meet one or more of the following criteria:

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

The site identified during the present project possesses integrity of location, design, setting, materials, workmanship, feeling, and association. It is assessed as significant under Criterion "d" based on the above criteria. The site has yielded information important for understanding prehistoric habitation in the area.

Treatment Recommendations

The present project was conducted in conjunction with proposed seawall improvements in the coastal portion of the Kona Reef Condominium development. The recording of the Site 30493 cultural deposit has adequately documented it. No further work or preservation is recommended because of the disturbed nature of the deposit and the limited potential to obtain additional archaeological information. No further work or preservation is recommended because of the disturbed nature of the deposit and the limited potential to obtain additional archaeological information,

TRANSLATION OF HAWAIIAN WORDS[1]

ahupua'a - traditional Hawaiian land unit usually extending from the uplands to the sea

ali'i - chief, chiefess, officer, ruler, monarch, peer, headman, noble, aristocrat, king, queen or commander

hale -house, building, institution, lodge, station, hall

heiau - pre-Christian place of worship, shrine

konohiki – headman of an *ahupua'a* land division under the chief

Kuhina nui - powerful officer in the days of the monarchy

kuleana - small piece of property, as within an *ahupua'a*

Māhele - land division of 1848

makai – towards ocean

pahoehoe – Smooth, unbroken type of lava, contrasting with *a'ā*

[1] - from wehewehe.org

REFERENCES

Allen, M.

1984 Archaeological Reconnaissance Survey, Waiono Meadows Development Project Area, Puapua'a 1st and 2nd, Holualoa 1st and 2nd, North Kona, Island of Hawai'i (TMK: 7-5-15:2, 12 and 7-6-2:1, 14), PHRI Report 119-070584. Prepared for Waiono Meadows Ranch, Ltd.

Barnette, B.

2011 An Archaeological Inventory Survey, Innovations Public Charter School, Queen Ka'ahumanu Highway (State Route 11), TMK: (3) 7-5-010:001. Pua'a Ahupua'a, North Kona District, Island of Hawai'i. Sims and Associates report 16590 prepared for Innovations Public Charter School,

Barrera, W.

1991 Archaeological Reconnaissance Survey, Wai'aha 2, North Kona (TMK: 3-7-5-18:7). Prepared by Chiniago Inc.

Berrigan, D., A. Haun and D. Henry

2007 Archaeological Data Recovery, Sites 15512, 15513, 15515, 15516, 22041, 22042 and 22046, Land of Wai'aha 1, North Kona District, Island of Hawai'i (Haun & Associates report 120 prepared for Tom Bolton, Kailua-Kona,

Bevan, A, M. Elmore and J. Kennedy

2004 An Archaeological Inventory Survey for TMK: 7-5-16: 31 and 35 (Por.) in Wai'aha 1st and 2nd Ahupua'a, North Kona District, Island of Hawai'i. Archaeological Consultants of the Pacific, Inc., Hale'iwa. On file at DLNR-Historic Preservation Division.

Burtchard, G.

1996 "Population and Land-Use on the Keauhou Coast: the Mauka Land Inventory Survey, Keauhou, North Kona, Hawai'i Island, part I: Narrative." IARII, Honolulu. On file at DLNR-SHPD.

Chinen, Jon J.

1958 *The Great Mahele: Hawaii's Land Division of 1848.* University of Hawai'i Press.

Condé, J., and G. Best

1973 *Sugar Trains: Narrow Gauge Rails of Hawai'i.* Felton, California: Glenwood Publishers

Corbin, A., and B. Gothar

2001 Archaeological Inventory Survey, Walua Apartment Project, Land of Wai'aha 1st, North Kona District, Island of Hawai'i (TMK: 3-7-5-18:7). PHRI Report prepared for Maryl Group, Inc.

Cordy, R.

1995 Central Kona Archaeological Settlement Patterns. State Historic Preservation Division, DLNR, State of Hawai'i. Prepared for the Planning Department, County of Hawai'i

DLNR (Department of Land and Natural Resources)

2003 Hawai'i Administrative Rules, Title 13. Department of Land and Natural Resources, Subtitle 13, State Historic Preservation Division Rules.

FR

n.d. Foreign Register of Kuleana Claims Recorded by the Board of Commissioners to Quiet Land Titles in the Hawaiian Islands. Manuscript. Hawai'i State Archives.

FT

n.d. Foreign Testimony Recorded by the Board of Commissioners to Quiet Land Titles in the Hawaiian Islands. Manuscript. Hawai'i State Archives.

Fuke, S.

1981 Environmental Assessment/ Negative Declaration for Variance for Development within the Shoreline Setback Area. Prepared for Environmental Quality Commission, Office of Governor, Honolulu.

Giambelluca, T.W., Q. Chen, A.G. Frazier, J.P. Price, Y.-L. Chen, P.-S. Chu, J.K. Eischeid, and D.M. Delparte

2013 Online Rainfall Atlas of Hawai'i. *Bull. Amer. Meteor. Soc.* 94, 313-316, doi: 10.1175/BAMS-D-11-00228.1.

Hammatt, H., and S. Clark

1980 Archaeological Testing and Salvage Excavations of a 155 Acre Parcel in Na Ahupua`a Pahoehoe, La`aloa, and Kapala`aea, Kona, Hawai'i. Archaeological Research Center Hawai'i Report 14-152 III. Prepared for Pacific Basin Resorts, Inc.

Hammatt, H., and W. Folk

1980 Archaeological Survey, Phase I: Portions of Keauhou-Kona Resort, Keauhou and Kahaluu, Kona Excavations within the Proposed Keahole Agricultural Park, Kalaoa-Ooma, Kona, Hawai'i.

Archaeological Research Center Hawai'i Report 14-177 II. Prepared for Kamehameha Investment Corp.

Haun, A., D. Henry and D. Berrigan

2007 Archaeological Data Recovery, Sites 15517, 15518, 21988, 21991, 21994, 21996. 22067, 22068 and 22069, Land of Waiaha 1, North Kona District, Island of Hawai'i. Haun & Associates Report 185 prepared for Sunstone Realty Partners, LLC, Kailua-Kona.

Haun, A.

2008 Archaeological Inventory Survey, TMK: (3) 7-5-17: Por. 004, Land of Wai'aha 2, North Kona District, island of Hawai'i. Haun & Associates report 580 prepared for Mr. Stanley Gomes.

Head, J., S. Goodfellow and P. Rosendahl

1994 Archaeological Inventory Survey, Ali'i Drive Sewer Project, Lands of Puapuaa 2nd and 3rd, and Waiaha 1st and 2nd, North Kona District, Island of Hawai'i (TMK: 7-5-18, 7-8).

Indices

1929 *Indices of Awards Made by the Board of Land Commissioners to Quiet Land Titles in the Hawaiian Islands.* Territory of Hawai'i, Honolulu.

