Draft Environmental Assessment For Aliomanu Road Repair

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Department of Public Works
County of Kauai

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March 2009

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General Information Summary

Applicant:	County of Kauai, Department of Public Works Mo'ikeha Building 4444 Rice Street, Suite 255 Lihue, Kauai, Hawaii 96766
Owner:	County of Kauai and State of Hawaii
Consultant/Preparer:	Oceanit Suite 600 828 Fort Street Mall Honolulu, HI 96813
Approving Agency:	County of Kauai Planning Department 4444 Rice Street Lihue, HI 96766
Project Description:	A portion of Aliomanu Road has been eroded by wave action just north of Anahola Stream. The County of Kauai will repair the road that will include a rock revetment on the seaward side of the existing road. This revetment will be buried to a depth of approximately six feet to prevent future undermining of the road.
Anticipated Determination:	Finding of No Significant Impact (FONSI)
Agencies Consulted:	Department of Land and Natural Resources Office of Conservation and Coastal Lands County of Kauai, Planning Department Department of Hawaiian Home Lands Office of Hawaiian Affairs State Historic Preservation Division Kauai Historic Preservation Review Commission
Community Groups Consulted:	Anahola Homesteaders Council, Mr. James Torio, Executive Director Kanuikapono Public Charter School, Mr. Kamahalo Ka`uhane, President
Individuals Consulted:	Mr. Milton Ching Mr. Sam Makepa Mr. Mike and Mrs. Sondra Grace Ms. Sharon A. Pomroy
Tax Map Key:	4-8-18: 028, 029
State Land Use:	Urban District

County General Plan:	Residential Community
County Zoning:	Open
Special Designations:	Special Management Area and Shoreline Setback

1 Introduction

This environmental assessment is being prepared by Department of Public Works (DPW) of the County of Kauai, to repair Aliomanu Road located along the shoreline in Anahola. This road is being undermined by shoreline erosion, causing part of the road to collapse into the ocean. This project will require County of Kauai funding to repair the road and reinforce the makai side of the road with a rock revetment on lands owned by the County and the State of Hawaii.

The new rock revetment will be built within the State of Hawaii parcels and the shoreline area that is within the Conservation District and will require a Conservation District Use Permit (CDUP), Shoreline Setback Variance (SSV) and a Special Management Area (SMA) permit. The road will be reconstructed in the existing location and protected by a rock revetment on the makai side. The footing of the revetment will be at a depth of -6 feet below mean sea level (MSL) to prevent future undermining of the road from shoreline erosion.

The tax map key numbers for this project are 4-8-18: 028, 029 (see Figure 1-1). The State of Hawaii is the owner of these parcels, but the road repair section is under the jurisdiction of the County of Kauai.

The project area is shown in Figure 1-2 below. Photos showing the deteriorating road are shown in Figures 1-3 and 1-4.

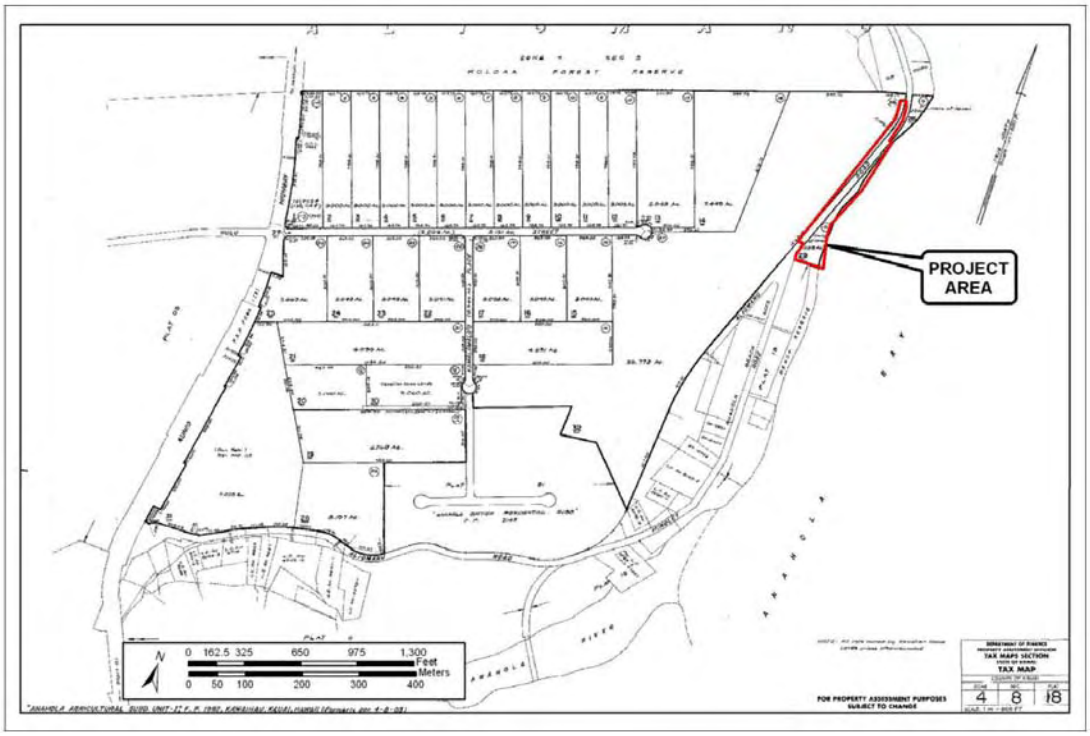

Figure 1-1. TMK of Project Site

Figure 1-2. Location of Aliomanu Road Repair Site

Figure 1-3. View of Aliomanu Road looking north

Figure 1-4. Undermining of the road

2 Project Description

2.1 Location of Project and Description

The Aliomanu Road Repair Project is located on the eastern coastline of the island of Kauai in the town of Anahola. The road will be repaired to conditions that existed prior to the collapse of portions of the roadway as a result of shoreline erosion. The road is on lands maintained by the County of Kauai. A rock revetment will be constructed on the seaward side of the roadway to prevent future damage to the road by erosion. The revetment will be at approximately six feet below MSL to prevent future undermining of the roadway. Excavated material from the trenching activities will be stockpiled south of the site and be used as backfill material for the construction the road and revetment.

A temporary solution using sand bags to prevent near term erosion is in place until such time the permanent solution is designed and constructed. The sand bags will be removed prior to construction.

2.2 Existing Land Use Classifications

The project is located within the urbanized area of Anahola town. The State Land Use designation is "U" (Urban) and the County General Plan designation is "Residential Community". Just mauka of the road the State Land Use and County General Plan designation is "A" (Agriculture) The County of Kauai zoning designation is "Open".

The project site is within the Special Management Area as shown in Figure 2-2. Therefore a Special Management Area Permit will be required. A shoreline setback variance will also be needed for this project.

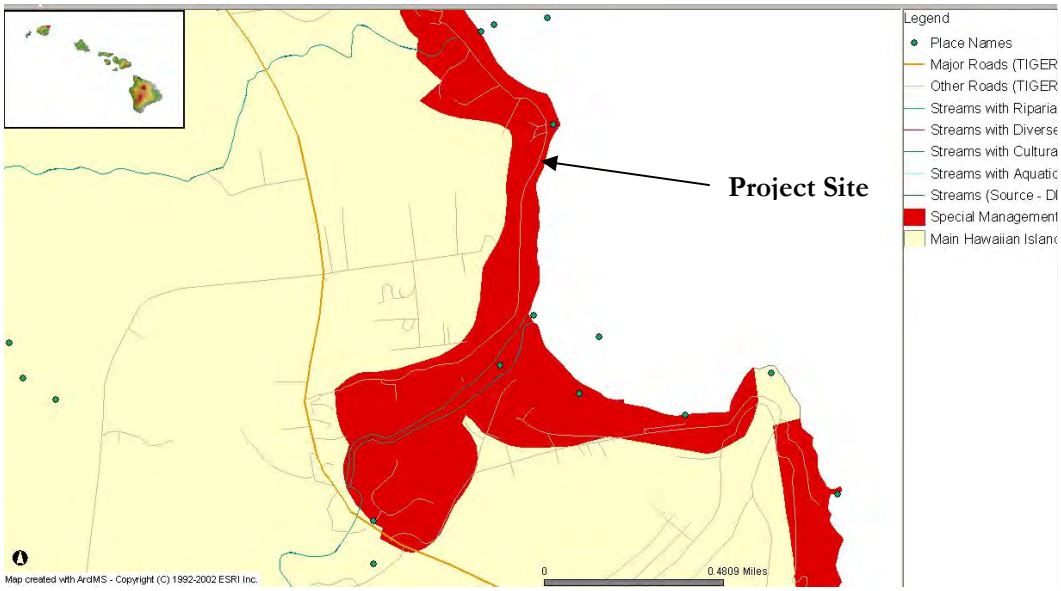

Figure 2-1. Special Management Area Map

3 Alternatives Considered

3.1 No Action Alternative

The no action alternative would mean that the roadway will continue to be undermined by shoreline erosion and ultimately slip into the ocean, cutting off vehicular access to areas north of Anahola. Since the Aliomanu Road beyond Anahola terminates north of the eroded area, residents living north of this section of the roadway will not have access to their properties unless another road was construction from Kuhio Highway to the northern side of Aliomanu Road.

3.2 Proposed Project Alternative

Borings taken at the site indicated that the substrata consist of sand and clay to a depth of 25 feet below mean sea level. There is no hard substrate within this depth to use as a foundation.

The proposed project is to rebuild the existing roadway to include a 2-foot wide shoulder to pre-erosion conditions and stabilize the road with a new rock revetment to prevent future erosion of the roadway (see Figure 3-1). This new revetment will be constructed to a depth of 6 feet MSL. A geotextile fabric will be placed beneath the bottom layer of smaller rocks to prevent soil from escaping through the revetment. The top layer consists of two rows large boulders similar in size to those found at the site. Sand removed from the buried portion of the revetment will be place over the boulders. The revetment will slope at 1.5H:1V.

Maintenance of the revetment will be needed several years after the revetment has been constructed because of settling. However, once the settling has occurred periodic maintenance will be needed to replace any dislodged boulders.

Other alternatives considered are as follows:

3.2.1 Seawall Supported by Micro-piles

This alternative consists of a seawall supported on micro-piles driven into the substrate. The piles will be a few feet apart and will be driven to 15 feet below MSL. A pile cap will be placed at 2 to 3 feet below MSL, and the seawall is constructed on the cap. The seaward slope of the seawall will be protected by riprap to dissipate wave action and reduce scour at the footing. This alternative was not selected because of construction below water level and possible scour below the pile cap that will expose the piles that are spaced apart. This might ultimately result in soil loss under the road causing damage.

3.2.2 Concrete Wall with a Cutoff

This alternative consists of a concrete seawall with a vertical seaward face. The seaward portion of the wall will extend to 6 feet below MSL forming a barrier against soil loss. However, if the beach erosion exposes the bottom of the cutoff wall, soil loss from under the wall will occur resulting in damage to the road. This alternative was not selected because of possible functional failure and construction work below water level.

3.2.3 Drilled Shaft Retaining Wall

This alternative consists of a series of 30 inch diameter concrete piles that are cast in pre-drilled shafts. Thirty-inch diameter holes are drilled into the substrate to a depth of 25 to 30 feet and a casing is introduced to prevent collapse. The shaft is filled with concrete while the casing is removed. Alternate piles are placed at 24 inches apart and allowed to set. Intermediate piles are then drilled and cast to create a 3 inch overlap that prevents loss of soil from between each pile. As in the earlier alternatives the seaward slope of the seawall will be protected by a rock toe to dissipate wave action and reduce scour at the footing. However, in this option, it is very unlikely that scour will reach the bottom of the piles, and thus there is no possibility of scour failure or sink holes.

3.2.4 Construction of a Bridge

Aliomanu Road has two separate sections of roadway (North and South) that intersect with Kuhio Highway. The northern Aliomanu Road occurs north of the project site and dead ends at the edge of an unknown stream. The southern section of Aliomanu Road parallels Anahola Stream then turns north at the stream mouth towards the section of collapsed roadway repair site and continues north and also dead ends on the opposite side of this stream. Construction of a bridge to connect the two roads was considered. However, the cost to building this bridge was very high in the multi-million dollar range and the terrain made a bridge construction project difficult because major land altering would be needed. In addition, the roadway is currently not constructed to County standards and would need to be widened to accommodate a bridge. This widening of the road would require taking land from all adjacent landowners to construct the roadway to the appropriate right-of-way width. This high construction cost, land acquisition and land altering was not considered practical especially since the road will service a very small number of residents. Thus, the cost benefit for an expensive bridge construction was eliminated as a viable alternative.

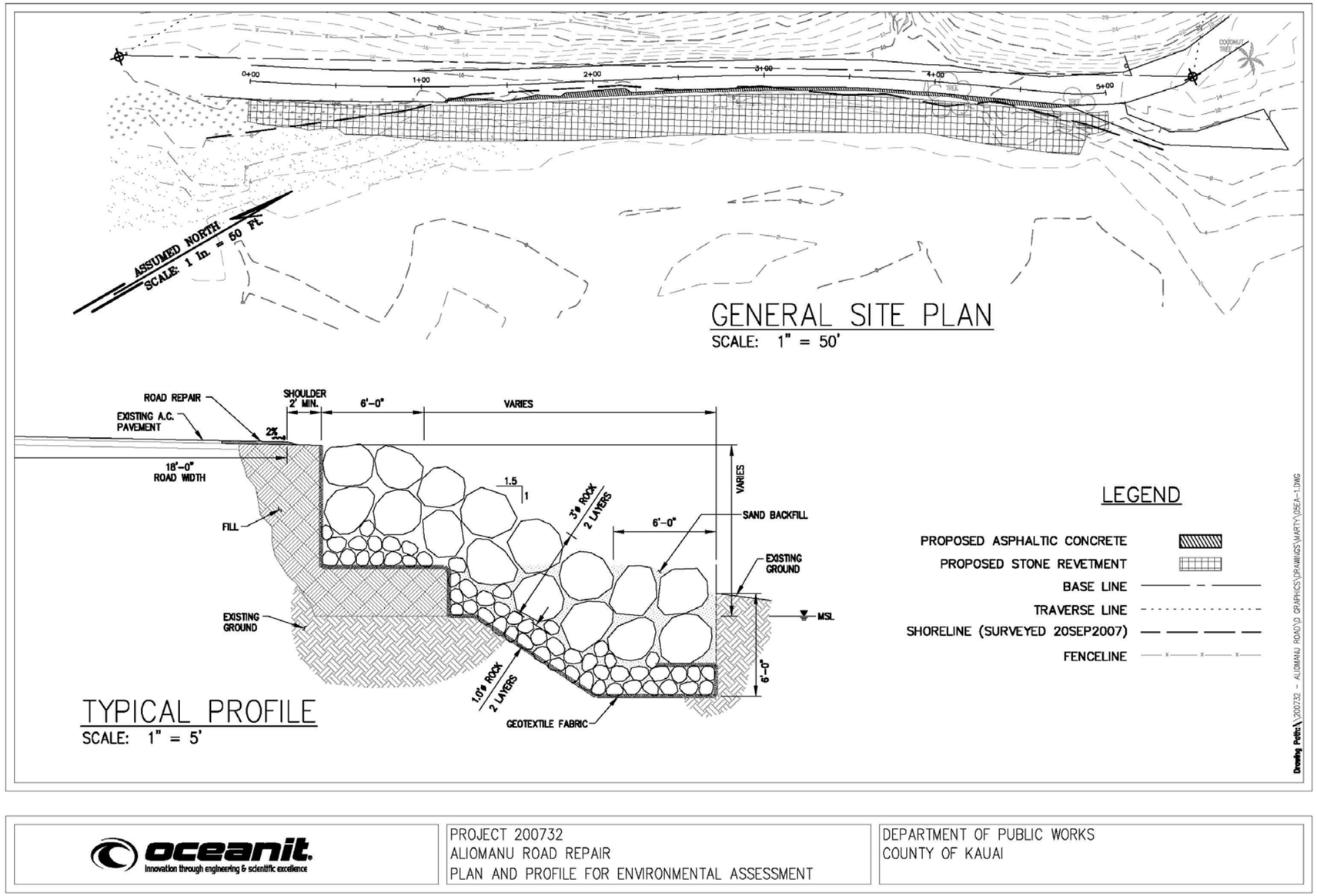

Figure 3-1. Plan and Profile of Road Repair and Rock Revetment

4 Physical, Biological and Cultural Environment

This chapter discusses the existing physical, biological and cultural environment in the vicinity of the project site and probable impacts and mitigation measures needed.