Juvik, S.P., and J.O. Juvik (editors)

1998 *Atlas of Hawai'i,* Third Edition. University of Hawai'i Press. Honolulu.

Kamakau, S.

1961 *Ruling Chiefs of Hawai'i.* Honolulu: The Kamehameha Schools Press.

Kawachi, C.T.

1989 An Upland Habitation and Agricultural Complex in North Kona, Hawai'i Island. Master's thesis, Department of Anthropology, University of Hawai'i.

Kelly, M.

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

Kirch, P.V.

1985 *Feathered Gods and Fishhooks: An Introduction to Hawaiian Archaeology and Prehistory*. Honolulu: University of Hawai'i Press.

Kouneski, E., D. Grant and J. Kennedy

2006 An Archaeological Inventory Survey Report for TMK: 7-5-16:35 (POR.) in Wai'aha 1st Ahupua'a, North Kona District, Island of Hawai'i. Archaeological Consultants of the Pacific, Inc. report prepared for Mr. Brian Takeda, R.M. Towill Corp, Honolulu.

Maly, K.

1996 Appendix A - Historical Documentary Research. Archeological Inventory Survey, Hienaloli 3 and 4, North Kona District, Island of Hawai'i (TMK: 7-5-11:2) by Henry, J.D., T.R. Wolforth, and P.H. Rosendahl. PHRI Report 1348-032996. Prepared for Maryl Development, Inc.

2001 HE WAHI MOʻOLELO NO NÄ ʻÄINA, A ME NÄ ALA HELE I HEHI ʻIA, MAI KEAUHOU A I KEALAKEKUA, MA KONA, HAWAIʻI . A Historical overview of the Lands and Trails traveled between Keauhou and Kealakekua, Kona, Hawaiʻi. Kumo Pono Associates report

Moffat, R. M. and G.L. Kirkpatrick

1995 *Surveying the Mahele: Mapping the Hawaiian Land Revolution. Palapala`äina.* Editions Limited, Honolulu.

NR

n.d. Native Register of Kuleana Claims Recorded by the Board of Commissioners to Quiet Land Titles in the Hawaiian Islands. Manuscript. Hawaiʻi State Archives.

NT

n.d. Native Testimony Recorded by the Board of Commissioners to Quiet Land Titles in the Hawaiian Islands. Manuscript. Hawaiʻi State Archives.

Newman, T.

1970 Hawaiian Fishing and Farming on the Island of Hawai'i in AD 1778. Department of Land and Natural Resources, Division of State Parks.

Pukui, M., S. Elbert and E. Mo`okini

1976 *Place Names of Hawai'i*. University of Hawai'i Press, Honolulu

Rechtman, R.

2002 An Archaeological Inventory Survey of TMK: 3-7-5-18:08, Wai'aha 1st Ahupua'a, North Kona District, Island of Hawaiʻi. Prepared for Dan Bolton.

Reinecke, J.E.

1930 Survey of Sites on West Hawai'i. Ms. In Bishop Museum (1930).

Sato, H.H., E.W. Ikeda, R. Paeth, R. Smythe, and M. Takehiro Jr.

1973 *Soil Survey of the Island of Hawaiʻi.* U.S. Dept. of Agriculture, Soil Conservation Service and University of Hawaiʻi Agricultural Experiment Station. Washington D.C. Government Printing Office.

Schilt, A.R.

1984 Subsistence and Conflict in Kona, Hawaiʻi. An Archaeological Study of the Kuakini Highway Realignment Corridor. *Departmental Report Series* 84-1. Department of Anthropology, B.P. Bishop Museum, Honolulu. Prepared for Department of Transportation, State of Hawaiʻi. Experiment Station, Washington, D.C.: Government Printing Office.

Speakman, C.E., Jr.

2001 *An Informal History of the Hawaiian Island.* San Rafael: Pueo Press.

Soehren, L

1979 Reconnaissance Survey, TMK: 7-5-18:5 & 29, Waiaha 2, North Kona, Hawaiʻi. Captain Cook, Hawaiʻi.

1981 Archaeological Reconnaissance Survey: Wai‘aha 1, North Kona, Hawai‘i (TMK: 7-5-18:20 and 87). Captain Cook, Hawai‘i.

Stokes, J.F.G and T. Dye

1991 Heiau of the Island of Hawai‘i. *Bishop Museum Bulletin in Anthropology* 2. Bishop Museum Press, Honolulu.

Speakman, C.E., Jr.

2001 *An Informal History of the Hawaiian Island.* San Rafael: Pueo Press.

Thrum, T.G.

1908 *Heiaus and Heiau Sites Throughout the Hawaiian Islands*, island of Hawai‘i. *The Recognized Book of Authentic Information on Hawai‘i, Combined with Thrum‘s Hawaiian Annual and Standard Guide 38-47,* Honolulu Star-Bulletin, Honolulu.

Waihona ‘Aina Corporation

2000 The Mahele Database, waihona.com.

Wehewehe.org

2016 Hawai‘i Electronic Library - *Nā Puke Wehewehe ‘Ōlelo Hawai‘i*

Wolfe, E., and J. Morris

2001 Geological Map of the Island of Hawai‘i. U.S. Department of the Interior. U.S Geological Survey.

APPENDIX A – SHPD LETTER

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

GUY M. 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
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

January 5, 2012

Peter J.K. Dahlberg
pdahlberg@hawaii.rr.com

LOG NO: 2011.3364
DOC NO: 1112MV27
Archaeology

Dear Mr. Dahlberg,

SUBJECT: **Chapter 6E-42 Historic Preservation Review –**
Grading Permit Application for a Seawall at the Kona Reef Condominium Hotel
Waiaha Ahupua'a, North Kona District, Island of Hawai'i
TMK: (3) 7-5-018:071

Thank you for the opportunity to review this Grading Permit Application that was received by our office on November 29, 2011. We apologize for the delayed review and thank you for your patience. According to the application 0.314 acres of the 3.082 acre property will be graded to facilitate the construction of a new seawall at the Kona Reef Condominium Hotel. A review of our records indicates that there has been no archeological inventory survey completed on this parcel, and we have no information on this parcel in our correspondence files. Our records show that in 2011, two separate inadvertent discoveries of human skeletal remains occurred in connection with the construction of seawalls on Ali'i Drive - one at the Kona Bali Kai, and one at the Banyan Tree Condos.

SHPD archaeologist Michael Vitousek conducted a site visit to the proposed seawall construction area on December 23, 2011. The site visit was necessary due to the lack of information on this parcel and the recent discoveries in the area. During the inspection, what appears to be an exposed archeological deposit was identified along the shoreline at the north end of the project area. The deposit consists of a darkened anthropogenic sandy layer that includes marine shell, echinoidea, and charcoal. The cultural layer appears to be eroding out of the face of the shoreline bank and, while most noticeable in the north end of the project area, may extend the entire length of the ocean frontage. It was difficult to determine the exact location of the cultural layer due to the presence of stacked stones that had been placed in front of the eroding bank across most of the shoreline. Subsurface cultural layers in sandy shoreline deposits have a high probability for containing human burials.