4.1 Climate, Topography, and Soils

The island of Kauai has a land area of about 555 square miles and is the fourth largest island in the Hawaiian island chain and is the northernmost and geologically the oldest of the major islands within the State (SCS, 1972). Kauai is a shield volcano and is classified as the Waimea Canyon volcanic series.

Kauai, like the other Hawaiian Islands, has a mild semi-tropical climate. The northeast trade winds blow approximately 80 percent of the time. During winter months, the trade winds are interrupted by cyclonic disturbances known as "Kona" storms where the wind direction is from the southeast.

The topography of the island rises from sea level to an elevation of 5,170 feet at Kawaikini Peak near the center of the island. The topography at the roadway site rises from sea level to about 10 feet mean sea level (msl).

The island of Kauai is made up of 10 soil associations. Soil association in the vicinity of the project site consists of the Lihue-Puhi soils (SCS, 1972). The Lihue-Puhi soils are well-drained soils with fine to moderately fine textured subsoil. Soils specific to the project site are Beaches (BS), Badland (BL), and Mokuleia fine sandy loam (Mr). Beaches consist mainly of light-colored sand derived from coral and seashells. These soils occur mainly along the coastline. The Mokuleia soils consist of well-drained soils found along the coastal plains and is adjacent to and mauka of the beach soils. The northern section of the roadway consists of Badland soils that are nearly barren with rapid runoff and geologic erosion is active.

4.1.1 Impacts

The repaired road and rock revetment are intended to prevent future erosion of the road and along the coastline. Thus, over time, the repaired road and revetment are intended to maintain the existing topography in the area and will have no adverse impacts.

Excavated material from the project site will be used as backfill material for the rock revetment. Therefore, no adverse impacts on the existing soils are expected.

4.1.2 Mitigation

No adverse impacts are expected on the climate, topography, or soils. Therefore, there are no mitigation measures.

4.2 Natural Hazards

Natural hazards consist mainly of tsunami, flooding, earthquakes, and hurricanes. The proposed roadway lies within the tsunami evacuation zone. Wave heights from the 1946 and 1960 tsunami were 18 and 6 feet, respectively. These wave heights would overtop the roadway.

According to the Flood Insurance Rate Map (FIRM), Aliomanu Road from Anahola Stream to Kuaehu Point is within the AE Zone with a flood elevation of 10 feet. The AE designation means that there is a 1% annual chance flood also known as the 100-year flood.

The island of Kauai has a low rating of Zone 1 for seismic activity from earthquakes. However, structures will be designed to comply with appropriate Federal and County design standards to minimize damage to structures similar to other construction projects.

Hurricanes cause damage with heavy rains, strong winds, and storm surge. Damage to the roadway and revetment from hurricane force winds and storm surge may be inevitable. However, the roadway and revetment will be designed and constructed in accordance with appropriate Federal and County standards.

4.2.1 Impacts

The new roadway is not expected to have an adverse impact on natural hazards. Conversely, the roadway is expected to have a positive effect because it will provide adequate access to properties north of the eroded roadway.

4.2.2 Mitigation

Since the project will not have an adverse impact on natural hazards, no mitigation is recommended. However, the roadway and revetment will be construction in accordance with appropriate Federal and County standards.

4.3 Aquatic Resources and Water Quality

A site visit was conducted by Oceanit civil engineer and field biologist personnel on May 8, 2008. Conditions on site during the survey were typical light trade winds and low surf with a brief rain shower shortly after 8 am. The survey was conducted during a falling tide with moderate waves breaking over the offshore fringing reef and continuing to the shoreline as small 1 to 2-foot irregular waves. Personnel conducted a visual reconnaissance of the shore-side of the site documenting findings with photographs. A nearshore survey of shallow water and tidepools was conducted by foot and using a face-mask and snorkel documenting the findings with underwater photographs. The path covered by the shallow water swim survey began from the small spit of sand to the east of the site and ran parallel to and about 100 feet off shore and outside of groups of partially submerged rocks, with a maximum depth of 4 feet and is depicted in Figure 1. The return leg of the survey was in the shallower surge zone about 30 feet from shore. The fringing reef, approximately 600 feet off shore was not visited.

The fringing reef, roughly 600 feet off shore, breaks the major trade-wind swells leaving only 1-2 foot waves and surge within the lagoon. The characteristics of the nearshore area are modulated by the

presence of a series of large rocks or up-lifted reef sections roughly 50 to 75 feet off shore of the beach and a pile of emergent rocks forming a minor point near the southern edge of the project. Input from local residents, confirmed by conversations with Federal Fisheries personnel, indicate that this rock pile has often served as a resting place for one or more Hawaiian Monk Seals (*Monachus schauinslandi).*

On the out leg of the survey path visibility was about 30-feet, but this decreased to near zero in the shallow surge zone on the return leg. The substrate along the outer transect consisted of a solid rock substrate covered mainly in crustose coralline algae, with patches of short macro algae including the green *Halimeda*. The short stature of the fleshy algae is indicative of a high energy surge environment. Patches of coarse sand were interspersed between rocky areas and within cracks and small holes in the benthic substrate. While the benthic substrate was generally flat, there was a basalt bench uplifted about 1.5 feet above the general surface. Occasional coral heads, mainly rose coral (*Pocillopora meandrina*, Figure 2) were seen on the flat rock substrate of the outer leg of the survey. Finger coral colonies (*Porites compressa*) with a maximum diameter of 10-inches were also observed on the outer leg of the survey where they were protected by up-lifted ledges or boulders. Percent coral cover on the outer leg of the survey was on the order of 5-percent. Fish observed included schools of small goatfish and a variety of small damsel fish and wrasses.

On the inner leg of the survey no corals were observed, and the benthic algae was less diverse, less abundant, and shorter in stature, presumably due to the increase wave energy and abrasion in this surge zone.

No sea turtles were observed on this visit, although it is likely that they frequent this shoreline. Fairly regular monk seal presence has been documented.

4.3.1 Impacts

With two exceptions noted below, the nearshore and land-side habitat adjacent to the project site do not support flora or fauna that is either highly endangered or of a uniquely high ecological value. The very nearshore area likely impacted by any revetment or other proposed shore structure does not support coral growth or habitat for any special or sensitive species. A limited number of corals are located about 100 feet or more off shore, outside the uplifted rocks in the surge zone, but it is unlikely that construction of a coastal revetment (presuming no in water concrete or accidental pollution event) would adversely impact these colonies. It is highly likely that three endangered species, two species of sea turtles (green: *Chelonia mydas*, and Hawksbill, *Eretmochelys imbricata*) could be present in the project area. Three monk seals are known to occasionally use the adjacent rocks as a haul-out resting location.

4.3.2 Mitigation

In the event that turtles are observed directly adjacent to the construction site, within range of danger from misplaced tumbling revetment rocks or construction equipment, construction should be stopped until the turtles leave the area. In the event that a monk seal is seen in the nearby surf or sunning on adjacent beaches, construction should also be stopped until the seal voluntarily leaves the area.

4.4 Botanical Resources

Dominant shoreline vegetation on the mauka side of the roadway is dominated by ironwood (*Casuarina equisetifolia*) and Naupaka (*Scaevola sericea*). On the makai side of the road, Naupaka and tree heliotrope (*Tournefortia argentea*) were the dominant species typically found on the upper beach zones.

4.4.1 Impacts

Since there were no state or federally listed threatened or endangered plant species in the vicinity of the project, no adverse impacts are expected. The area of the project site does not contain much vegetation.

4.4.2 Mitigation

There will be no impacts on threatened or endangered plant species, so no mitigation is required.

4.5 Avifaunal and Feral Mammals

The endangered Hawaiian monk seal was observed basking on the rocks just south of the project site. Several monks seals apparently visit this area and the National Oceanic and Atmospheric Administration (NOAA) are aware of the monks seal's presence in this area. No other endangered species were observed at the site. However, the Hawaiian Hoary Bat is commonly seen in this area and tends to forage at dawn and dusk during non-construction hours. No endangered water birds were seen in this vicinity.

4.5.1 Impacts

The Hawaiian monk seal does frequent this area and the Hawaiian Hoary Bat is common on the island of Kauai. There is no habitat available for endangered or threatened bird species at the site, so no adverse impacts are anticipated.

4.5.2 Mitigation

If the monk seal is in the vicinity of the project site during construction work will cease operations and the Department of Land and Natural Resources (DLNR) on Kauai and NOAA will be consulted to make a determination on whether the construction operations are disturbing the seal. If it is determined by the DLNR that the monk seal is disturbed, construction will cease until such time the monk seal leaves the site. No adverse impacts are expected on endangered or threatened birds, as none exists in the area.

To minimize impacts on the Hawaiian Hoary Bat during construction, work hours will be established to avoid the typical foraging periods at dawn and dusk.

4.6 Historic, Archaeological, and Cultural Resources

Consultation with the State Historic Preservation Office indicated that there are no known archaeological sites in the vicinity of the project site. However, subsurface cultural resources are always a possibility.

A field inspection and literature review was conducted by Cultural Surveys Hawaii in September 2008 and confirmed that there are no archaeological sites in the immediate area of the project. However, because the area does contain sand dunes, it was recommended that all subsurface work be monitored by an archaeologist in the event subsurface resources are uncovered.

A cultural impact assessment was also conducted by Cultural Surveys Hawaii in February 2009. Attempts were made to contact a total of 20 people and there were 13 respondents, four of which were interviewed. All four respondents interviewed indicated a concern for changes in wave action, affects on fish life, effects on the reef and continued erosion. Residents just north of the project area have constructed walls and revetments that led to erosion on a lot where the house is slipping into the ocean. Three of the interviewees mentioned connected the "other Aliomanu Road" to the north via the construction of a bridge. This alternative was explored, but the cost to build this bridge was very high and the topography was such that major land altering would be needed to build this bridge that services very few homes. Thus, it was not practical or cost effective to build this alternative. After evaluating all the alternatives, the rock revetment has the least impact on the environment and is the most cost effective.

Since the existing roadway is already in place, repair of the roadway and rock revetment will not have an adverse effect on cultural practices. The shoreline will still be available for hunting and gathering practices.

4.6.1 Impacts

No archaeological sites are anticipated at the site, therefore, no adverse impacts on historical or cultural resources are expected. Cultural practices at the site will be no different than existing conditions with the repaired roadway and rock revetment. However, archaeological monitoring is recommended during excavation operations in the event subsurface cultural resources are uncovered.

4.6.2 Mitigation

Should subsurface archaeological resources or burials be uncovered during construction, all work will cease and the Kauai/Niihau Burial Council and the Kauai Historical Society will be contacted to determine what appropriate mitigation measures are needed.

Repair of the road and new rock revetment is not expected to have any adverse impact on cultural practices in the area. The shoreline will still be accessible for hunting and gathering practices.

4.7 Visual Resources

Since the elevation of the roadway and rock revetment is approximately 10 feet below mauka lands, no visual obstructions are expected. Residents living mauka of the roadway will not be able to see the roadway and rock revetment.

4.7.1 Impacts

No adverse impacts are expected from the replacement of the road and revetment.

4.7.2 Mitigation

Since no adverse impacts from the road and rock revetment are expected, no mitigation is planned. However, landscaping using native plants like the naupaka could be used for additional soil stabilization and as a visual amenity.

4.8 Air Quality and Noise

The State Department of Health, Clean Air Branch, monitors ambient air in the State of Hawaii via 16 air monitoring stations on four islands. Oahu has nine monitoring stations, Big Island has five and there are one each on Maui and Kauai. The Environmental Protection Agency has set standards for six pollutants: 1) carbon monoxide; 2) nitrogen dioxide; 3) sulfur dioxide; 4) lead; 5) ozone; and 6) particulate matter ($PM_{2.5}$ and PM_{10}). Particulate matter is measured in microns. The subscript 2.5 and 10 represents microns in aerodynamic diameter. The State has also set standards for hydrogen sulfide because of the volcanic activity using the monitors on the Big Island. For the one monitor on Kauai, only PM_{10} is measured.

The State has set more stringent standards for nitrogen dioxide and carbon monoxide. The Federal standard for nitrogen dioxide is 100 ug/m^3 (micrograms per cubic meter of air) whereas the State standard is 70 ug/m^3. For Carbon Monoxide, the 1-hour Federal standard is 40,000 ug/m^3 and the State standard is 10,000 ug/m^3.

According to the 2006 annual summary none of these pollutants exceeded State or Federal standards in the last 5 years from 2002 to 2006. The State of Hawaii continues to be the one of the best in the nation in ambient air quality standards.

Noise pollution is regulated by the State Department of Health which has set specific decibel levels into three classes based on land use. Hawaii Administrative Rules Title 11, Chapter 46, Community Noise Control contains the specific sound levels in dBA and is shown in Table 1.

Table 4-1. Maximum Permissible Sound Levels in dBA

Zoning District	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
Class A	55	45
Class B	60	50
Class C	70	70

Class A zoning district are lands zoned residential, conservation, preservation, public space, open space, or similar type. Class B are lands zoned for multi-family dwellings, apartment, business, commercial, hotel, resort, or similar. Class C are lands zoned agriculture, country, industrial, or similar type. Since the roadway and revetment is located near a few residences, Class A has been identified as the standard to use for this assessment.

Noise levels cannot exceed the dBA identified above for more than 10 percent of the time within any twenty minute period, except by permit or variance. Impulsive noise shall be ten dBA above the maximum permissible sound levels. Impulsive noise includes activities such as hammering, pile driving, and explosion. Construction equipment with a motor and/or exhaust system shall operate with a muffler, except for pile hammers or pneumatic hand tools weighing less than fifteen pounds.

4.8.1 Impacts

In the immediate vicinity of the construction activities, short term impacts on air quality is anticipated from the movement and excavation of sand to build the roadway and revetment below the water level. Release of particulate matter is not expected to be excessive since most of the sand that will be removed will probably be wet. However, if the sand is stockpiled and dries before it is backfilled, particulate matter from the dried sand could become airborne.

Short term noise impacts are also associated with construction activity. Heavy equipment will be used to excavate the sand for the construction of the revetment. No pile driving is planned, therefore no impulsive noise will be generated.

4.8.2 Mitigation

The construction site will be watered down periodically to prevent particulate matter from becoming airborne during construction. Dust screens may also be used to protect the construction site from exposure to wind and to also minimize airborne particulate matter. Once the project is completed, the air quality in the area will not be different from the existing conditions.

Noise impacts will also be generated from construction equipment. Curfew times for construction will be established and mufflers will be used on equipment to minimize noise from construction equipment. Again these impacts are short term and will occur during construction. After construction is completed, no noise impacts will be generated by the project.

5 Social and Economic Factors

This section describes the social and economic environment of the Anahola area where the replacement road and rock revetment will be built. Factors such as demographic characteristics and economic context are described below.

5.1 Social Factors

Population of the County of Kauai was 58,463 people according to the 2000 census data. This represents only 5 percent of the total population of the State of Hawaii. Kawaihau district had a population of 18,525 people with Anahola town accounting for 1,932 people.

The average number of people per household on the island of Kauai in 2000 was 2.86 people. This average household size is lower than a decade earlier when the number of people per household was 3.09.

The largest ethnic population of Kauai is Asian with 21,042 people, followed by White with 17,255 people. Native Hawaiians are the third largest ethnic population with 5,334 people. These numbers represent people that declared one race on the census survey.

Housing units on Kauai in year 2000 totaled 25,331 compared to 460,542 units in the State. Owner occupied units totaled 12,384 units and renter occupied units totaled 7,799 unit. Vacant units totaled 5,148. Homeowner vacancy rate was 1.2 percent while the rental vacancy rate was 6.1 percent. The median value of housing units on Kauai in 2000 was $216,100.

5.1.1 Impacts and Mitigation

Reconstruction of the roadway and revetment is not expected to have adverse impacts on the social environment on Kauai. Thus no mitigation is planned.

5.2 Economic and Fiscal Factors

Civilian labor force for the island of Kauai in 2006 is estimated at 32,550 people. The labor force is comprised of persons 16 years of age and over. Kauai has the smallest labor force compared to the other three counties. Oahu has the highest with a labor force of 439,850 people. On Kauai 31,800 people in the labor force are employed. The unemployment rate is 2.3 percent. The average annual income is $31,390 on Kauai compared to $37,656 on Oahu.

Leisure and hospitality industry has the highest number of jobs at 8,550. These jobs include arts, entertainment, recreation, accommodation, food services, drinking places and full-service restaurants. The second highest job count was the Trade, Transportation, and Utilities industry with 6,150 jobs. These jobs include wholesale and retail trade, transportation, warehousing, air transportation and utilities. Government (Federal, State, and Local) accounted for the third highest job count of 4,250. The job count in the agricultural industry was in the bottom three lowest with 700 jobs.

There were 565 farms on Kauai in 2002 covering 151,828 acres. The average farm size was 269 acres. Farms between 1 to 9 acres were the most abundant with 352 farms followed by 127 farms between 10 to 49 acres. Crop lands totaled 474 acres with the remaining in livestock and poultry. Crop lands

include sugarcane, pineapple, fruits, vegetables, coffee, flowers, seed crops, nursery products, and macadamia nuts. Livestock include cattle and calves, hogs and pigs, and chickens.

5.2.1 Impacts

Long-term adverse impacts on the economy are not expected from the reconstruction of the roadway and rock revetment. Short term positive impacts are expected from direct and indirect employment and supplies needed to construct the roadway and revetment.

5.2.2 Mitigation

No mitigation is needed on the economic environment of the project since the project is relatively small and will have a short term positive impact on the economy.

6 Infrastructure, Public Facilities, and Utilities

This section describes the existing infrastructure, public facilities, and utilities in the vicinity of the project sites and any adverse impacts that the project will have. Water, wastewater, drainage, solid waste, transportation, electric, telephone, cable, medical, schools, police, and fire will be addressed in this section.

6.1 Water, Wastewater, Drainage, and Solid Waste

Services provided by the County of Kauai include water, wastewater, drainage, and solid waste. Water is managed by the Department of Water. In the Anahola area, the main water supply mains are installed along Kuhio Highway. Construction of the roadway and revetment will not impact the water supply or distribution systems in the area

Wastewater facilities are handled by the Department of Public Works. Sewer lines have been installed within the roadways. The project will not have an impact on the wastewater facilities.

Anahola Stream is the nearest drainageway located south of the roadway repair site. Replacement of the roadway and revetment will increase the amount of impervious surfaces. However, this increase in runoff is not significant enough to impact coastal waters.

The County maintains an island-wide system of solid waste collection and disposal. Kekaha Landfill is the primary disposal site for solid waste with refuse transfer stations located throughout the island. The new roadway and revetment is not expected to have an adverse impact on solid waste facilities. Rocks at the existing site will be used on the seaward face of the repaired roadway.

6.1.1 Impacts and Mitigation

The roadway repair and revetment is not expected to have an adverse impact on water, wastewater, drainage, or solid waste facilities. Therefore, no mitigation is planned.

6.2 Transportation

Kuhio Highway is the main vehicular access to this area and is under the jurisdiction of the State Department of Transportation. The construction of the roadway and revetment is not expected to have an impact on existing roadways since the construction site is located on the coastline and the road dead ends a few hundred feet north of the project site.

6.2.1 Impacts

Short term impact to area residents will occur during construction of the road repair and new revetment. After construction is completed, the traffic pattern in the area will be restored to normal conditions.

6.2.2 Mitigation

A traffic control plan will be prepared to mitigate any traffic congestion in the area during construction.

6.3 Power and Communications

Electricity is provided by Kauai Island Utility Cooperative, and Hawaiian Telephone and Sandwich Isles Communications provide telephone service. Oceanic Time Warner Cable provides cable TV service. The new roadway and revetment will not require electricity, telephones or cable service. Existing electric and telephone poles are located mauka of the site and will not be affected by the project.

6.3.1 Impacts and Mitigation

Since the project will not require electricity, telephone, or cable services, no impacts on these systems are expected and no mitigation is required.

6.4 Medical, Schools, Police, and Fire

Medical facilities in the area include Kauai Medical Clinic and Samuel Mahelona Memorial Hospital. Public schools include Kapaa Elementary, Kapaa Middle School, and Kapaa High School approximately 5 miles south of the site. A police substation is located along Niu Street and the nearest fire station is located on Kuhio Highway near Pouli Road. No effects on these facilities are expected from the project on these facilities.

6.4.1 Impacts and Mitigation

No impacts on medical, schools, police, and fire are expected. Thus no mitigation is required.

7 Conformance with Plans and Policies

This section will describe the relationship of the project to applicable State and County policies. Only those policies related to the proposed roadway repair and revetment will be described.

7.1 Hawaii State Plan and Functional Plans

The Hawaii State Plan was developed to serve as a guide for future development of the State of Hawaii in areas of population growth, economic benefits, enhancement and preservation of the physical environment, facility systems maintenance and development, and socio-cultural advancement. The Plan identifies, in general, the goals, objectives, policies and priorities for the development and growth of the State.

Twelve Functional Plans were also developed to further define the goals and objectives of the Hawaii State Plan. The twelve functional plans include: 1) Agriculture; 2) Conservation Lands; 3) Employment; 4) Energy; 5) Health; 6) Higher Education; 7) Historic Preservation; 8) Housing; 9) Recreation; 10) Tourism; 11) Transportation; and 12) Water Resources Development.

Functional plans that have a positive or adverse impact from the proposed roadway repair and revetment are Employment, Historic Preservation, and Transportation.

7.1.1 Employment Functional Plan

The major issues of concern for the Employment Functional Plan are:

1) Improve the qualifications of entry-level workers and their transition to employment;

2) Develop and deliver education, training and related services to ensure and maintain a quality and competitive workforce;

3) Improve labor exchange;

4) Improve the quality of life for workers and families; and

5) Improve planning of economic development, employment and training activities.

Construction of the project will have a short-term positive impact on employment by providing direct and indirect jobs. After construction is completed, no new jobs will be created.

7.1.2 Historic Preservation Functional Plan

The issues of concern in the Historic Preservation Function Plan are:

1) Preservation of historic properties;

2) Collection and preservation of historic records, artifacts and oral histories and perpetuation of traditional skills; and

3) Public information and education on the ethnic and cultural heritages and history of Hawai`i.

If any subsurface cultural resources are uncovered during construction, work will cease and the Kaua`i Historic Preservation Office will be consulted. An archaeologist is also recommended to be on site during excavation activities of the project in the event subsurface cultural resources are uncovered.

7.1.3 Transportation Functional Plan

The major issues of concern in the Transportation Functional Plan are:

1. Transportation congestion and infrastructure deficiencies.

2. Relationships between transportation facilities and economic development.

3. Infrastructure development lagging behind population, employment and economic growth

This project relates directly with the Transportation Functional Plan in that it strives to provide a safe movement of people and goods for residents in the Anahola area. With the existing eroded roadway, only one-way traffic is possible in both directions. Vehicles must yield to oncoming traffic in both directions as the road is wide enough for only one vehicle. This narrowed section of the road also poses a dangerous condition for emergency vehicles such as the Fire Department vehicles.

7.2 Kaua‘i General Plan

The Kaua`i General Plan is the guiding document for Ordinance No. 753, Bill No. 1957, Chapter 7, and HRS Chapter 46. It provides the framework for land use regulations, the location and character of new development and facilities, and planning for County and State facilities and services.

The island of Kaua`i was divided up into five planning districts: 1) North Shore; 2) Kawaihau; 3) Līhue; 4) Kōloa-Po`ipū-Kalāheo; and 5) West Side. The project site is located in the Kawaihau planning district. One of the major components of the plan was the development of Heritage Resources Map and the Land Use Map for each district. The heritage resources map identifies known historic, scenic, and other unique qualities of the district. The land use map identifies the future land use vision for development in the district.

The heritage map shows that the project site is in the “Residential, Urban Center” designation and surrounded by “Open Space, Parks, Agriculture, Conservation” lands. There is one “Other Important Historic Building” located between Kuhio Highway and Anahola Stream mouth. However, the site will not be affected by the construction of the roadway and revetment. The land use map also shows “Residential Community” designation immediately along the coastline with “Agricultural” mauka of the residential lands. Construction of the roadway and revetment will not change the land use designations along Aliomanu road.

8 Significance Criteria

To determine whether a proposed action may have a significant effect on the environment, it needs to consider every phase of the action, the expected primary and secondary consequences, and the cumulative as well as the short and long-term effect of the action. Therefore, evaluation of the significance criteria determines if there are any significant impacts on the environment. The following states the criteria used to determine significant impacts and a description of the impact, if any.

(1) Involves an irrevocable commitment to loss or destruction of any natural or cultural resource;

The project will not result in the irrevocable commitment to loss or destruction of any natural or cultural resource. However, if subsurface cultural resources are uncovered during construction, work will cease and the Kaua`i Historical Society will be contacted.

(2) Curtails the range of beneficial uses of the environment;

The new revetment will not curtail beneficial uses of the existing environment. Conversely, the revetment will preserve the beneficial uses of the environment by preventing the coastline from eroding into the ocean from waves and currents. The project will also allow continued recreational use of the coastline for hunting and gathering activities.

(3) Conflicts with the state's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders;

The project will not conflict with the State's long-term environmental policies or goals and guidelines as expressed in chapter 344, HRS. Evaluation of the construction activities described in this EA show that the project will not have long-term negative impacts. Short-term impacts will occur during construction from noise and dust. However, these impacts can be mitigated by the use of mufflers on equipment and frequent watering of the project site. Best management practices will also be implemented during the construction phase.

(4) Substantially affects the economic or social welfare of the community or state;

The project will have a short-term positive effect on the economy from jobs and increased revenue during construction. However, after construction the revetment will not affect the economy. The project also will not affect the social welfare of the community or the state. Conversely, it will help the social welfare of the community by providing a safe access to residents north of the eroded roadway.

(5) Substantially affects public health;

Construction of the revetment will protect the roadway that provides access to residents north of the site. The result should be a positive effect on public health.

(6) Involves substantial secondary impacts, such as population changes or effects on public facilities;

The new revetment will have no impact on population changes, but will make the roadway safer and less likely to collapse again in the future.

(7) Involves a substantial degradation of environmental quality;

The revetment will not contribute to a substantial degradation of environmental quality.

(8) Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions;

The project is not part of a larger action and will not contribute to cumulative effects upon the environment.

(9) Substantially affects a rare, threatened, or endangered species, or its habitat;

The endangered Hawaiian Hoary Bat is known to forage in the area. These mammals forage at dawn and dusk, which is before and after the construction operations. After construction completion, the revetment will have no affects on the endangered bat.

Should a monk seal haul itself out on the beach near the construction site, construction will cease until the Kauai representative of the Department of Land and Natural Resources makes a determination on whether the construction activities are disturbing the monk seal. If so, work will commence after the monk seal has left the area.

There were no threatened, rare or endangered botanical resources in the vicinity of the project. Therefore, no negative impacts on plants are expected during or after construction.

(10) Detrimentally affects air or water quality or ambient noise levels;

Short-term impacts on air quality and noise levels will occur during construction. However, once the construction is completed, no long-term affects on air quality and noise level will occur.

Revetment construction may temporarily increase turbidity in nearshore waters. Best management practices will be implemented to minimize the effects of turbidity or other pollutants.

(11) Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters;

The planned new revetment and adjoining beach are within the tsunami inundation area and within the coastal flood zone where storm wave action can be a hazard. The beach occurs naturally at this location. The threat from erosion and coastal flooding is no different from that facing the existing roadway. By replacing the existing damaged road and including a rock revetment, the potential for damage to the structure and roadway is reduced.

(12) Substantially affects scenic vistas and viewplanes identified in county or state plans or studies;

The revetment is not within an identified view plane. Residents and visitors to the area will continue to have a view of the ocean as no vertical structure is planned to obscure scenic views.

(13) Requires substantial energy consumption.

The new revetment is not dependent on electricity and will not have an impact on energy consumption. Short-term energy consumption will occur during construction from the operation of equipment. However, once construction is completed, no energy consumption will be needed.

8.1 Anticipated Determination

A Finding of No Significant Impact (FONSI) determination is anticipated for the project based upon the information provided in this EA document. The results of the assessments conducted have determined that there will be no significant negative impact from the repair of the road and installation of the new rock revetment.

9 Permits and Approvals

This section lists the anticipated permits and approvals that will be required to repair the roadway and construct the new rock revetment. The project is along the coastline and is within the conservation district, therefore a Conservation District Use Permit will be required.

9.1 Permits Required

Table 9.1 lists the permits required.

Table 9.1 – Permits Required

Permit	Agency Approval
Special Management Area	County of Kaua`i Planning Department
Shoreline Setback Variance	County of Kaua`i Planning Department
Conservation District Use Permit	Department of Land and Natural Resources, Office of Conservation and Coastal Lands
404 Clean Water Act	Corps of Engineers
401 Water Quality Certification Permit	Department of Health, Clean Water Branch

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Appendix A

Terrestrial and Aquatic Assessment

Terrestrial and Aquatic Survey For Aliomanu Road Repair Anahola, Kauai, Hawai'i

Department of Public Works
County of Kauai

Prepared by:
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June 2008

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1.1 Introduction

The County of Kauai is planning for the repair of a portion of Aliomanu Road where the roadway is collapsing due to shoreline erosion. The project site is located on the eastern shore of Kauai at the northern portion of Anahola Bay. This biological survey was conducted in support of an Environmental Assessment report concerning the proposed repairs to the roadway and installation of a coastal structure to protect the repaired road. The purpose of this survey was to characterize the nature of the shoreline and nearshore flora and fauna in the vicinity of the project, to report any unique or valuable species that may be adversely impacted by the project, and to recommend mitigation efforts if appropriate.

1.2 Methods

A site visit was conducted by Oceanit civil engineer and field biologist personnel on May 8, 2008. Conditions on site during the survey were typical light trade winds and low surf with a brief rain shower shortly after 8 am. The survey was conducted during a falling tide with moderate waves breaking over the offshore fringing reef and continuing to the shoreline as small 1 to 2-foot irregular waves. Personnel conducted a visual reconnaissance of the shore-side of the site documenting findings with photographs. A nearshore survey of shallow water and tidepools was conducted by foot and using a face-mask and snorkel documenting the findings with underwater photographs. The path covered by the shallow water swim survey began from the small spit of sand to the east of the site and ran parallel to and about 100 feet off shore and outside of groups of partially submerged rocks, with a maximum depth of 4 feet and is depicted in Figure 1. The return leg of the survey was in the shallower surge zone about 30 feet from shore. The fringing reef, approximately 600 feet off shore was not visited.

1.3 Results

The two lane roadway asphalt surface averaging 18 feet in width runs immediately adjacent to the shoreline from Kuaheo Point south approximately 0.5 mile along Anahola Beach until it turns inland at the stream mouth. The elevation of the road surface varies from about 5 to 10 feet above MSL and is backed on the inland side by private lands with elevations of 35 to 40 feet. The sand beach adjacent to the northernmost approximately 500 feet of this roadway, has eroded to the edge of the road displacing boulders into the surge zone. The asphalt road surface along this northern section displays cracks in several locations and barriers have been erected adjacent to seriously eroded and undercut sections.

Dominant shoreline vegetation on the mauka side of the roadway is dominated by ironwood (*Casuarina equisetifolia*) and Naupaka (*Scaevola sericea*). On the makai side of the road, Naupaka and tree heliotrope (*Tournefortia argentea*) were the dominant species typically found on the upper beach zones.

The fringing reef, roughly 600 feet off shore, breaks the major trade-wind swells leaving only 1-2 foot waves and surge within the lagoon. The characteristics of the nearshore area are modulated by the presence of a series of large rocks or up-lifted reef sections roughly 50 to 75 feet off shore of the beach and a pile of emergent rocks forming a minor point near the southern edge of the project. Input from local residents, confirmed by conversations with Federal Fisheries personnel, indicate that this rock pile has often served as a resting place for one or more Hawaiian Monk Seals (*Monachus schauinslandi).*

On the out leg of the survey path visibility was about 30-feet, but this decreased to near zero in the shallow surge zone on the return leg. The substrate along the outer transect consisted of a solid rock substrate covered mainly in crustose coralline algae, with patches of short macro algae including the green *Halimeda*. The short stature of the fleshy algae is indicative of a high energy surge environment. Patches of coarse sand were interspersed between rocky areas and within cracks and small holes in the benthic substrate. While the benthic substrate was generally flat, there was a basalt bench uplifted about 1.5 feet above the general surface. Occasional coral heads, mainly rose coral (*Pocillopora meandrina*, Figure 2) were seen on the flat rock substrate of the outer leg of the survey. Finger coral colonies (*Porites compressa* Figure 4) with a maximum diameter of 10-inches were also observed on the outer leg of the survey where they were protected by up-lifted ledges or boulders. Percent coral cover on the outer leg of the survey was on the order of 5-percent. Fish observed included schools of small goatfish and a variety of small damsel fish and wrasses.

On the inner leg of the survey no corals were observed, and the benthic algae was less diverse, less abundant, and shorter in stature, presumably due to the increase wave energy and abrasion in this surge zone.

No sea turtles were observed on this visit, although it is likely that they frequent this shoreline. Fairly regular monk seal presence has been documented.