In light of this information **SHPD requests that an archaeological inventory survey (AIS) be conducted** in order to identify the density and distribution of this cultural layer and determine if the cultural layer retains its historic significance or has been modified by construction of the condos. If significant historic properties are potentially located in this project area, the AIS should outline an appropriate course of mitigation. SHPD requests the opportunity to review and accept the results of the AIS prior to the issuance of any permit from the county that may facilitate the destruction of historic properties on this subject parcel. For a list of the approved archeological consultants in the state of Hawaii please visit the Historic Preservation Division's website http://hawaii.gov/dlnr/hpd/

Please contact Mike Vitousek at (808) 652-1510 or Michael.Vitousek@Hawaii.gov if you have any questions or concerns regarding this letter.

Aloha,

Theresa K. Donham
Acting Archaeology Branch Chief
Historic Preservation Division

APPENDIX E: COASTAL RESOURCE AND EROSION ASSESMENT
GEOHAZARDS CONSULTANTS INTERNATIONAL, INC.

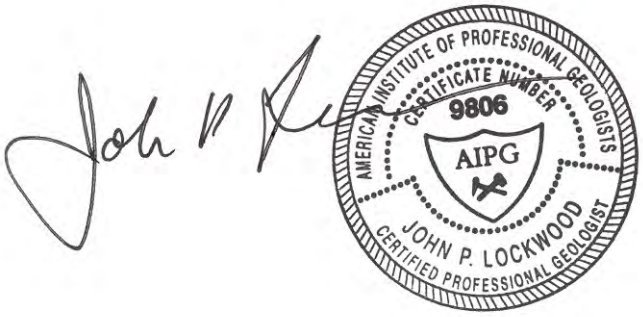
GEOHAZARDS CONSULTANTS INTERNATIONAL, INC.
Appraisal of hazards – reduction of risk

GEOLOGIC AND MARINE FACTORS THAT AFFECT SHORELINE EROSION

Kona Reef Condominiums
North Kona District, Hawaii
TMK: (3) 7-5-018:071

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

June, 2016



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

TABLE OF CONTENTS

Introduction - Study Requirement	p. 3
Field Inspections	p. 4
Geologic Description	p. 4
Effects of Subsidence and Sea-level Rise	p. 7
Wave environment along the Kona Coast	p. 8
Erosion Mechanisms	p. 10
Erosion Rate	p. 15
Erosion Mitigation Strategies	p. 16
Potential Impact of Proposed Erosion Mitigation Strategies	p. 16
Coastal Zone Hazards	p. 16
Conclusions	p. 17
References Cited	p. 17

Introduction – Study requirement

Coastal erosion is a potentially serious problem anywhere along Hawaii's coastlines, although the most serious problems reflect the vulnerability of sand beaches to erosion (DLNR, 2000), and are thus mostly of concern on the older islands of the State (Kauai, Oahu, and Maui). Erosion is of less concern on Hawaii Island, where rocky shorelines are the norm, and are for the most part immune to significant erosion.

Tsunamis and storm surges can, however, impact rocky coastlines on Hawaii, causing near-shore erosion. Significant damages along much of the western shoreline of Hawaii were caused by a tsunami associated with the devastating Japan earthquake of March 11, 2011. This tsunami caused minor damage at the Kona Reef Condominiums (hereafter referred to as the "KR Property"), as multiple tsunami surges overtopped and partially destroyed a loose stone wall that was built along the KR Property frontage at the boundary between its lawn and the adjoining shoreline (Fi. 1).

Figure 1. Debris thrown up over the lawn of the Kona Reef Condominiums by tsunami wave surges related to the Japan earthquake of March 11, 2011. The surges caused minor erosion of the lawn, and caused damages to lower floor rooms. Note the low stone wall (arrow) that was partially destroyed and contributed to the debris.

In order to prevent future erosion of the lawn area, and to mitigate the effects of the rare storm or tsunami surges that could cross the shoreline, a low "Erosion Abatement Structure" (EAS) has been proposed to be constructed fronting the KR Property mauka of the shoreline. This report documents the nature of erosion and shoreline migration at the KR Property, based on quantitative measurements and observations obtained through field inspection, aerial photography, satellite imagery, and review of the geologic literature. Potential environmental impacts of the proposed EAS

is evaluated, particularly as to any impact on coastal processes or on adjoining properties. Original data are reported in both English and metric units, and we will cite those data in their original format in our discussions, whether in feet, meters, inches, or millimeters.

Field Inspections

John Lockwood and Tim Scheffler initially visited the KR Property in May, 2015 to make geologic observations and inspect evidence for storm surge erosion. We have visited again on multiple occasions in 2016 to make detailed inspections of coastal geologic structures and to observe and photograph wave activity during normal tides as well as during periods of strong storm wave surge.

Geologic Description

Lava substrate

The entire offshore frontage of the KR Project area is underlain by an irregular shelf of dense, near flat-lying pahoehoe lavas, lavas that also underlie the Kona Reef Condominium buildings and form the solid basement on which the building foundations are excavated (Figure 2). These lavas are part of a single voluminous flow that originated from vents at the summit of Hualalai volcano, 9 miles to the east. The age of this flow, unit "f2f" on the Hualalai geologic map of Moore and Clague (1991) is estimated to be in the range 10-25,000 years. Moore and Clague describe this unit to be an 'a'a flow, with about 8% plagioclase, but along the coast the flow consists entirely of "tube-fed" pahoehoe, with only about 3% plagioclase and minor olivine. It is thus possible that the flow at the KR property is not the same flow as labelled by Moore and Clague on their map, but it must be closely related, and is in the same sequence of old Hualalai summit-derived lavas.

This pahoehoe is uniformly dense, even-grained, and is characterized by uniformly distributed, subrounded vesicles (gas bubbles), typically 1-3 mm in size, and commonly stretched parallel to flow surfaces. The vesicles are hematite-lined, and frequently stained yellow-orange near the surface. The flow contains about 3% plagioclase as fine subhedral laths averaging 0.5 mm in length. Minor (0.5-1%) subhedral yellow-green olivine is present in all samples.

These lavas emplaced as multiple relatively thin, complexly interfingering flow units (Figure 3), and presently dip seaward about 2 degrees. Because the Island of Hawaii has been subsiding relative to sea level for the past several hundred thousand years (Campbell, 1986, Moore, 1970) this area was far inshore from the coastline that existed when the flows were emplaced. This area was at least 150 m higher above sea level at that time, assuming that these flows are at least 13,000 years old (see discussion on "Effects of Subsidence and Sea Level Rise on Shoreline Position" below).

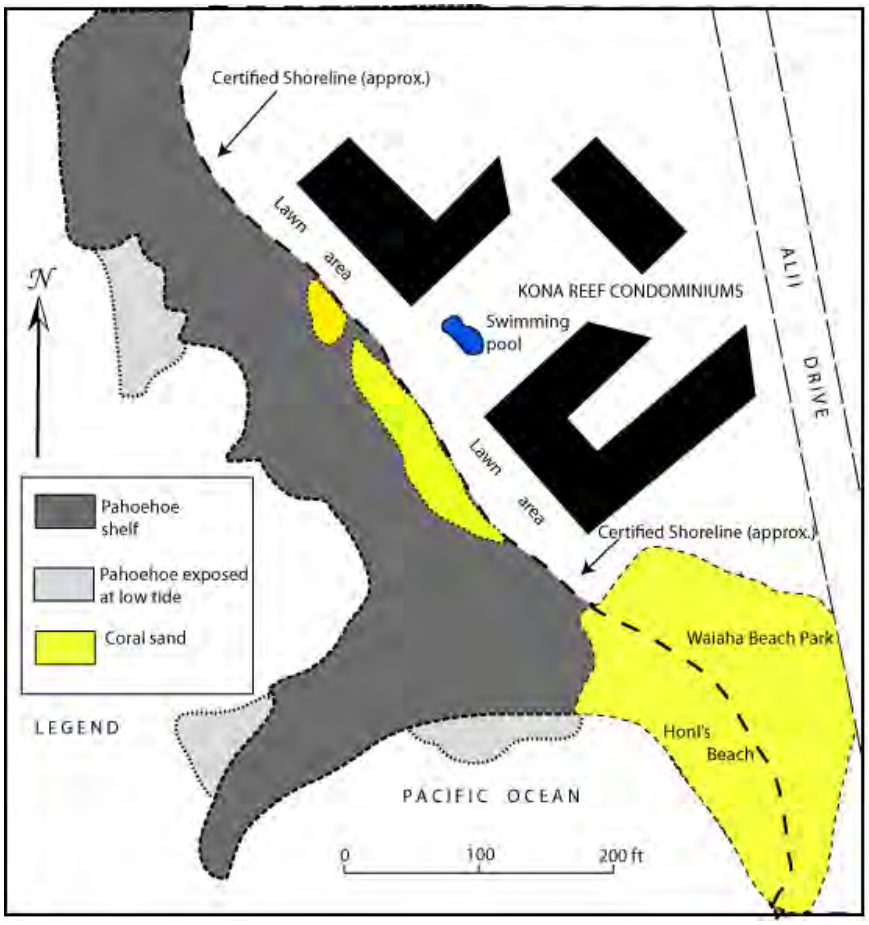


Figure 2. Kona Reef Condominiums - Coastal Features

Figure 3. Internal layering of the lava flow fronting the KR Property as exposed during low tide. These individual layers and "lava fingers" can be mechanically eroded by powerful storm surge waves, and are the sources of the rounded boulders found along the shoreline.

Unconsolidated sand and boulder deposits

Close to the shoreline, the pahoehoe lava shelf fronting the KR Property is overlain by irregular pockets of unconsolidated of sand and boulders. The subrounded to rounded boulders (Figure 4) are derived from mechanical erosion of the pahoehoe shelf, and are relatively stable in their position – they are only subject to movement by the most powerful storm surge waves that impact the coast. In contrast, the sand deposits can be moved about by less powerful surge waves, and are frequently smoothed over and move around the stationary boulders during high tides.

The sand deposits are derived from the mechanical and biologic erosion of offshore coral colonies, and are variable as to their quantity and distribution. A review of Google Earth images taken at various times of the year suggest that these sand deposits may be more extensive during summer months, and are depleted during winter, when storm surge waves are more common along the Kona coast. The source reservoirs for these sand deposits is not known, however it appears from review of satellite images that shallow sand deposits may be located just offshore of the edge of the pahoehoe platform that borders the KR Property. There is no evidence that sand is moving laterally across the pahoehoe platform, even from the adjacent large sand deposits at nearby Honl's Beach (Figure 2).

Figure 4. View looking seaward from the KR Property, during a period of strong surge, showing breaking waves at the edge of the pahoehoe platform about 150 feet from the shoreline. Note the subrounded to rounded storm boulders in the foreground, overlain by coral sand. These boulders are only moved by especially powerful storm waves, and are derived from the hydraulic excavation of pahoehoe from farther out on the platform.

Effects of Subsidence and Sea Level Rise on Shoreline Position

An overall global rise in sea level of 3.3 feet by the end of the 21st century has been proposed by Fletcher et al (2010), although locally these figures vary greatly in the short term because of climatic factors. The U. S. Army Corps of Engineers maintains a website with a "Sea level Change Calculator" based on historical tide station data that provides low, medium and high probability outcomes for sea-level rise over the next century. Their estimates for sea level rise over the next 80 years at Hilo, Hawaii (the nearest tide station) by (Figure 5) vary from 1 to 5 feet.

Hwang et al (2007) use a figure of .16 in (4 mm)/yr for global sea level rise in their assessments, but these figures do not account for the apparent sea level rise relative to shorelines on the Island of Hawaii. Relative sea-level rise on a sinking island is a result of the combined

global sea level rise and land subsidence. Because of isostatic settling into the underlying mantle, the entire island of Hawaii has been subsiding since volcanoes began growing in this area over a million years ago, at rates that have been estimated at between 1.8 and 2.4 mm/yr. for the past several thousand years (Campbell, 1986). A drowned reef terrace west of Kealakekua Bay, 10 miles south of the KR Property, formed about 13,000 years ago, but is now at 150 m water depth, showing that this area has subsided at an absolute rate of 1.8-3 mm/yr (Moore and Fornari. 1984). These authors assumed a value of 1.8 mm/yr global sea level rise, but the higher 4 mm/yr value proposed by Hwang et all (2005) is more realistic, especially considering the recently observed impact of global warming on sea level rise. A rise in relative sea level of at least 6-7 mm (0.25 in)/yr is thus the most reasonable value to assume for the near-term future in this area. At this rate (about a foot rise in 50 years), the effects on the shoreline fronting the KR Property should be minimal during its expected future lifetime. The offshore pahoehoe platform will still be present, and waves will break at its margin, so that relatively low-energy storm surges will remain the problem to be dealt with.