1.4 Conclusions and Recommendations.

With two exceptions noted below, the nearshore and land-side habitat adjacent to the project site do not support flora or fauna that is either highly endangered or of a uniquely high ecological value. The very nearshore area likely impacted by any revetment or other proposed shore structure does not support coral growth or habitat for any special or sensitive species. A limited number of corals are located about 100 feet or more off shore, outside the uplifted rocks in the surge zone, but it is unlikely that construction of a coastal revetment (presuming no in water concrete or accidental pollution event) would adversely impact these colonies. It is highly likely that three endangered species, two species of sea turtles (green: *Chelonia mydas*, and Hawksbill, *Eretmochelys imbricata*) could be present in the project area. Three monk seals are known to occasionally use the adjacent rocks as a haul-out resting location. In the event that turtles are observed directly adjacent to the construction site, within range of danger from misplaced tumbling revetment rocks or construction equipment, construction should be stopped until the turtles leave the area. In the event that a monk seal is seen in the nearby surf or sunning on adjacent beaches, construction should also be stopped until the seal voluntarily leaves the area.

Figure 1 – Area studied in this survey. Approximate project area is within the linear markings. The loop represents the course of the in-water survey, dots indicating photo-points, solid lines indicating video recording.

1. Benthic algae mat over hard substrate nearshore at northern extent of project site.

2. Rose coral (*Pocillopora meandrina*) on uplifted hard substrate approximately 75 feet off shore.

3. Mixed algae mat, including green *Halimeda* species, located approximately 75 feet offshore.

4. Finger coral (*Porites compressa*) colonies in crevasse protected by larger rocks and uplifted benches approximately 100 feet off shore in3-4 feet of water.

5. Sea cucumber (*Actinopyga mauritiana*)

6. View of the project site and coastline from the north, facing south. Also the starting point for the revetment.

7. A tree heliotrope (*Tournefortia argentea*) individual recently topple due to erosion.

8. Ironwood (*Casuarina equisetifolia*) and Naupaka (*Scaevola sericea*) on the right dominate the mauka portions of the project site. On the makai side of the road (left upper), Naupaka and tree heliotrope (*Tournefortia argentea*) can be observed.

Appendix B

Achaeological Assessment Report

Final
Archaeological Assessment for the ‘Aliomanu Road Repair Project, Anahola Ahupua‘a, Kawaihau District, Kaua‘i TMK: [4] 4-8-018:029, 999

Prepared for

Oceanit

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Management Summary

Reference	Archaeological Assessment for the ‘Aliomanu Road Repair Project, Anahola Ahupua‘a, Kawaihau District, Kaua‘i, TMK: [4] 4-8-018:029, 999 (Groza et al. 2009)
Date	March 2009
Project Number (s)	Cultural Surveys Hawai‘i Inc. (CSH) Project Code: ANAHOLA 1
Investigation Permit Number	CSH presently conducts archaeological work under archaeological permit number 09-20 issued by the State of Hawai‘i Department of Land and Natural Resources / State Historic Preservation Division (DLNR / SHPD)
Project Location	The project area is generally south of Kuaehu Point, east of Kūhiō Highway, north of Anahola Bay, and west of the ocean. Specifically the project is the section of ‘Aliomanu Road that has been damaged by high surf and is shown on Figure 1. These repairs will only involve the road and the filled area *makai* of the road, but will not intrude into the area *mauka* of the road.
Land Jurisdiction	State of Hawai‘i
Agencies	State Historic Preservation Division/Department of Land and Natural Resources (SHPD/DLNR)
Project Description	The proposed project includes the repair of an approximately 350 meter long portion of ‘Aliomanu Road, coastal Anahola Ahupua‘a, and the construction of a shoulder and wall *makai* (east) of the road
Project Acreage	This portion of ‘Aliomanu Road runs approximately 350 linear meters and the project area is approximately 0.29 acres.
Area of Potential Effect (APE) and Survey Acreage	The Area of Potential Effect is understood as the parcel (TMK: [4] 4-8-018:029, 999) in which the repair of the ‘Aliomanu Road may impact cultural deposits.

Historic Preservation Regulatory Context	At the request of Oceanit, CSH conducted an archaeological inventory survey investigation for the proposed ‘Aliomanu Road Repair Project. Per the requirements of Hawai‘i Administrative Rules (HAR) Chapter 13-13-276, the study was conducted to identify, document, and make Hawai‘i Register of Historic Places (Hawai‘i Register) eligibility recommendations for the survey area’s historic properties. Because no historic properties were identified in the survey area, this investigation is termed an archaeological assessment per HAR Chapter 13-13-275-5. This archaeological assessment report was prepared to support the proposed project’s historic preservation review under Hawai‘i Revised Statutes (HRS) Chapter 6E-8 and HAR Chapter 13-13-275. This archaeological assessment report was prepared to support the proposed project’s historic preservation review and any other project-related historic preservation consultation.
Fieldwork Effort	The CSH field crew included two CSH archaeologists, Gerald Ida, B.A. and Nancine “Missy” Kamai, B.A., under the general supervision of Hallett H. Hammatt, Ph.D. Fieldwork was conducted on August 22, 2008 and required 2 person days to complete.
Number of Historic Properties Identified	None
Effect Recommendation	No historic properties were identified within the approximately 350 meter long survey area. CSH’s effect recommendation for the proposed ‘Aliomanu Road Repair Project is “no historic properties affected.”
Mitigation Recommendation	An archaeological monitoring program is recommended since the project area is underlain by Beaches (BS) (Foote et al. 1972). On several Hawaiian islands, and indeed throughout the windward coast of Kaua‘i, traditional Hawaiian burials have been documented in Beaches and Jaucas sands. Monitoring during all subsurface activities is recommended. On-call monitoring may subsequently be appropriate based on monitoring results and consultation with SHPD (State Historic Preservation Division).

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Section 1 Introduction

1.1 Project Background

At the request of Oceanit, 828 Fort St. Mall, Honolulu, HI 96813, Cultural Surveys Hawai‘i Inc. (CSH) completed an archaeological assessment for the proposed ‘Aliomanu Road Repair Project, Anahola Ahupua‘a, Kawaihau District, Kaua‘i, TMK: [4] 4-8-018:029, 999. The proposed project consists of the repair of an approximately 350 meter long portion of ‘Aliomanu Road and the construction of a shoulder and wall *makai* (east) of the road.

The project area is generally south of Kuaehu Point, east of Kūhiō Highway, north of Anahola Bay, and west of the ocean. Specifically the project is the section of ‘Aliomanu Road that has been damaged by high surf. These repairs will only involve the road and the filled area *makai* of the road, but will not intrude into the area *mauka* of the road as depicted on the 1998 US Geological Survey Topographic map (Figure 1), a tax map (Figure 2), and on a modern aerial photograph (Figure 3).

At the request of Oceanit, CSH conducted an archaeological inventory survey investigation for the proposed ‘Aliomanu Road Repair Project. Per the requirements of Hawai‘i Administrative Rules (HAR) Chapter 13-13-276, the study was conducted to identify, document, and make Hawai‘i Register of Historic Places (Hawai‘i Register) eligibility recommendations for the project area’s historic properties. Because no historic properties were identified in the project area, this investigation is termed an archaeological assessment per HAR Chapter 13-13-284-5. This archaeological assessment report was prepared to support the proposed project’s historic preservation review under Hawai‘i Revised Statutes (HRS) Chapter 6E-8 and HAR Chapter 13-13-275. This archaeological assessment report was prepared to support the proposed project’s historic preservation review and any other project-related historic preservation consultation.

1.2 Scope of Work

The scope of work for this investigation includes:

1. Historical and previous archaeological background research to include study of archival sources, historic maps, Land Commission Awards and previous archaeological reports to construct a history of land use and to determine if archaeological sites have been recorded on or near this property.
2. Field inspection of the project area to identify any surface archaeological features and to investigate and assess the potential for impact to such sites. This assessment will identify any sensitive areas that may require further investigation or mitigation before the project proceeds.
3. Preparation of a report to include the results of the historical research and the fieldwork with an assessment of archaeological potential based on that research, with recommendations for further archaeological work, if appropriate. It will also provide

mitigation recommendations if there are archaeologically sensitive areas that need to be taken into consideration.

Figure 1. Portion of US Geological Survey Topographic Map, Anahola Quad (1998), showing location of area of proposed work

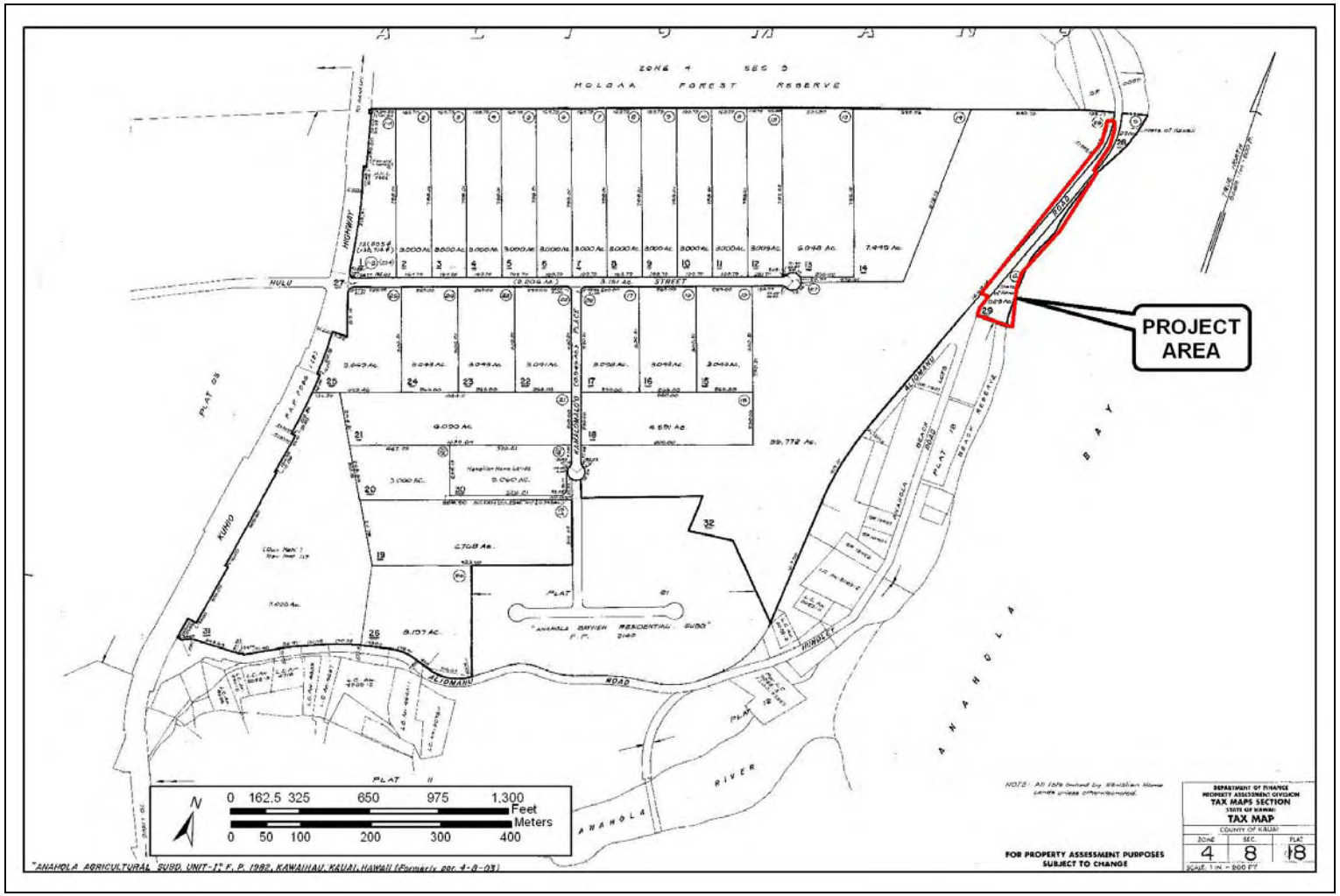

Figure 2. Tax map (4-8-018) with overlay of area of proposed work

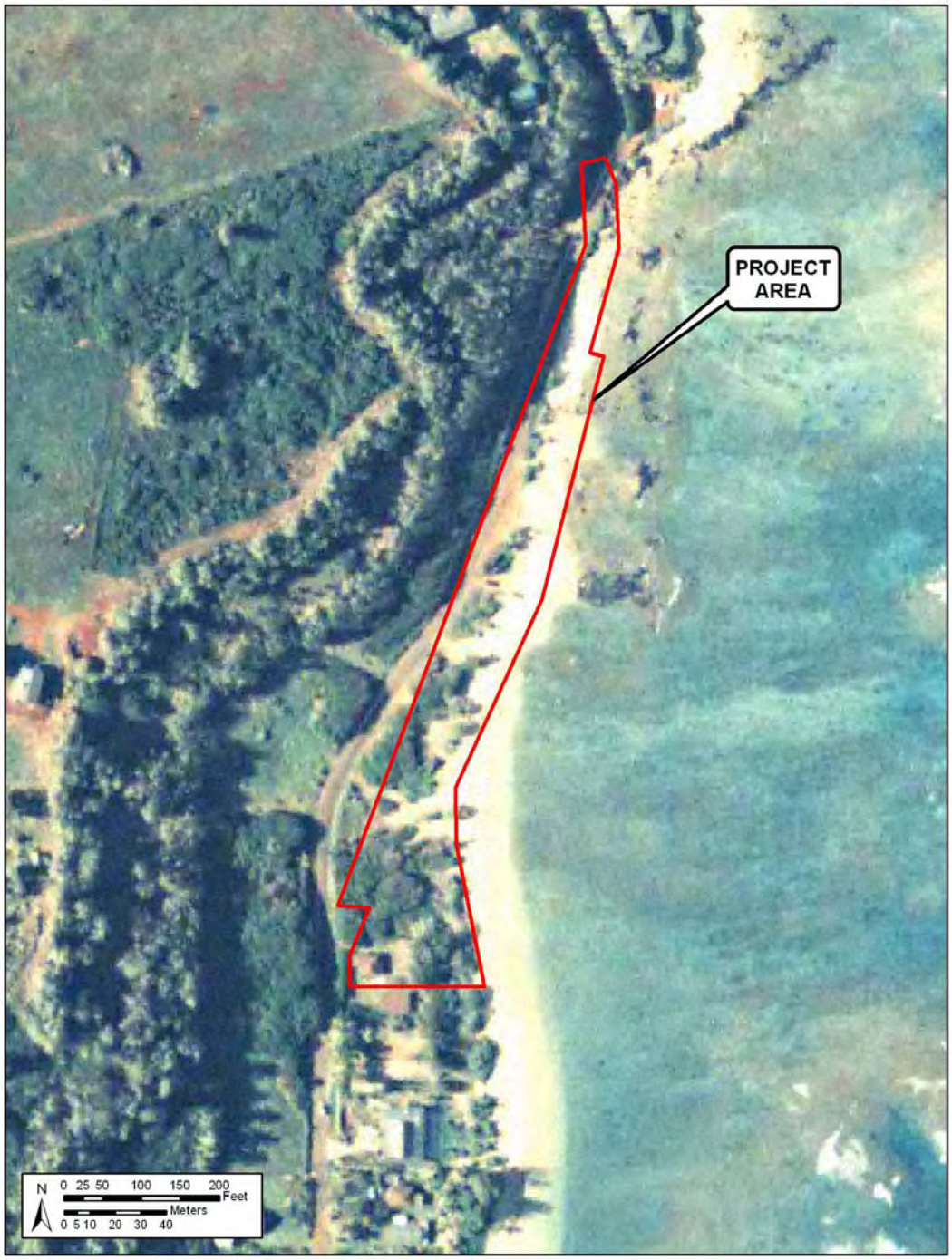

Figure 3. Aerial photograph, with overlay of area of proposed work

1.3 Environmental Setting

1.3.1 Natural Environment

The proposed project area is in the northeastern-most portion of Anahola, and on the northeast coast of Kaua‘i. Anahola is in the district of Kawaihau, traditionally called Ko‘olau. Anahola Ahupua‘a, comprised of 6,327 acres is the largest of the *ahupua‘a* within the district. The *ahupua‘a* also contains the largest river in the district, Anahola River, that was previously surrounded by numerous agricultural terraces. Handy and Handy (1972:422) measured the cultivation surrounding Anahola River as 1,200 meters wide.

The project area ranges in elevation from sea level to approximately 20 feet above mean sea level. Annual rainfall along the Ko‘olau coast ranges from 25 to 150 inches (Armstrong 1973). Dunes and alluvial benches adjacent to the Anahola River characterize the coastal region of Anahola and overlie Koloa Volcanic Series lavas that are approximately 1.5 million years old (Macdonald and Abbott 1970).

Soil within the project area consists of Beaches (Figure 4). Beaches (BS) occur as sandy, gravelly, or cobbly areas on all the Hawaiian Islands. They are washed and rewashed by ocean waves. The beaches consist mainly of light-colored sands derived from coral and seashells, although a few beaches are dark colored because their sands are from basalt and andesite (Foote et al. 1972). Burials have been found within beaches sand throughout the islands.

Very little vegetation is present within the project area since most of the area consists of an asphalt road with areas of exposed road grade, and the beach.

1.3.2 Built Environment

The project area contains a portion of ‘Aliomanu Road. There are no structures within the project area.

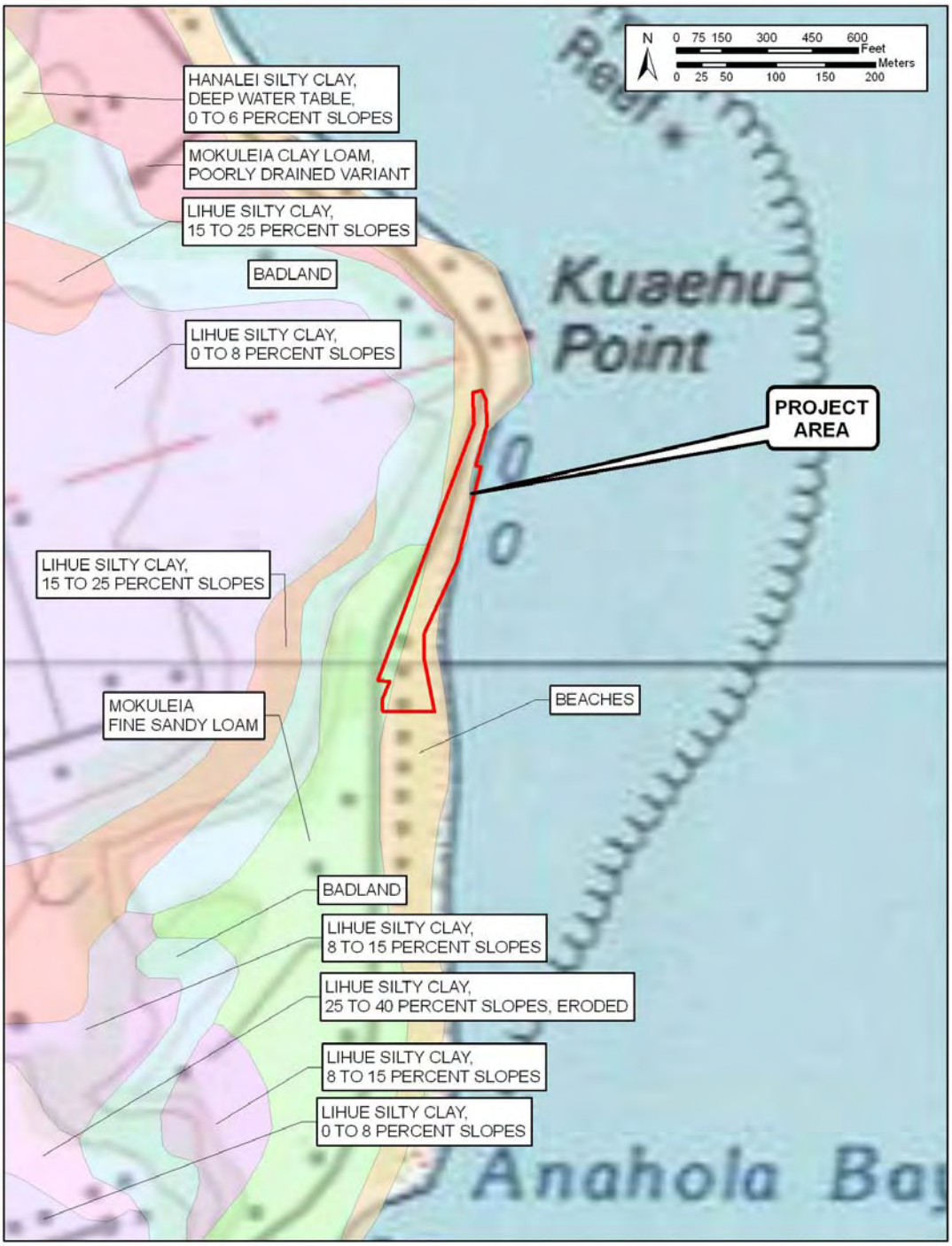

Figure 4. Overlay of the Soil Survey of the State of Hawai‘i (Foote et al. 1972), indicating the soil type within the project area

Section 2 Methods

2.1 Field Methods

The fieldwork component of this archaeological assessment was accomplished on August 22, 2008 by two CSH archaeologists, Missy Kamai, B.A. and Gerald Ida, B.A. under the general supervision of Hallett H. Hammatt, Ph.D (principal investigator). The fieldwork required approximately two person-days to complete and consisted of a complete pedestrian inspection of the area of the proposed ‘Aliomanu Road Repair Project.

Fieldwork consisted of a 100% coverage pedestrian inspection along the shoreline adjacent to ‘Aliomanu Road. The pedestrian inspection of the project area was accomplished by inspecting the wave-cut bank beneath the road. The interval between the archaeologists was generally less than 5 m.

2.2 Document Review

Background research included: a review of previous archaeological studies on file at SHPD/DLNR; review of documents at Hamilton Library of the University of Hawai‘i, the Hawai‘i State Archives, the Mission Houses Museum Library, the Hawai‘i Public Library, and the Archives of the Bishop Museum; study of historic photographs at the Hawai‘i State Archives and the Archives of the Bishop Museum; and study of historic maps at the Survey Office of the Department of Land and Natural Resources. Historic maps and photographs from the CSH library were also consulted. In addition, Māhele records were examined from the Waihona ‘Aina database (www.waihona.com).

This research provided the environmental, cultural, historic, and archaeological background for the project area. The sources studied were used to formulate a predictive model regarding the expected types and locations of historic properties in the project area.

Section 3 Background Research

Anahola was named after a *mo‘o* or lizard who changed forms; in the ocean he was a merman, and on land, a man. Another *mo‘o*, Pehu-iki, was the guardian of the pond at the mouth of Anahola River called Alaweo. The pond was named after the native goosefoot shrub growing on the pond’s banks. Pehu-iki is said to have had three daughters who were often seen sitting on the banks of Alaweo pond combing their long hair. The four *mo‘o* slept in the cave of Hāhā-lina, “to grope through the stickiness” (Wichman 1998:90-91).

The *ahupua‘a* of ‘Aliomanu (lit. “scar made by birds”) lies to the north and the *ahupua‘a* of Kamalomalo‘o (lit. “dry loincloth”) to the south. The northern boundary of the *ahupua‘a* is at Kuaehu Point (lit. “silent, still, lonely”) just north of the project area, and the southern boundary of the *ahupua‘a* is at Lae Līpoa (lit. “*līpoa* seaweed point”). Coastal zones similar to the project area were traditionally utilized for marine resources, habitation, burials, and ceremonial structures that were often associated with fishing (Bennett 1930).

Clark (2002:12) describes ‘Aliomanu Beach and reef just to the north of the project area. This narrow calcareous sand beach is fronted by a long, wide, shallow reef that is famous for its *limu*.

> The reef is one of the island’s famous seaweed harvesting sites for *limu kohu*, or *Asparagopsis taxiformis*. This prized edible seaweed is found elsewhere in Hawai‘i, but local consumers believe the best *limu kohu* comes from Kaua‘i and specifically from the reefs at ‘Aliomanu, Ka‘aka‘aniu, and Pīla‘a. Commercial harvesting on these reefs has for generations been the domain of a small group of Hawaiian families from Anahola and Moloa‘a, the communities closest to the reefs. *Limu kohu* grows at the edge of the reef where there is a constant flow of water from breaking waves. After it is harvested and cleaned, it is soaked overnight in fresh water to reduce its iodine flavor, drained, and lightly salted. If it is to be sent to market, it is rolled into tight balls. Hawaiians differentiate between *limu kohu līpehe*, a milder flavored light red variety, and *limu kohu koko*, a stronger flavored dark red variety. (Clark 2002:12).

3.1 Historical Background

Much of the knowledge of traditional land use patterns is based on recorded information during the early post-contact period and later oral reports. Although few early visitors reported on Anahola, traditional Hawaiian economy was based on agricultural production, marine exploitation, livestock raising, and wild plant and bird collection.

3.1.1 Late 1700s – 1850

Early reports relate that Anahola was a small village surrounded by fertile fields.

George Vancouver (1798:221-223) examined the east coast of the island from his ship in 1793 and stated that it was the “most fertile and pleasant district of the island . . .” However, he did not anchor or go ashore due to inhospitable ocean conditions.

In 1840, Peale and Rich, with Charles Wilkes' United States Exploring Expedition (1844), traversed the coastline on horseback heading north from Wailua:

> The country on the way is of the same character as that already seen. They passed the small villages of Kuapau [Kapa‘a], Keālia, Anehola [Anahola], Mowaa, and Kauharaki, situated at the mouths of the mountain streams, which were closed with similar sand-bars to those already described. These bars afforded places to cross at, though requiring great precaution when on horseback. The streams above the bars were in most cases, deep, wide, and navigable a few miles for canoes. Besides the sugarcane, taro, etc., some good fields of rice were seen. The country may be called open; it is covered with grass forming excellent pasture-grounds, and abounds in plover and turnstones, scattered in small flocks [Wilkes 1845:69].

In 1849 William Patterson Alexander toured the island of Kaua‘i and described Anahola as:

> ...chequered with kalo patches, and studded with houses ... a delightful view from the south side. The Anahola river, one of the finest on the island, flows through the valley, and spreading near its mouth into a broad sheet of water, surrounds a little islet which has a romantic appearance [Alexander 1991:123].

3.1.2 Early Population Estimates

Missionaries began taking censuses in Hawai‘i in 1823, although Anahola's population was not counted until 1847. The population at that time was 280 people, and thus it was the second most populated *ahupua‘a* on the northern shores of Kaua‘i. However, the drastic depopulation of the Hawaiian Islands following the introduction of Western disease has been documented in a number of sources (Bingham 1847; Stannard 1989; Bushnell 1993). According to one estimate, the population of Hawaiians and part-Hawaiians fell from approximately 300,000 in 1778 to 82,593 by 1850 (Schmitt 1968:43, 74). Therefore, the population of Anahola prior to the first census was likely significantly higher.

3.1.3 Māhele Records

During the 1848 privatization of land in Hawai‘i known as the Māhele, 86 individual *kuleana* claims were submitted and 64 claims were granted in Anahola (Table 1). No individual *kuleana* Land Commission Awards (LCA) were awarded in the current project area. Most of the awards are in the delta area or within close proximity to Anahola River with the majority of the ahupua‘a held by the crown (Indices 1929).

Māhele records are an important resource for determining land-use during the first half of the 19th century. In general, Anahola claims included *lo‘i kalo*, *wauke* (*Broussonetia papyrifera*), and *noni* (*Morinda citrifolia*). Additional parcels were used for house lots, ponds, and some *māla* of *noni* and *wauke*. The claims for *lo‘i* (wet land) and *kula* (dry land) suggest that people were producing a wide range of crops such as yams, sweet potatoes, and squashes. These crops were likely being sold or traded. House lots were for the most part located on the coast with *lo‘i*

Table 1. Land Commission Award Claims Granted in Anahola

LCA #	Claimant	‘Ili	Land Use	Awarded
00440!	Pua‘ahinehune			No
0069*K	Kaehu, J. W.			No
03030	Kawaimakanui	Palawai, Pauko	House lot	Yes
03411B	Paupau	Kalaiula, Hope	Lo‘i or mo‘o, house lot	Yes
04406!	Pa‘a			No
04526	Opae	Keawaakaehu Keakaawaehu	Lo‘i, Wauke, ‘Āpana	Yes
04530	Ohao	Puoio,Kapahupoko, Kawaikapu	Lo‘i,Wauke, House lot	Yes
04535	Upai			No
04538	Ehuelua			No
04547	Anahola	Puamano, Papaihiapohaka	Lo‘i, Wauke, House lot	Yes
04554	Walanaeku	Koolaukai, Koolaukani	Lo‘i, Wauke, House lot	Yes
04556	Wailau			No
04559	Wahie	Kaihulu, Palikoa	Lo‘i, Wauke,	Yes
04581	Huluhulu	Kanapaa, Kapuonunui	Lo‘i, Wauke, House lot	Yes
04590	Kekuaiki	Hahalina, Kahalina	Lo‘i, Wauke, House lot	Yes
04591	Hulu	Kuakemana, Paanoho	Lo‘i, Wauke, House lot	Yes
04593	Haili	Haili	Lo‘i, Wauke, House lot	Yes
04594	Hiapo			No

LCA #	Claimant	‘Ili	Land Use	Awarded
04611	Pokake	Kapapa, Hanaiki	Lo‘i, Wauke, House lot	Yes
04621	Pehuiki	Hoolakaupu, Kapuapala	Lo‘i, Wauke, House lot	Yes
04624	Paa	Kukuluaukai, Paea	Lo‘i, Wauke, House lot	Yes
04627	Paia	Kapukalio, Kapoko	Lo‘i, Wauke, House lot	Yes
04632	Poopoo			No
04640	Pua‘a	Keakimoma, Keokala	Lo‘i, Wauke, House lot	Yes
04643	Piawe	Pukoenieni, Anahola	Lo‘i, Wauke, House lot	Yes
04619	Pohaku			No
04651	Po‘opo‘o	Anahola	Lo‘i, Wauke, House lot	Yes
04652	Puaeae			No
04655	Puaokekau, wahine	Kakaea	Lo‘i, Wauke, House lot	Yes
04656	Puoa	Kanaua, Kapoko	Lo‘i, House lot	Yes
04657	Puaunahi	Hikii, Paeia	Lo‘i, Wauke, House lot	Yes
04690	Nalawaia	Kealohi	Lo‘i, Wauke, House lot	Yes
04693	Luahele	Palawai, Koananai	Lo‘i, Wauke, House lot	Yes
04694	Lono 1 & 2	Puoio, Kumunana	Lo‘i, Wauke, House lot	Yes
04694B	Lonoiki	Ananakini, Kaluoopu	Lo‘i, Wauke, Noni	Yes
04699	Lupaieie			No
04711	Mailou	Hakaea, Makaikai	Lo‘i, Wauke, House lot	Yes

LCA #	Claimant	‘Ili	Land Use	Awarded
04712	Makaino	Hioka, Kioka	Lo‘i, Wauke, House lot	Yes
04718	Maumau	Anahola	Lo‘i, Wauke, House lot	Yes
04719	Makaolo	Hoopala	Lo‘i, Wauke, House lot	Yes
04721	Makakane			No
04722	Mahilauawa	Palawai	Lo‘i, ‘Āpana, Noni	Yes
04724	Mona	Kamoku, Kamuliwai	Lo‘i, Wauke, House lot	Yes
04727	Mailou	Pikau, Kekau	Lo‘i, House lot	Yes
04728	Makaino	Mamani	Lo‘i, Wauke, House lot	Yes
04730	Manamana	Kalaiwahiwai, Kamuliwai	Lo‘i, Wauke, House lot	Yes
04731	Makuakane	Kanapaa, Pouka	Lo‘i,	Yes
04760-1	Naelele	Palawai, Pukalio	Lo‘i, Noni, House lot	Yes
04754	Naololi	Pukoanini, Kaupake	Lo‘i, Noni, *Wauke*, House lot	Yes
04777	Nanukuwaiki	Kauapa, Kumuahane	Lo‘i, Wauke, House lot	Yes
04780	Naiwi	Mamania, Kaluanui	Lo‘i, Wauke, House lot	Yes
04782	Nakea	Pauko	Lo‘i, Noni, House lot	Yes
04797!	Mailou			Wrong Number
04879	Inoaole			No
04879B	Inoaole			No
04909	Kaeleu	Kamalupe, Kaloula, Olelokana	Lo‘i, Wauke, House lot	Yes

LCA #	Claimant	‘Ili	Land Use	Awarded
04913	Kanuhu	Olokuiha, Kamokuapi	Lo‘i, House lot	Yes
04916	Kumukou	Kanakini, Piwaha	Lo‘i, Wauke, House lot	Yes
04935	Koleaka	Kalahiki, Hikii	Lo‘i, House lot	Yes
04971	Kalehua	Kanamoa, Kapuakea	Lo‘i, Wauke, House lot	Yes
04980	Kuohu	Puuoio, Olelokana	Lo‘i, Wauke, House lot	Yes
04981	Kalima‘ele‘ele wahine	N/L	Lo‘i, Noni, House lot	Yes
04984	Kole / Kale	Papooulu, Kealuaahokia	Lo‘i, Kula, House lot	Yes
04987	Keanuhawai‘i	Pauku, Kaupapa	Lo‘i, Noni, House lot	Yes
05022	Kunane	Kamalupa, Puoni	Lo‘i, Wauke, House lot	Yes
05023	Kolia, D	Pukoenieni, Kanakahikio	Lo‘i, Wauke, House lot	Yes
05248	Kaehu, J. W.			No
05078	Kawaaiai	Kahalepua, Pohakumano	Lo‘i, Wauke, House lot	Yes
05083	Kiei	Kanakawale, Hikii	Lo‘i, Wauke, House lot	Yes
05084	Kaniku	Palikoa, Puapala	Lo‘i, Ulu, House lot	Yes
05089	Kuhaimoana	N/L	Lo‘i, Wauke, Noni	Yes
05099	Kauhaialae	Puuomano, Olelokana	Lo‘i, Wauke, House lot	Yes
05102	Kuihu	Puuoniunu, Papahikiloaka	Lo‘i, Wauke, House lot	Yes
05104	Kawaohia	Olokauha, Cahill	Lo‘i, Wauke, House lot	Yes
05105	Kawailoa	Pika, Malama	Lo‘i, House lot	Yes

LCA #	Claimant	‘Ili	Land Use	Awarded
05106	Kawailoa			Wrong Number
05112	Kupukupu			No
05141	Kaukai	Kuloa, Koapupu	Lo‘i, Wauke, House lot	Yes
05142	Kaliuwa‘a			Wrong Number
05143	Ka‘ahiki			No
05170	Kalawaia	Ananakini, Hakaea	Lo‘i, Wauke, House lot	
05190	Kekuaiki		Lo‘i, Wauke, House lot	No
05199	Kuoha	Puamano, Kaluaoopu	Lo‘i, Noni, House lot	Yes
05205	Kaholomoana	Halalua	Lo‘i, Wauke, House lot	Yes
05391	Hilo	Kaakaulua, Papakolea	Lo‘i,‘}pana, House lot	Yes
09581!	Huluhulu			Wrong Number

parcels on either side of Anahola River to take advantage of the fertile soil and fresh waters of the river’s wide floodplain.