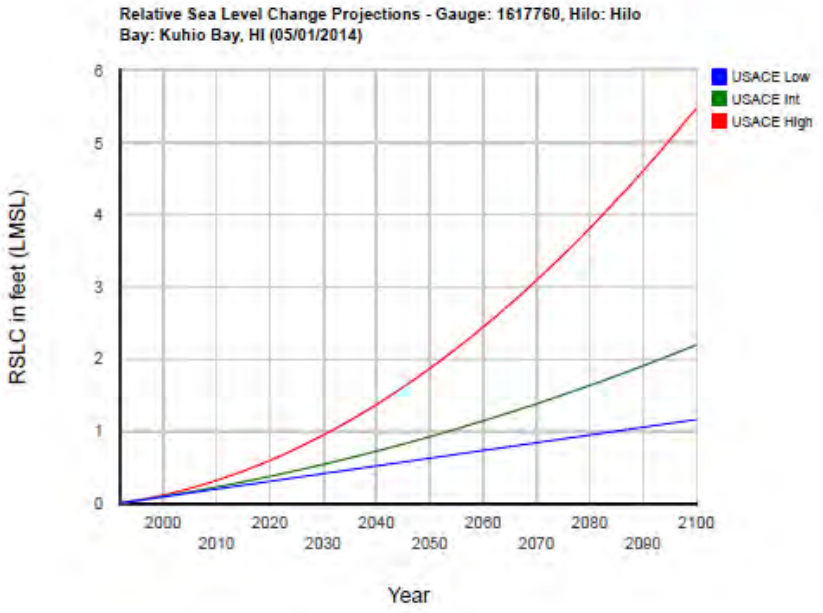


Figure 5. Projected sea level change at Hilo, Hawaii for this century (http://www.corpsclimate.us/ccaceslcurves.cfm)

Wave environment along the Kona Coast

The "wave climate" of Kailua-Kona, HI has been described by Dollar (1982) and Grigg (1998). The wave climate is the combination of conditions including wave energy, frequency, geology and topography of a specific site. Generally speaking, Kailua-Kona is completely sheltered from the Northwest Trade wind seas that batter the windward side of the islands. Hurricane generated swells can have impacts on the Kailua coast as can tsunami generated waves. Storm waves associated with regional swells that impact the Kailua-Kona area can be classified into three types:

1) South Pacific and Indian Ocean storms in the southern hemisphere winter (Hawaii's summer) can generate large south swells that impact the coast.

2) North Pacific storms in the winter generate some of the largest waves to impact the shoreline, on occasion having wave heights in excess of ten meters. However, these storms must contain a significant westerly element in order to impact Kailua directly, as the islands of Maui, Lanai and Molokai create a sort of wave-shadow shielding west Hawaii.

3) "Kona storms", locally generated storms and low pressure fronts moving from northwest to southeast, that are extremely unpredictable and variable in strength but can also produce significant waves with periods between 8 – 10 seconds and (deep water) heights from 3 – 5 meters (Table 1)

North Pacific waves are the largest and most destructive, exceeded only by the potential for large hurricane surf. However, the return interval for very large hurricane events on the island is roughly 40 years, while large winter swells can be expected annually (Grigg 1998; Figure 6). Of the major storms that have impacted West Hawaii over the past 60 years (Table 2), four have occurred since the Kona Reef Condominiums were constructed in 1980, but none have caused serious damage. Major waves were also associated with the March, 2011 Japan tsunami.

Table 1. Estimated average unrefracted wave characteristics for three wave types on the west coast of island of Hawaii (bottom slope ≈ 1:8.3)

	Wave period [s]	Deepwater wave height [m]	Deepwater wave length [m]	Breaker height [m]	Breaker depth [m]
South swell	20	1	682	2.4	1.7
North Pacific swell	15	2	384	4.6	3.3
Kona storm	9	6	138	7.7	6.0

Table 1. Characteristics of waves that can impact the west coast of Hawaii Island (Dollar, 1982).

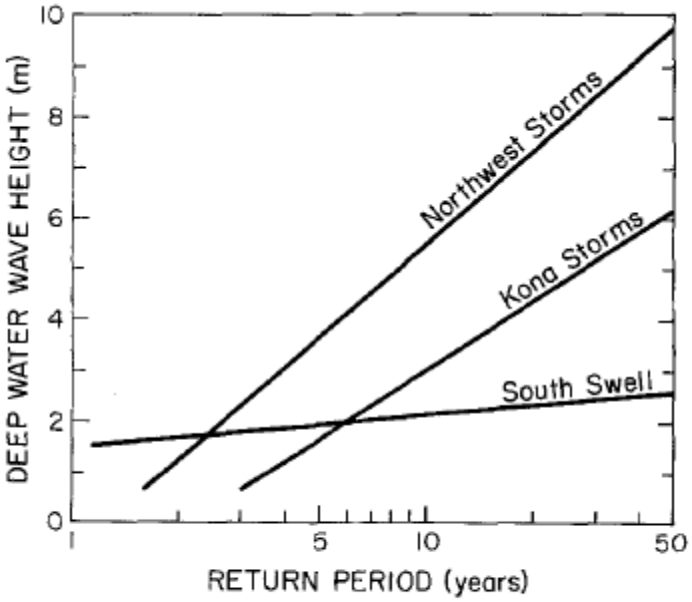


Fig. 3. Plots of deepwater wave heights (upper 10th) as function of average return period of storm events. (From Rochleau and Sullivan, unpublished data, 1981)

Figure 6. Average return periods of storm waves that can impact the Kona Coast (figure reprinted in Dollar, 1982).

Hurricane Name	Date	Major Kona Storms	Date	Tsunami Source	Date
Nina	December, 1957	Unnamed	January, 1974	Kamchatka	4 November, 1952
Dot	August, 1959	Unnamed	January, 1980	Japan	11 March, 2011
Iwa	November, 1982	Unnamed	December, 2010		
Iniki	September, 1992				

Table 2. Major hurricanes, winter storms, and tsunami that have impacted the west coast of Hawaii Island during the past 60 years.

Erosion Mechanisms

The lava platform that fronts the entire KR Property (Figure 2) serves as a wave buffer. Incoming waves break on the margin of this platform where most of their energy is dissipated (Figure 7) so that only wave surges travel over the platform and reach the shoreline.

Figure 7. Large surf impacting the coastline fronting the KR Property on February 25, 2016. Note that incoming waves break on the edge of the lava platform about 150 feet offshore, and that only low-energy surges reach the shoreline. Regardless of incoming swell and wave directions, surges travel over this platform in a direction normal to the shoreline; there are no lateral, longshore currents at the shoreline.

Interfaces between individual flow units form zones of weakness (Figure 3) can allow breaking waves at the platform margin and storm surges that move over the platform to break off rock fragments and move them shoreward. Most of these fragments, preserved as near-shore boulders, are well-rounded (Figure 4) indicating that such mechanical erosion is infrequent (otherwise fragments would be angular in shape). Original surface features on the lava platform are preserved in many places on the platform (Figure 8), showing that little surficial erosion has taken place since the lava flows were formed, and that wave erosion has been minimal.

Figure 8. Ropy pahoehoe texture on the surface of lavas exposed on the platform fronting the KR Property, demonstrating that little wave erosion is taking place in this area.

The only active erosion that was observed was caused by storm wave surges that reach the margin of the lawn fronting the KR Property (Figures 9, 10). This lawn is underlain by fine-grained fill material that was used as a substrate for lawn that was planted inshore from the shoreline about 35 years ago. Sapping of fine-grained material from under the lawn causes the

lawn grass to subside and creep seaward.