Handy and Handy (1972:423) describe the area as:

> There are old abandoned terraces along its banks far upstream, there are old loi from two to four miles inland along Anahola River and its tributary Ka‘alaua Stream and below their point of juncture there are many loi on the flats along the river banks as it meanders through its wide gulch. The delta is three-fourths mile wide, and this was all terraced.

Three LCAs were awarded south of the project area, 5022, 5023, and 5078. Each of the awarded properties contained *lo‘i*, *wauke*, and a house lot (see Figure 7 below).

3.1.4 1850-1900

In 1852 Inter-island Steamers launched their first attempt at service. In August of that same year, the Marianne capsized on her trip from Kaua‘i to Honolulu. Many of the native Hawaiians

on board swam to shore, some with children on their backs, to Anahola Bay. This was just one of the many events that began the twenty year struggle for inter-island steamers. By 1914 the inter-island steamers were finally profitable with 47 regular ports or landings, one of which was in Anahola (Thomas 1983: 31, 133).

Commissioner of Boundaries

In 1862, the Hawaiian Legislature created the Office of Commissioner of Boundaries to determine the exact boundaries of previously un-surveyed *ahupua‘a*. Previously some *ahupua‘a* had only been defined in the M~hele by traditional names. In 1874 the boundary commission assembled to identify the boundaries of Anahola through native Hawaiian landmarks. “All persons who had received awards for their lands by names only were required to appear before the Commissioners to have their boundaries determined and identified” (Chinen 1958:23). Based on oral testimony of *kama‘āina*, maps were drawn using their reference points. The testimonies of two Anahola *kama‘āina*, Kauniahi and Pihuiki, were taken and transcribed. Boundary commission testimony for Anahola *ahupua‘a* contains one significant point of reference, Kuaehu, that is mentioned several times. Located on the coast at the northern boundary line of the *ahupua‘a*, just north of the current project area, Kuaehu is said to be a place of sacrifice in the olden days by Kauniahi and a place of worship by Pihuiki.

Although Bennett (1931) described several *heiau* in Anahola, he did not identify a *heiau* within the vicinity of Kuaehu. The *kama‘āina* also described a resting place called Ahole just *mauka* of Kuaehu. The boundary also references a road that comes up from Keālia to K♣lauea and crosses at Keao‘opu. A third reference point, Papa‘aloa, marked Anahola’s southern boundary. Papa‘aloa is on the coast where the peninsula crosses into a fishpond.

Sugar Plantations and Rice Cultivation

Following the Māhele, private land ownership began to change land usage. Sugar plantations quickly developed and by 1877 eight sugar plantations had been established on Kaua‘i. The same year, Makee Sugar Company began cultivating sugar in Anahola. The sugar fields were located on the southern side of Anahola stream and in the delta areas. While the 1878 W.D. Alexander survey map does not provide many details, it shows the “Makee Sugar Company” name extending to the coast of Anahola (Figure 5).

Like most well watered areas in Hawai‘i, rice crops began replacing former *lo‘i kalo* in the second half of the 1800s. Chinese settlers purchased lands and converted *lo‘i* terraces adjacent to the Anahola River into rice fields (*Oryza sativa*). By 1892, Anahola was a rice farming district that was controlled by Mana and Hee Fatt from Kapa‘a. Rice production co-existed with the nearby sugar plantations until the 1930s when rising costs of production and competition from California caused a decline in rice production (Char and Char 1979:13-14).

Travelers passing through Anahola described “rice fields as far as one can see” (Damon 1931:358). Traveling north beyond the village of Anahola, “rugged, inaccessible bluffs meet the beating of waves and the strong sweep of trade winds at the northeastern corner of the Island” (Castle 1917:155). The 1914 Wall survey map shows the extent of agricultural endeavors surrounding Anahola River (Figure 6).

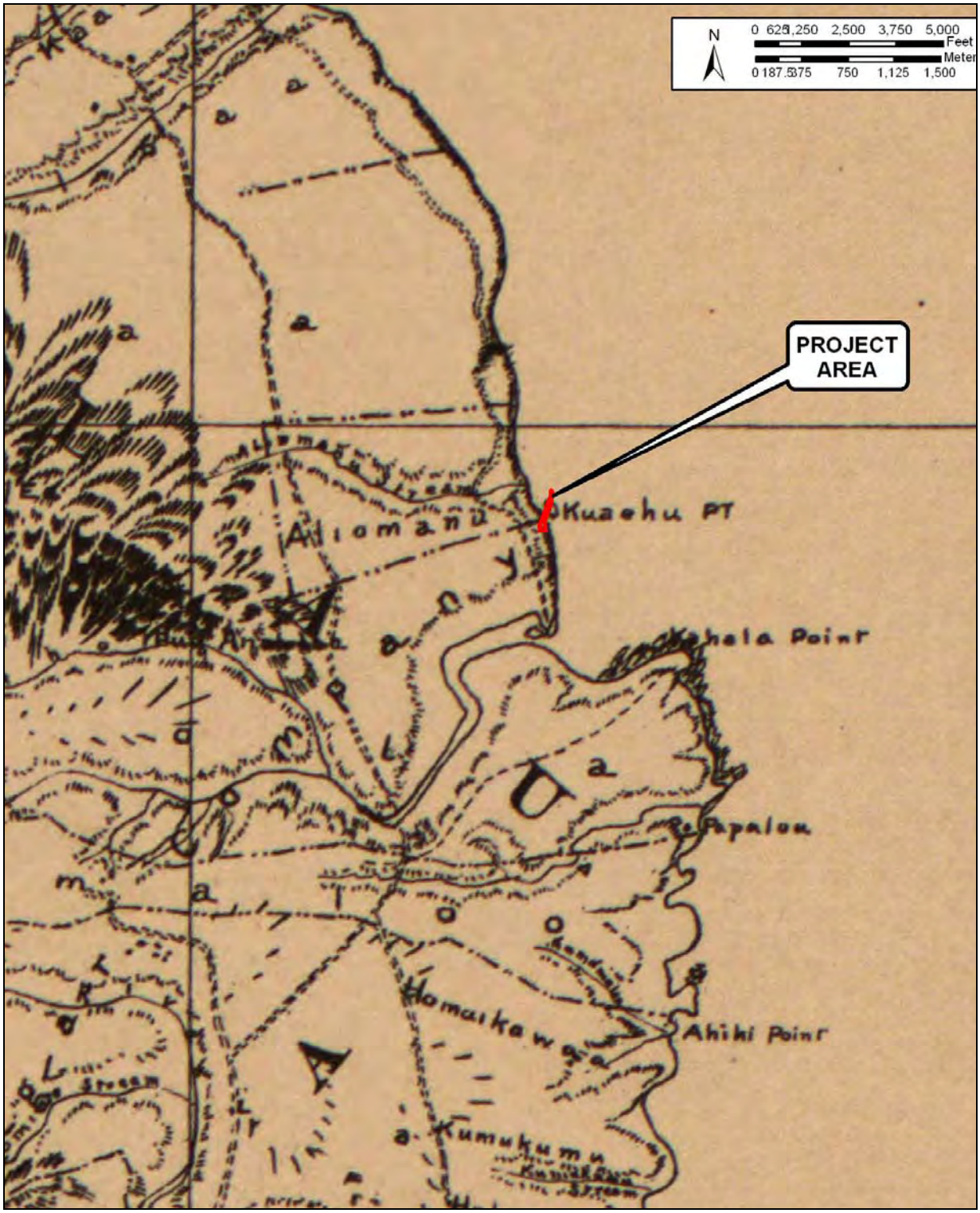

Figure 5. Portion of 1878 Alexander survey map with overlay of project area

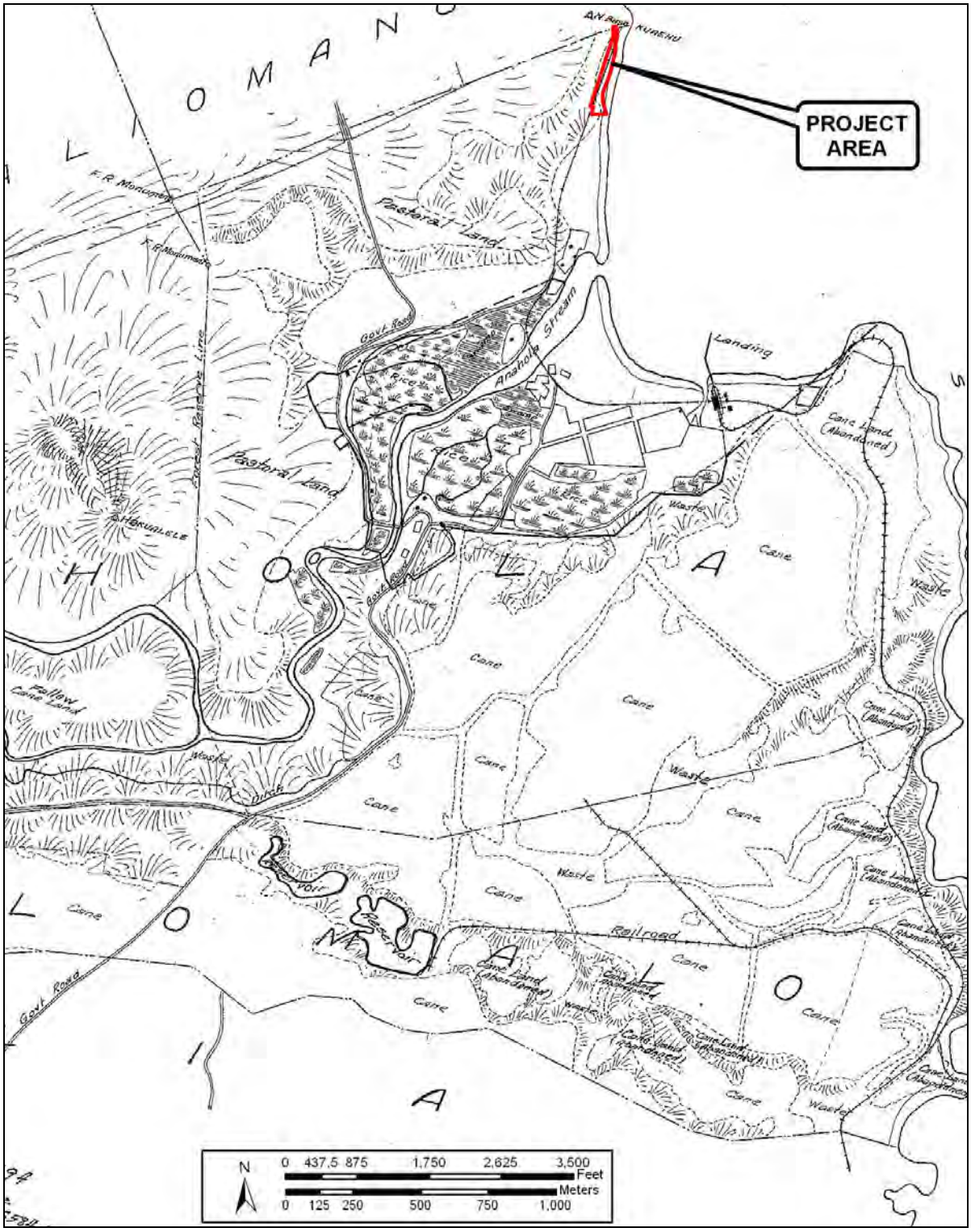

Figure 6. Portion of 1914 Wall survey map with overlay of project area

The current project area is located north of the sugar plantation and rice growing areas and was land held by the state.

3.1.5 1900-present

The Ahukini Terminal & Railway Company was formed in 1920 to establish a railroad to connect Anahola, Keālia, and Kapa‘a to Ahukini Landing and “provide relatively cheap freight rates for the carriage of plantation sugar to a terminal outlet” (Condé and Best 1973:185). The rail system in Anahola traveled along the coast to a landing (see Figure 6) that had been built in Anahola Bay in the early 1800s. In 1934, the Lihue Plantation Company absorbed the Ahukini Terminal & Railway Company and Makee Sugar Company (Condé and Best 1973:167). The railway and rolling stock formerly owned by Makee Sugar Company became the Makee Division of the Lihue Plantation. At the same time, in addition to hauling sugar cane, the railroad was also used to haul plantation freight including “fertilizer, etc...canned pineapple from Hawaiian Canneries to Ahukini and Nāwiliwili, pineapple refuse from Hawaiian Canneries to a dump near Anahola and fuel oil from Ahukini to Hawaiian Canneries Co., Ltd.” (Hawaiian Territorial Planning Board 1940:11). Shortly after the Lihue Plantation gained ownership of the railroad, passenger cars ran on the tracks. The last railroad tracks were removed in 1959 (Hilton 1990:378). The tracks still appear on the 1955 Dunn survey map (Figure 7) and are not on the 1963 USGS map (Figure 8).

Lihue Plantation closed in November 2000 (Ruehl 2001). Towns dependent on sugar cultivation and production suffered after the closing of the plantations, however, the growing tourist industry has begun to ease the economic affects. Plantation’s fields in Anahola that were formerly Crown Lands reverted to the Department of Hawaiian Home Lands.