Figure 9. Erosion of lawn margin fronting the KR Property. Storm surges are not capable of moving the boulders located here at the shoreline, but do erode the fine sediments underlying the lawn.

Figure 10. Detail of eroding lawn fronting the KR Property. Surges associated with the tsunami of March 11, 2011 removed fine materials surrounding the cobbles that underlie the lawn, and caused the lawn to retreat as much as six inches in places.

Erosion Rate

Available aerial photographs of the area date back only to 1954 (Table 1). Inspection of these photographs indicate that the general features of the coastline fronting the KR Property have not changed for the past 62 years, but the small scales of the photos would not reveal small changes (< ca. 15 feet) that may have occurred.

Date	Agency	Flight Line	Frames	Approx. Scale
1954	USN-USGS	017	09, 10	1:35,020
1976	USGS	GS-VEEC 8	59,60	1:37,410
2010-2015	Google Earth			Variable

Table 3 Stereographic aerial photography available for determination of erosion rates in the Property area.

Erosion of the lawn area mauka of the shoreline by rare storm or tsunami-related surges is a problem that has resulted in minor retreat of the lawn. The presence of coconut palm trees along the lawn frontage (Figure 11), trees that were planted in the 1980's, shows that any lateral erosion of this area has been very minor over this period.

Figure 11. View northward along the shoreline fronting the KR Property.

Erosion Mitigation Strategies

A low "Erosion Abatement Structure" (ERS) has been proposed to be constructed mauka of the shoreline, at the margin of the lawn area, to prevent further erosion of the lawn, and to prevent fine-grained landfill underlying the lawn from entering the sea (See Section [Graham Report] for details). Such a low structure would serve to protect the lawn area from surge waves that can reach the shoreline during times of storms or tsunami.

Potential Impact of Proposed Erosion Abatement Structure

The ERS will have absolutely no environmental impact, other than the beneficial effect of eliminating the potential for fine-grained fill material from beneath the KR Property lawn to be eroded out into the sea. Especially large surge waves (such as those associated with the March, 2011 tsunami) will be able to overtop this low structure, but wave energy will be further dissipated, preventing any erosional effects, and probably preventing rock materials from being thrown onto the lawn.

General Coastal Zone Hazards

Hwang (2005) recommends that all hazards facing coastal areas, and not just erosion, should be considered when planning for land-use and coastal construction in Hawaii. Fletcher *et al.* (2002) portray generalized hazards assessments for long areas of Hawaii's coastlines; they rate the specific hazards for the area of South Kona fronting the KR Property as follows (Table 4). The Property is located in Lava Flow Hazard Zone 4 of Wright and others (1992), but is in an area not impacted by lava flows in over 10,000 years.

Hazard Type	**Relative Threat**	**Scale (1-4)**
Tsunami	High	4
Stream Flooding	Medium-high	3
High Waves	Medium-low	2
Storms	Medium-high	3
Erosion	Medium-low	2
Sea Level Change	Medium-high	3
Volcanic/Seismic	High	4
Overall Hazard Assessment	High	6 (on scale of 1-7)

Table 4. Natural hazards impacting the coastline fronting the KR Property (from Fletcher et al., 2002, p.173)

Conclusions

No significant erosion of the shoreline fronting the Kona Reef Condominiums has taken place in historical time, although global sea level rise and continuing subsidence of Hawaii Island could result in inland migration of the shoreline over the next century. Minor erosion of a lawn fronting the KR Property is caused by the infrequent storm surge or tsunami waves that reach or extend beyond the shoreline. That erosion can be mitigated by the construction of a low stone wall (Erosion Abatement Structure) immediately mauka of the shoreline. Such a structure would have no negative environmental impacts or effects on adjoining coastal areas.

References Cited

Apple, R. A. and G. A. Macdonald, 1966, The rise of sea level in contemporary times at Honaunau, Kona, Hawaii: Pacific Science v. 20, pp.125-136.]

Campbell, J. F., 1986, Subsidence rates for southeastern Hawaiian Islands determined from submerged terraces: Geo-marine Letters, v. 6, pp. 139-146.

DLNR, 2000, Coastal Erosion Management Plan (COEMAP): State of Hawaii Department of Land and Natural Resources Unnumbered Report, Honolulu, Hawaii, 90 pp.

Dollar, S. J., 1982, Wave stress and coral community structure in Hawaii: Coral Reefs v.1, no.2 pp. 71-81.

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

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

Grigg, R. W., 1998, Holocene coral reef accretion in Hawaii - a function of wave exposure and sea level history: Coral Reefs, v. 17, n 3, pp. 263-272.

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

Kopp, R.E., Kemp, A.C., Bittermann, K., Horton, B.P., Donnelly, J.P., Gehrels, W.R., Hay, C.C., Mitrovica, J.X., Morrow, E.D. and Rahmstorf, S., 2016. Temperature-driven global sea-level variability in the Common Era. *Proceedings of the National Academy of Sciences*, p.201517056.

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

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

Moore, R. B. and Clague, D. A., 1991, Geologic Map of Hualalai Volcano, Hawaii: U. S. Geological Survey Misc. Investigations Map I-2213, 1:50,000.

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

APPENDIX F: FLORA AND FAUNA STUDY
GRANT GERRISH, PH.D.

Flora and Fauna Study
Kona Reef Condos Erosion - Control Structure

TMK (3) 7-5-018:71

April 18, 2016

Prepared For:

Associatiton of Apartment Owners of Kona Reef, Inc.
75-1029 Henry Street, #202
Kailua-Kona, Hawaii 96740

Prepared By:

Grant Gerrish, Ph. D
P.O. Box 91
Paauilo, HI 96776

Flora and Fauna Study
Kona Reef Condos Erosion - Control Structure

1.0 INTRODUCTION

1.1 Purpose of This Flora and Fauna Study

This flora and fauna survey supports an environmental assessment for a proposed erosion abatement project. This environmental assessment will be submitted to the County of Hawaii Planning Department, the accepting agency. The goal of this study is to describe the plants and animals that are presently on the project site or making use of it as habitat. Plants and animals and their habitats are recognized as "biological resources." Attention is also directed to areas surrounding the project site where biological resources might be affected by the proposed action. The status of plants and animals as "native" or "introduced," or as "listed" endangered or threatened is noted.

1.2 Brief Description of the Proposed Action

The owners of the Kona Reef Condos (Kona Reef AOAO) propose the construction of an erosion-control structure near the ocean-ward boundary of their ocean-front property in Kailua-Kona. This property, on Kahakai Road and Ali`i Drive, is designated by TMK (3) 7-5-018:071. The proposed structure would be a mortar and rubble wall, approximately 220 feet long and 1.5 feet wide, seated on bedrock. The top of the wall would be level with the existing grade. The entire structure and all construction activity would be within the subject parcel.

1.3 Existing Conditions of the Project Site

The term, "project site," refers to the specific location that would contain the proposed structure and all of the nearby area that would be affected by direct construction impacts, such as excavation and trampling by workers and equipment.

The project site is part of an ocean-front property situated in urban Kailua-Kona, Hawaii County, coordinates N 19° 37' 45" W155^{o} 59' 20" (GPS coordinates). This neighborhood

includes well-used streets and thoroughfares (Ali`i Drive and Kuakini Highway), multi-unit residential buildings, resorts, and a resort Hotel (the Royal Kona Resort). (Figure 1.) The vegetation within the neighborhood is mostly managed landscapes of ornamental plants and lawns. The project site is entirely within a well-maintained grassy lawn between the seashore and the buildings and other constructed features of the Kona Reef Condos. The ocean-ward (towards the ocean) boundary of the property and project site is very near the certified shoreline at the upper limits of the shore. The adjoining seashore is a moderately sloping, boulder and sand beach, that stretches down to a small bay, called *Wai'aha*, south of Kailua Bay and part of the Pacific Ocean (USGS 1982).

Figure 1. Google Earth image of location and surroundings. Project Area is between the ocean and the building labeled "Kona Reef Resort."

The project site is within a strip of lawn about 15 to 30 feet wide between the constructed features and the sea shore (Figure 2.). The lawn is used recreationally by residents of the Kona Reef Condos as well as members of the public walking along the shore. A narrow strip of more natural beach vegetation grows at the upper limit of the seashore, outside the project site. The ocean and marine environments lie beyond the beach.

Figure 2. Site Photo. Project site is the grassy strip running from upper-left to center bottom between the blue and white structure and the black lava beach. Google Earth image.

2.0 STUDY METHODS

The biologist, Dr. Grant Gerrish, Ph.D. spent approximately 2 hours at the project site and in the near vicinity on March 5, 2016. Plants and animals on the site and in the near vicinity were observed and recorded at that time and several photos were taken.

Dr. Gerrish was shown the site by the applicant's representative, Mr. Ray Pieri. Mr. Pieri indicated the property boundary, showing Dr. Gerrish recent survey marks that he stated showed certified shoreline and the property boundary. Mr. Pieri further stated that the proposed erosion-control structure would be located within the applicant's property, approximately one foot above the certified shoreline.

Other sources of information include the County of Hawaii website and Google Earth and Google Maps images. The websites of US Fish and Wildlife Service (www.fws.gov) and National Marine Fisheries Service (www.nmfs.gov) were consulted for information concerning marine reptiles and marine mammals known to live in the waters near the project site and the protection status (eg. "threatened" or "endangered") of these animals. The scientific names of plants are in accordance with the Smithsonian Institute Department of Botany Checklist of Hawaiian Plants (Smithsonian 2012). Common names are, for the most part, taken from Wagner, Herbst and Sohmer (1990). Bird names are in accordance with Hawaii Audubon Society (2005).

3.0 RESULTS

3.1 Plants Within the Project Site

The vegetation within the project site is entirely a lawn maintained at a very low height (Figure 3). The dominant grass species is a cultivated form of Bermuda grass (*Cynodon dactylon*). Four other introduced grass species were identified within the lawn as well as three species of sedges. Two of the sedges, *Fimbrystilis dichotoma* and *Cyperus polystachyos*, are common indigenous species while the third sedge is an introduced species. A couple of ornamental bougainvillea shrubs are planted at the upper edge of the project site. (Table 1.)

Figure 3. The Project site view looking north. Kona Reef Condos on right. Coconut trees and *naupaka* are outside the project area. Photograph by Grant Gerrish.

3.2 Animals Observed On and Near the Project Site

A number of common introduced bird species were seen within the project site and on adjoining areas with similar landscaped vegetation. Those species seen and recorded during the site visit were House Sparrow (*Passer* domesticus), Saffron Finch (*Sicalis flaveola*), Common Waxbill (*Estrilda astrild*), and Zebra Dove (*Geopilia striata*). These are common bird species in urban environments on the Island of Hawaii. Undoubtedly, several more species of similar introduced urban birds would be observed with a longer observation period. It is possible that the indigenous *Kolea* (Pacific Golden Plover: *Pluvialis fulva*) would forage within this lawn.

No non-human mammals were seen on the project site during the survey. Undoubtedly, mongoose, mice, rats and domestic dogs and cats are occasionally on or near the site. This urban site possesses no habitat resources that would make it attractive or particularly useful to native Hawaiian vertebrate species, other than possibly the *Kolea*, mentioned above.

Table 1. Plant Species Within the Project Site.

Scientific Name Common Name	Origin
Axonopus compressus (Sw.) P. Beauv. tropical carpet grass	Introduced
Bougainvillea Comm. *ex* Juss. sp. Bougainvillea	Introduced
Cynodon dactylon (L.) Pers. *Manienie, Manienie haole*, bermuda grass	Introduced
Cyperus brevifolius (Rottb.) Hassk. *kili`o`opu*	Introduced
Cyperus polystachyos Rottb. no common name	Indigenous
Elusine indica (L.) Gaertn. goose grass	Introduced
Fimbrystilis dichotoma (L.) Vahl no common name	Indigenous
Poa L. sp. blue grass	Introduced
Stenotaphrum secundatum (Walter) Kuntze St. Augustine grass, buffalo grass	Introduced

3.3 Plants and Terrestrial Animals on the Beach Outside the Project Site

The width of the beach, defined as the average distance from the certified shoreline to the edge of the ocean water, is about 8.5 m (30 feet). The change in vegetation between the lawn within the project site and the beach vegetation outside the project site is abrupt (Figure 4). The grasses in the lawn completely cover the soil surface but the sandy and rocky substrate is exposed below the shoreline. A narrow band of beach plants grows along part of the

certified shoreline below the project site. These are primarily two indigenous species, *naupaka* (*Scaevola taccada*) and beach morning glory (*Ipomoea pes-caprae*). Four coconut trees (*Cocos nucifera*) also grow just below the shoreline. From their location and spacing, it appears that these four trees were planted. (Table 2.)

One bird species, the indigenous *`Akekeke* (Ruddy Turnstone: *Arenaria interpres*), was observed on the beach near, but outside, the project site. It is likely that other indigenous shore birds, such as the *`Ulili* (Wandering Tattler: *Heteroscelus incanus*), may occasionally use this beach.

Figure 4. Photo of the beach and interface with project site lawn, view looking south. Project site is entirely within grassy area. The certified shoreline is at the top of the rocky beach. Coconut trees and shrubs are outside the project site. Building at left is Kona Reef Condos. *Wai'aha* County Beach Park in background (near center of photo). Photograph by Grant Gerrish.

It is possible, but highly unlikely, that marine animals such as sea turtles or seals, could bask on the beach. It is considered highly unlikely because of the high level of human activity nearby. These animals are further described and evaluated in Sections 3.4 and 4.3 as marine animals.