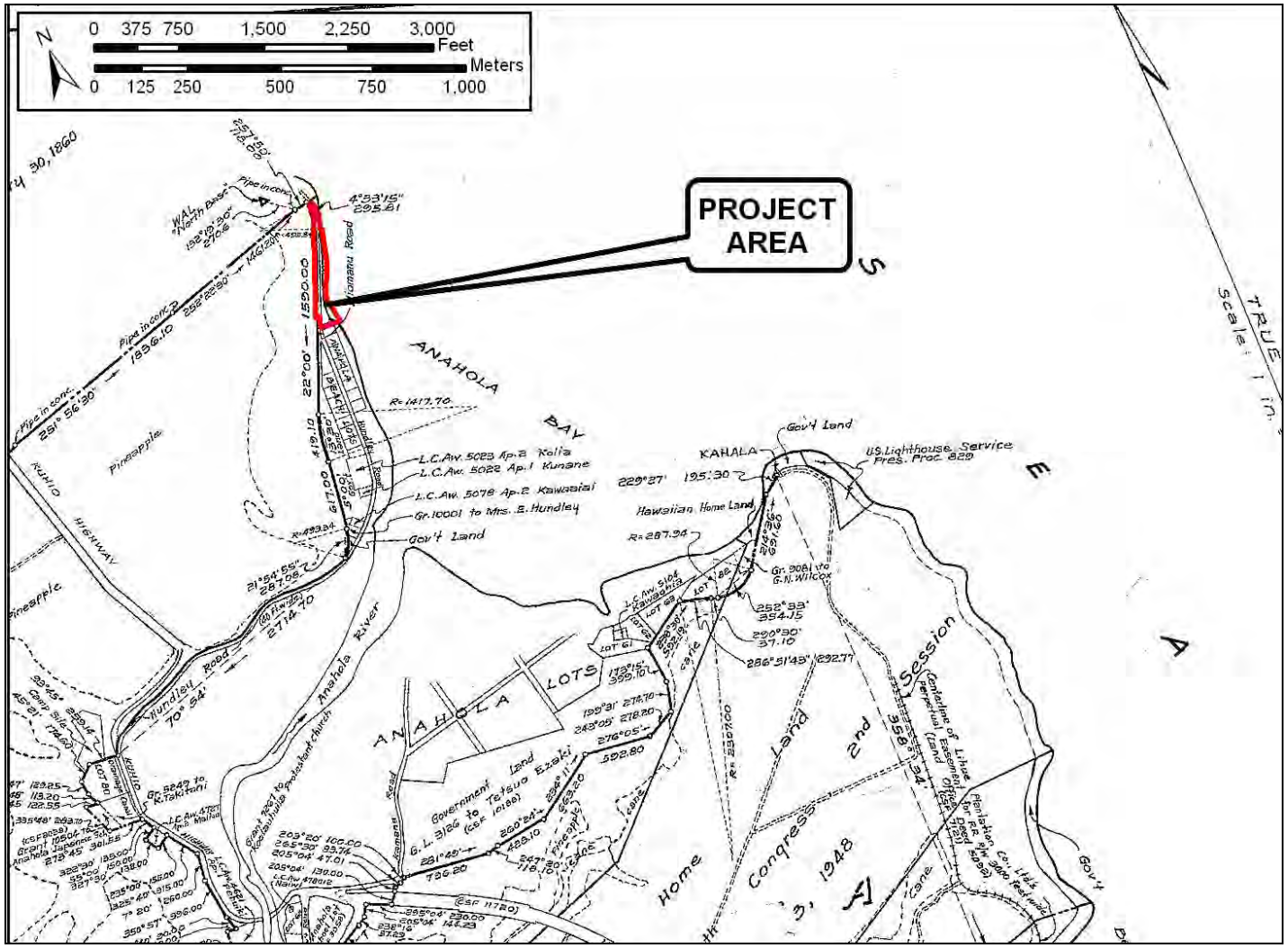

Figure 7. Portion of 1955 Dunn survey map with overlay of project area

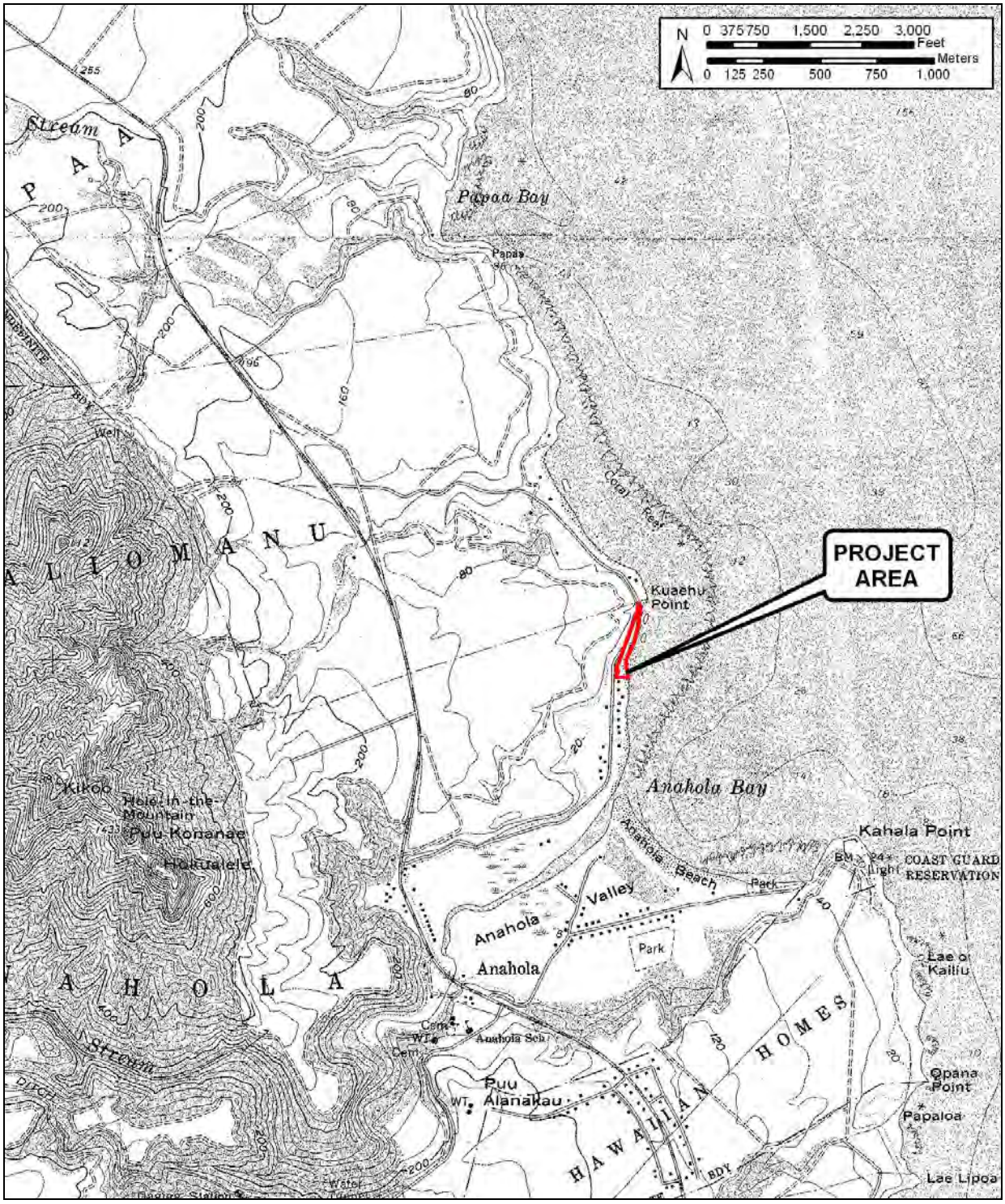

Figure 8. 1963 USGS topographic map with overlay of project area

3.2 Previous Archaeological Research

Although no archaeological studies have been conducted in the present project area, a few have been conducted within its vicinity. A discussion of the findings follows with a list of these projects presented in Table 2 and locations shown on Figure 9. The projects are listed in date order, from oldest to the most recent, and show the author, type of study, and the findings.

Wendell Bennett conducted the first systematic archaeological survey on the Island of Kaua‘i in the late 1920s. Bennett examined and recorded 202 sites on the island and five sites in Anahola.

> Site 113. Aikanaka heiau, at Anahola Point near the end of the bluff on the south side of the bay. Described by Thrum as, “A small heiau, about 40 feet in size. All destroyed.” One large rock marks the spot of this heiau in the cane field.
>
> Site 114. Paeaea Heiau, back of Anahola bay inland from the government road on the north side of the valley, a low site that gives a poor view of the country. Described by Thrum as, “A small round heiau, walls 8 feet high not thick; class not known.”
>
> Site 115. Kuhua Heiau, on the edge of the north bluff of Anahola Valley, about half way between the government road and the sea bluff. It has an excellent view of the valley. The site is now marked by a few tumbled walls in a pineapple field.
>
> Site 116. Dune burials, in the dunes around Anahola bay many bones that have been found as burials have been uncovered by the shifting sand.
>
> Site 117. Taro terraces, the inland part of Anahola Valley has the usual taro lines, through the edges of the valley are too steep for much cultivation. On the flats near the mouth of the valley, taro is still grown [Bennett 1931:129].

Site 113, Aikanaka Heiau, and site 116, are on Anahola Bay and south of the project area. Site 115, Kuhua Heiau, is on ‘Aliomanu Road and south of the project area. The two other sites are inland.

A 1979 survey of upland Hawaiian Homes Farmlands found one site (-473) that was identified as the remains of an animal enclosure. Only two of the four walls remained standing (Kikuchi 1979.

A 1983 cursory survey within the Keālia Forest Reserve found two sites. SIHP 50-30-04-471 is a C-shaped shelter, and site -472 consists of agricultural terraces (Kikuchi 1983).

A reconnaissance project (Ota 1985) by Hawaiian Homelands was undertaken to identify the remains of two previously described *heiau*, ‘Aikanaka (site 113) and Kuhua (site 115). The reconnaissance substantiated reports by Thrum (1907) and Bennett (1931) that the *heiau* were “destroyed” as no remains were found.

Table 2. Previous Archaeological Research at Anahola

Reference	Location	Nature of Study	Findings
Bennett 1931		Island-wide survey	Identified five sites in Anahola
Kikuchi 1979	Anahola, 4-4-8-01:1	Site Survey	
Kikuchi 1983	Reservoir site, Anahola farm plots	Cursory Survey	
Ota 1985	Anahola 4-4-9-10:1,2,3,5. 4-8-various	Archaeological Reconnaissance	Confirmed that the two *heiau* in the Anahola vicinity are destroyed (Bennett’s sites 113 & 115)
Denham et al. 1992	‘Aliomanu Ahupua‘a 4-9-04:1	Archeological Inventory Survey	Subsurface testing found one fire pit site radiocarbon dated to AD 1483 to 1680
Hammatt and Ida 1992	‘Aliomanu Ahupua‘a 4-9-05, por. 4	Archeological Inventory Survey	SIHP -1896; inadvertently found burial and cultural layer
McMahon 1992a	Just south of Kuaehu Point	Inadvertently found burial	SIHP -1881; left in situ
McMahon 1992b	Just south of Kuaehu Point	Inadvertently found burial	SIHP -1882; left in situ
Taniguchi 1996	4-8-18:24	Anahola community meeting	Reviewed remnants of Kuhua Heiau (Bennett’s site 115)
Dixon et al. 1997	Anahola Subdivision G and G1 (TMK 4-8-12:6 & 4-8-18-26)	Archeological Inventory Survey	SIHP # 50-30-04-627 with seven features associated with pre-contact habitation and radiocarbon dated to AD 1455-1675
McGerty and Spear 1999	Anahola Beach Park, TMK 4-8-14:6	Archaeological Inventory Survey	No findings
Rechtman and Dougherty 2001	38 acres of Dept. of Hawaiian Homelands, TMK 4-4-8-	Archaeological Inventory Survey	Identified SIHP -877, the remains of a former *lo‘i* field, during backhoe trenching. AMS dated to a 2 Sigma calibrated range of AD 1520-1950

	03:05, por. 16		

Figure 9. Portion of US Geological Survey Topographic Map, Anahola Quad (1998), showing previously identified sites and archaeological projects conducted within the vicinity of the project area

Denham et al. (1992) conducted an archaeological inventory survey just north of the current project area in ‘Aliomanu Ahupua‘a. One fire pit site was found and radiocarbon dated to AD 1483 to 1680. Artifacts including glass fragments, basalt fragments, buttons, metal and ceramics were also found. Survey results indicated this area was inhabited for many years, and LCA documents for the land awards in the vicinity provided written evidence of land usage.

A 1992 archaeological inventory survey conducted by Cultural Surveys Hawaii (Hammatt and Ida 1992) reported on SIHP 50-30-4-1896, which contained a burial and a cultural layer. The survey was conducted in the coastal area at the border of ‘Aliomanu and Pāpa‘a Ahupua‘a, north of the project area, and in an area that is similar to the current project area. Site -1896 is located at the slope/beach interface along a bank approximately 60 ft. *mauka* of the high tide line. It is at the base of a slope primarily comprised of terrestrial deposits with some marine sand.

Two sites (1881/1882) were found approximately 500 m south of the project area after Hurricane Iniki. Site -1881 is a burial that was found by the owner of a private residence when he attempted to build a fence (McMahon 1992a). Site -1882 is a burial that was found during the excavation of an *imu* (McMahon 1992b).

In 1996, the Department of Hawaiian Home Lands invited the elders of the Anahola community to a community meeting regarding Kuhua Heiau (-0115; Bennett’s site 115). No one that was born and raised in Anahola attended the meeting, but community members viewed Kuhua Heiau from ‘Aliomanu Road. Only limited remains of the *heiau* were found. Nancy McMahon (SHPD) also stated that the integrity of the *heiau* had been destroyed long ago (Taniguchi 1996).

Dixon et al. (1997) conducted an archaeological inventory survey of an Anahola subdivision approximately 450 m southwest of the current project area and just to the north of the northeast terminus of the ‘Aliomanu Road spur. One site, SIHP # 50-30-04-627 with seven features was found beneath the 1-foot deep plow zone and radiocarbon dated to AD 1455-1675. This pre-contact Hawaiian habitation site and features had been previously disturbed by modern agricultural practices. Dixon et al. (1997) recommended monitoring in this area for future projects.

Two large boulders with several circular and linear worn depressions on their surfaces were located on the *mauka* side of ‘Aliomanu Road during the same survey. The boulders suggest a pre-contact marine subsistence focus along the Anahola shoreline related to “the practice of chumming the water with pounded fish remains, poison, and perhaps *kukui* nut oil in order to spear fish rising to feed on the bait - a practice often conducted at night by torch light” (Dixon et al. 1997). The depressions on the rock face are described by Kirch (1985:273) as bait cups.

During the 1999 archaeological inventory survey of Anahola Beach Park, south of the project area, six test pits were excavated. No cultural material was found and no recommendations were made, although a caveat regarding the traditional use of sand dunes for burials was presented (McGerty and Spear1999).

Rechtman Consulting (Rechtman and Dougherty 2001) conducted an archaeological inventory survey of approximately 38 acres of Department of Hawaiian Homelands inland from Anahola Bay and southwest of the project area. No surface features were observed and one site

(SIHP -877), the remains of a former *lo‘i* field, was found during backhoe trenching. A charcoal sample found within the *lo‘i* remains was AMS dated to a 2 Sigma calibrated range of AD 1520-1950. No further archaeological work was recommended although subsurface testing prior to development of a particular lot (#12) that may contain remnants of site -877 was recommend.

Section 4 Results of Fieldwork

No significant historic properties were identified within the current project area.

The approximately 350 meter shoreline project area just south of Kua‘ehu Point and *makai* of ‘Aliomanu Road was inspected (Figure 11 and Figure 12). The wave-cut bank along the *makai* side of the road was thoroughly inspected and no archaeological sites were observed. The exposed wave-cut is approximately 107 m long and is generally in the most northern portion of the project area. Of this 107 m long stretch, the southern 42 m shows wave erosion into the road grade. The northern 65 m stretch has more serious erosion where waves have undercut, and in some areas caused collapse of the asphalt road bed.

Two representative profiles were recorded within exposed areas of the project area to document the stratigraphy. Profile #1 of the wave-cut bank was recorded in the northern, more seriously eroded stretch (Figure 10); this was the north-most portion of the project area that was accessible without having to stand in the ocean record the stratigraphy. This northern portion of the project area contained asphalt road surface with an underlying coral cobble base and varying layers of imported sands and fill (Figure 13 and Figure 14).

Profile #2 was recorded further south, where the waves have cut only into the road grade, not the asphalt road itself. This profile was recorded adjacent to and *makai* of a surveyor’s pipe, and a sign post holding the signs “YIELD” and “ONCOMING TRAFFIC” (Figure 15). Profile #2 is 20.2 m south of Profile #1. This portion of the project area contained wave and wind deposited beach sand overlying multiple layers of sand and sediments with coral pebbles, glass fragments, and pieces of metal. This fill layer appears to be compacted.

No historic properties were found and no subsurface excavations were conducted.