Table 2. Plant Species on Beach Outside Project Site

Scientific Name Common Name	Origin
Boerhavia coccinea Mill. no common name	Introduced
Cocos nucifera L. *niu*, coconut	Polynesian
Heliotropium foertherianum Diane & Hilger tree heliotrope	Introduced
Ipomoea pes-caprae (L.) R. Br. subs. *brasiliensis* (L.) Ooststr. beach morning glory, *pohuehue*	Indigenous
Leucaena leucocephala (Lam.) de Wit subs. *leucocephala* *koa haole*	Introduced
Scaevola taccada (Gaertn.) Roxb. *naupaka kahakai*	Indigenous

3.4 The Marine Environment and Marine Animals

The project site for the proposed action is separated from the waters of *Wai'aha* and the Pacific Ocean by the beach described in the section above. The near-shore waters are not part of the project site and were not surveyed for this proposed action. Significant biological resources in the off-shore waters are listed in this section so that potential adverse impact outside the project site can be evaluated. Literature indicates a large number of invertebrate and vertebrate animals occur in the ocean waters along the Kona Coast (Juvik and Juvik 1998). Species protected by the State and Federal endangered species regulations that may be found

in these and other Hawaiian waters include the Pacific green sea turtle (*Chelonia mydas*: threatened species), (hawksbill turtle (*Eretmochelys imbricate:* endangered species), Hawaiian monk seal (*Neomonachus schauinslandi*: endangered species) and the humpback whale (*Megaptera novaeangliae*: endangered species). (www.fws.gov; www.nmfs.gov).

The critical habitat that was designated for the Hawaiian Monk Seal in September, 2015, includes certain sections of the beach and shoreline on Hawaii Island (Federal Register 2015). The beach and ocean waters in front of the Kona Reef Condos is part of a segment defined as "South of Oneo Bay through to Holualoa Bay area" between markers HA 91 and HA 92 and further defined as the shoreline between two points designated by the coordinates 19^0 38' 10" N, 155^0 59' 29" W and 19^0 36' 31" N, 155^0 58' 41" W. The critical habitat, quoting the Federal Register, "…include(s) marine habitat from the 200-m depth contour line, …through the water's edge 5 m into the terrestrial environment from the shoreline…" Thus, the critical habitat extends into the project site on the property owned by Kona Reef Condos AOAO.

4.0 DISCUSSION AND RECOMMENDATIONS

4.1 Flora: Plant Resources on and Near the Project Site.

4.11 Discussion of Plant Resources

All of the plants within the project site are very common species that have no importance for the conservation of Hawaiian biodiversity. These plants are valuable for the stabilization of the soil and for the esthetic values provided to the people who use the area.

The plants outside the project area, at or below the certified shoreline, include indigenous species that are typical of the shoreline habitat. These shrubs and coconut trees may help reduce wave-erosion near the shoreline. Although these are all species that are common and widespread on Hawaii island, their presence here provides the esthetic value of an authentic native Hawaiian plant community in a neighborhood with few native plant species.

4.12 Recommendations for Plant Resources

- The plant-life on the project site should be maintained or replaced after construction to minimize soil erosion and to preserve the recreational and esthetic values of the area.

- Construction activities should avoid damaging the plants on the beach, outside the project area. Any inadvertent damage to the beach plants should be restored, if so directed by appropriate authorities.

4.2 Fauna: Terrestrial Animal Resources on and Near the Project Site

4.21 Discussion of Terrestrial Animal Resources

Only introduced bird species were observed within the project survey. The project site does not contain any important resources, such as nest sites or special food sources that would attract bird or mammal species. Individual birds may easily avoid the proposed construction activities, thus avoiding injury.

Construction activities may temporarily frighten indigenous shore birds from this section of the beach. Loss of the use of this portion of the habitat for brief periods would not have an adverse impact of the well-being of these birds or their species.

4.22 Recommendations for Terrestrial Animal Resources

- No discernible adverse impact on terrestrial animals is anticipated. No recommendations are made.

4.3 Marine Environment and Marine Animals

4.31 Discussion of Marine Resources

The purpose of the proposed action is to prevent or reduce erosion at the shoreline that might adversely affect water quality in the marine environment. It is beyond the scope of this biological report to determine if the proposed erosion-control structure when completed will achieve this goal or to determine what, if any, post-construction impact it may have on the marine environment. Any such impacts cannot be evaluated in this section of this report.

Possible construction-related impact on the marine environment that can be anticipated would be pollution of the near-shore water by uncontrolled runoff of soil or construction materials.

It is possible that marine mammals or reptiles could move onto the beach from the ocean while construction is taking place. These animals could include the endangered Hawaiian monk seal and the endangered and threatened turtles listed in section 3.4. As proposed, the construction would not physically endanger these animals, however, the noise and activity of construction could frighten them back into the water. It would be an infraction of the Endangered Species Act to disturb any of these animals.

4.32 Recommendations for Marine Resources

- Best Management Practices and all other necessary actions should be taken to ensure that no soil, fill or any other material from the proposed action enter the water of the Pacific Ocean.

- In the unlikely event that a sea turtle or a seal is observed on the project site or on the beach or anywhere else near the project site, all construction activities should be stopped until the animal voluntarily returns to the ocean. Marine mammals and turtles should not be disturbed or harassed in any way. It is recommended that the US Fish and Wildlife Service be notified if any such animals are seen near the project site.

REFERENCES

Federal Register. 2015. Endangered and Threatened Species: Final Rulemaking to Revise Critical Habitat for Hawaiian Monk Seals. Document Number 2015-20617, 50 CFR 226. August 21, 2015.

Hawaii Audubon Society. 2005. Hawaii's Birds. 6th ed. Island Heritage Publishing. Waipahu, Hawaii.

Smithsonian. 2012. Flora of the Hawaiian Islands. Hawaiian Vascular Plant Updates: A Supplement to the Manual of the Flowering Plants of Hawai`I and Hawai`I's Ferns and Fern Allies – Version 1.3, 12 April 2012. botany.si.edu/pacificislandbiodiversity/hawaiianflora/.

Juvik S. D. and J. O. Juvik, eds.1998. Atlas of Hawai'i. 3rd Edition. University of Hawaii Press. Honolulu, Hawaii.

USGS. 1982. Kailua Quadrangle. 7.5 Minute Series (Topographic). U.S. Geological Survey, Denver, Colorado. Map.

Wagner W. L., D. R. Herbst and S. H. Sohmer. 1990. Manual of the Flowering Plants of Hawai'i. University of Hawai'i Press/Bishop Museum Press. Honolulu, Hawaii.

www.fws.gov. US Fish and Wildlife Service Website. http://www.fws.gov/pacificislands/.

www.Hawaiicounty. Hawaii County Website. http://www.hawaiicounty.gov.

www.nmfs.gov. National Marine Fisheries Service Website.
http://www.nmfs.noaa.gov/pr/species/ *and* http://www.nmfs.noaa.gov/pr/species/criticalhabitat.htm.