Figure 10. Portion of USGS Topo Map, Anahola Quad (1998), showing project area and locations of profiles

Figure 11. General view of the wave cut bank *makai* of ‘Aliomanu Road, view to north-northwest

Figure 12. ‘Aliomanu Road showing asphalt damage, view to north

4.1.1 Profile 1

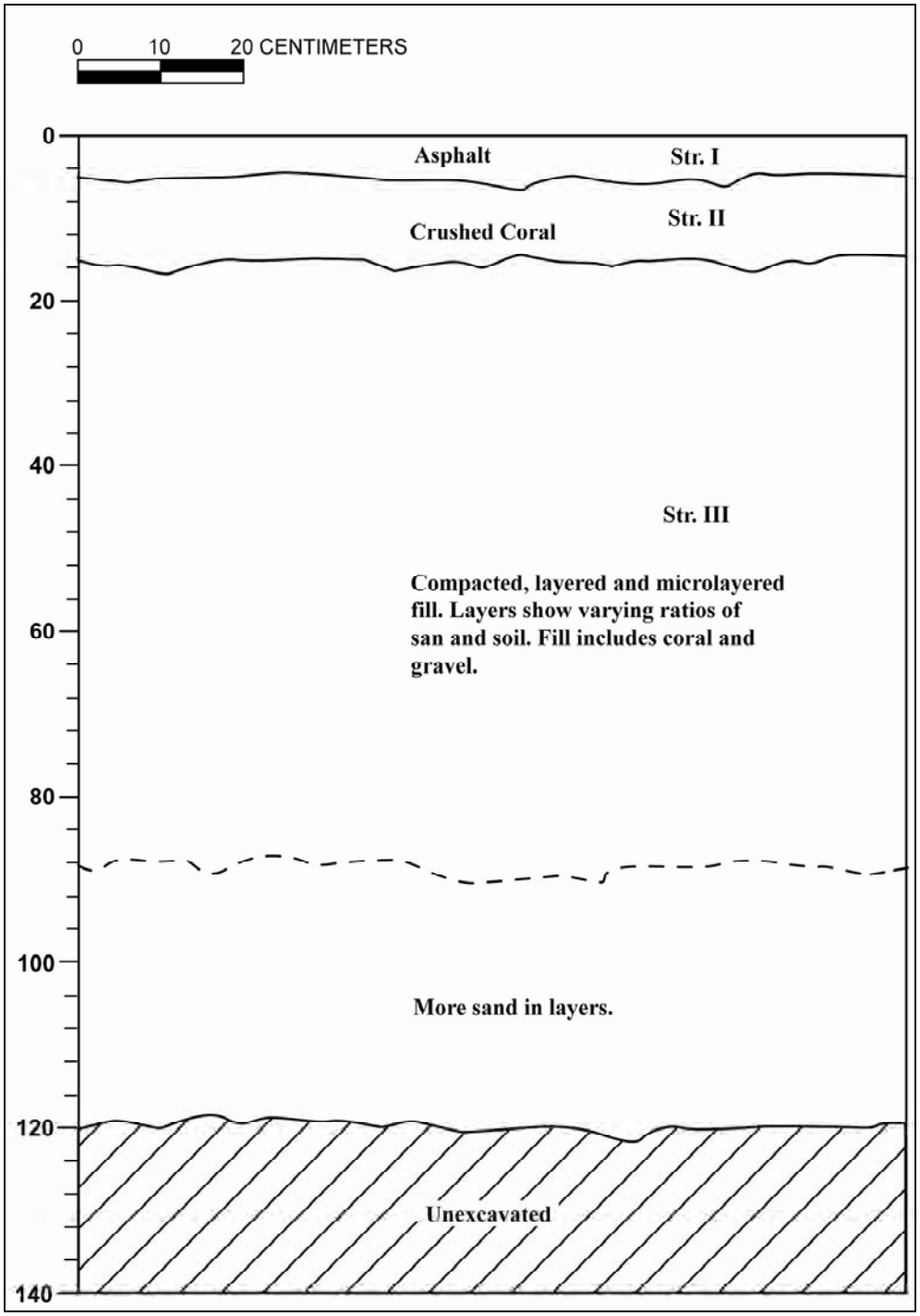

Figure 13. Stratigraphy of Profile 1

Table 3. Stratigraphy Descriptions for Profile 1

Strata	Depth (cmbs)	Description
Stratum I	0-6	Asphalt
Stratum II	5.0-16	Fill Horizon; crushed coral base course
Stratum III	15-90	Compacted layered and micro-layered fill that appears to be compacted. Layers show varying ratios of sand and soil with various colors. Various textures, strong grade, various sizes, dry very hard consistency, strong cementation, mixed origin of sediments, abrupt boundary distinctness, smooth topography

Figure 14. Profile 1, view to west

4.1.2 Profile 2

Figure 15. Location of Profile 2, view to northwest

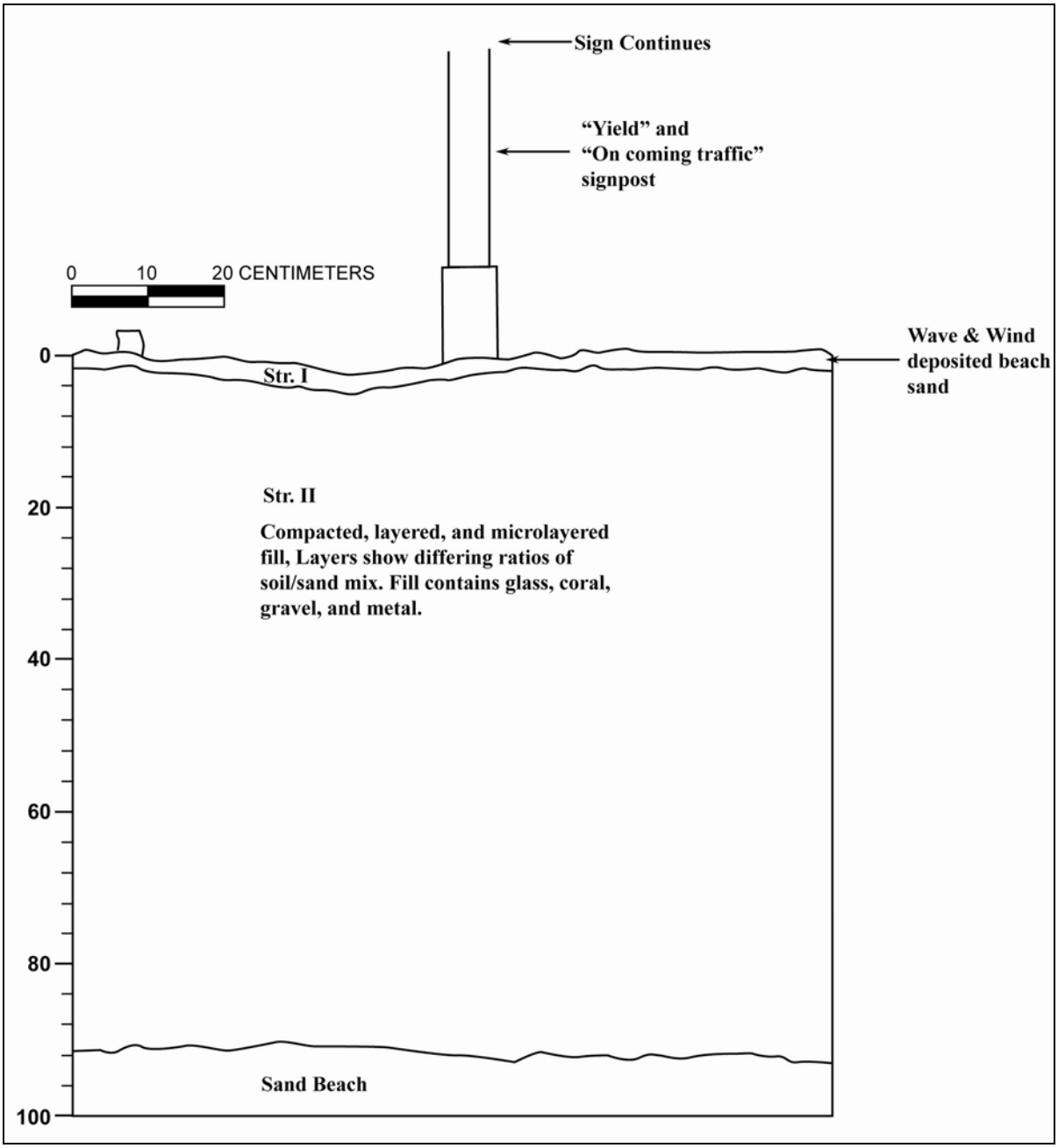

Figure 16. Stratigraphy of Profile 2

Table 4. Stratigraphy Descriptions for Profile 2

Strata	Depth (cmbs)	Description
Stratum I	0-3	Wave and wind deposited beach sand. Yellowish brown sand, medium size, weak grade, medium size, single grain, dry, loose consistency, non-plastic, no cementation, marine origin, abrupt boundary, smooth topography
Stratum II	2-94	Compacted layered and micro-layered fill that appears to be compacted. Layers show varying ratios of sand and soil with various colors. Layers consist of sand and sediment with coral pebbles, gravel, glass fragments, and pieces of metal. Dry, very hard consistency, non-plastic, strong cementation, mixed origin, abrupt boundary, smooth topography.
Stratum III	90-100	Beach sand. Natural sand that underlies fill layer and has been exposed by wave action. Similar coloring to Stratum II

Figure 17. Profile 2, view to west

Section 5 Summary

In compliance with and to fulfill applicable Hawai‘i state historic preservation legislation, CSH completed this archaeological assessment for the proposed ‘Aliomanu Road Repair Project. The area of potential effect is defined as the entire 350 linear meter project area.

Per the Hawai‘i state requirements [HAR Chapter 13-276], this archaeological assessment investigation includes the results of cultural, historical, and archaeological background research, and fieldwork. The background research focused on summarizing the project area’s pre-contact and post-contact land use, cultural significance, and types and locations of potential cultural resources within the project area and its vicinity.

As part of its archaeological assessment field effort, carried out August 22, 2008, CSH conducted systematic pedestrian inspection of the project area. No historic properties were identified.

These findings are largely in keeping with expectations for the project area, based on historical and previous archaeological research. While some coastal habitations are likely, it is unclear to what extent coastal Anahola was inhabited. Traditional habitation does not appear to be indicated for the project area or its immediate vicinity as no LCA claims were made and the location is not conducive to agricultural cultivation.

The construction of ‘Aliomanu Road, including activities such as grading, may have removed any trace of any pre-existing historic properties.

Section 6 Recommendations

6.1 Project Effect

No historic properties were identified within the 350 linear meter project area. The construction of ‘Aliomanu Road likely impacted or destroyed any surface or subsurface historic properties that may have existed within the project area. Consequently, CSH’s effect recommendation for the proposed development project is “no historic properties affected.”

6.2 Mitigation Recommendations

An archaeological monitoring program is recommended since the project area is underlain by Beaches (BS) (Foote et al. 1972). On several Hawaiian islands, and indeed throughout the windward coast of Kaua‘i, traditional Hawaiian burials have been documented in Beaches and Jaucas sands. Additionally, burials have been inadvertently found along the coastline and within fairly close proximity to the project area. Two burials (SIHP -1881/1882) were inadvertently found approximately 500 m south of the project area after Hurricane Iniki, and the remains of one individual was found just across the P~pa‘a Ahupua‘a boundary.

An archaeological monitoring program consistent with the standards of Hawai‘i Administrative Rules 13-279 will need to be developed beginning with the preparation of an archaeological monitoring plan for the review and approval of the SHPD (State Historic Preservation Division) in advance of the road repair. Monitoring during all subsurface activities is recommended. On-call monitoring may subsequently be appropriate based on monitoring results and consultation with SHPD.

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Appendix C

Aliomanu Cultural Report

FINAL

Cultural Impact Assessment for the ‘Aliomanu Road Repair Project, Anahola Ahupua‘a, Kawaihau District, Kaua‘i TMK: [4] 4-8-018:029, 999

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Management Summary

Reference	Cultural Impact Assessment (CIA) for the ‘Aliomanu Road Repair Project, Anahola Ahupua‘a, Kawaihau District, Kaua‘i, TMK: [4] 4-8-018:029, 999 (Magat, Groza, Gollin and Hammatt 2009)
Date	March 2009
Project Number (s)	Cultural Surveys Hawai‘i Inc. (CSH) Project Code: ANAHOLA 2
Project Location	The project area is generally south of Kuaehu Point, east of Kuhio Highway, north of Anahola Bay, and west of the ocean. Specifically the project is the section of ‘Aliomanu Road that has been damaged by high surf. These repairs will only involve the road and the filled area *makai* of the road, but will not intrude into the area *mauka* of the road.
Land Jurisdiction	State of Hawai‘i
Agencies	State Historic Preservation Division/Department of Land and Natural Resources (SHPD/DLNR) and other entities
Project Description	The proposed project includes the repair of an approximately 350-meter long portion of ‘Aliomanu Road, Anahola Ahupua‘a, and the construction of a shoulder and wall *makai* (east) of the road.
Project Acreage	This portion of ‘Aliomanu Road runs approximately 350 linear meters and the project area is approximately 0.29 acres.
Area of Potential Effect (APE) and Survey Acreage	The Area of Potential Effect includes the approximately 0.29-acre project area. While this investigation focused on the project APE, for the purposes of this CIA the study area included the entire *ahupua‘a* of Anahola.
Document Purpose	The project requires compliance with the State of Hawai‘i environmental review process [Hawai‘i Revised Statutes (HRS) Chapter 343], which requires consideration of a proposed project’s effect on traditional cultural practices. At the request of Oceanit, CSH undertook this CIA. Through document research and cultural consultation efforts, this report provides information pertinent to the assessment of the proposed project’s cultural impacts [per HRS Chapter 343 and the Office of Environmental Quality’s (OEQC) *Guidelines for Assessing Cultural Impacts*]. The document is intended to support the project’s environmental review and may also serve to support the project’s historic preservation review under HRS Chapter 6E-42 and Hawai‘i Administrative Rules Chapter 13-284.
Consultation Effort	Hawaiian organizations, agencies and community members were contacted in order to identify potentially knowledgeable individuals with cultural expertise and/or knowledge of the project area and

	vicinity. The organizations consulted included the State Historic Preservation Division (SHPD), the Office of Hawaiian Affairs (OHA), and Kaua‘i Island agencies pertinent to the proposed project area such as the Kaua‘i/Ni‘ihau Island Burial Council, Kauai Historic Preservation Review Commission, Anahola Homesteaders and more.
Results of Background Research	Background research shows: 1. Located in the Kawaihau district, traditionally known as Ko‘olau, the project area is north of Anahola River and immediately south of Kuaehu Point, and south of ‘Aliomanu Beach and reef. The reef is one of Hawai‘i’s most famous resources for the prized seaweed *limu kohu* (*Asparagopsis taxiformis*). 2. Anahola River was once surrounded by numerous Hawaiian agricultural terraces, with cultivation measured as 1,200 meters wide (Handy and Handy 1972:422). Coastal zones similar to the project area were traditionally utilized for marine resources, habitation, burials, and ceremonial structures related to fishing. 3. Radiocarbon dating of a fire pit just north of the current project area in the ‘Aliomanu *ahupua‘a* suggests occupation of this area may date from AD 1483 to 1680. 4. The project area is associated with specific *mo‘olelo* (stories, legends) about: the origin of Anahola, named after a *mo‘o* (lizard, water spirit) who changed forms; Hōkū-‘alele which is the largest peak in Anahola; Lahemanu (daughter of an Anahola chief); *limu kohu* gathering; fishing; Pōhaku o Kāne; and the boy Hiku who created a swing to retrieve the spirit of Princess Kawelu from the land of the dead.
Results of Community Consultation	Attempts were made to contact a total of 20 people for the purposes of this CIA; 13 people responded; and 4 *kūpuna* and/or *kama‘āina* were interviewed for more in-depth contributions. The findings of this CIA suggest that there are several areas of cultural interest and concern regarding the proposed ‘Aliomanu Road Repair Project. Community consultation shows: 1. Two participants would like to see a community dialogue with those living close to the road as well as the broader Anahola community as there is concern about continued erosion if only a wall is constructed and there is no provision made for sand retention. A balanced approach was suggested. 2. Four community participants stated that the revetment will change the natural wave action of the shoreline, affect fish life,

	kill the reef and cause unintended erosion in other places. They pointed to past revetment projects along neighboring properties close to the project area which have led to a change in ocean currents, to water resources drying up, and further erosion. They expressed concern that the project will merely be a “temporary” fix that can lead to more problems. 3. OHA noted the possibility that, “the proposed revetment could cause accretion and secretion on either side of the revetment. In this scenario, additional revetments would be constructed to mitigate erosion, resulting in the entire stretch of shoreline being ‘hardened’.” 4. Three community contacts noted that the project area is immediately located next to the sand dunes on the north side of Anahola Bay, where *iwi kūpuna* have been found. 5. The project area and environs, especially the shoreline, have a long history of use by Kānaka Maoli (native born) engaging in a variety of cultural activities including *limu kohu* gathering, fishing for *‘owama* (*Mullidae sp*., goatfish) as well as other species, and traditional voyaging. The project area is also a known resting place for the endangered Hawaiian monk seal (*Monachus schauinslandi*) and is a large fish feeding area. 6. Three community contacts mentioned the existence of a possible alternative road, namely the other ‘Aliomanu Road that has been cut off from the other end. 7. According to Mr. Kamahalo Ka‘uhane, the project area is an ideal place to provide opportunities for traditional learning for students. 8. Three participants noted the existence of several *heiau* in the vicinity of the project area, including Kuhua Heiau. 9. Ms. Sharon Pomroy noted the presence of “Night Marchers” (*huaka‘i pō* or *pō kāne*) on the Hokualele Road above the project area.
Cultural Impact Assessment Recommendations	The findings of this CIA indicate that there is a wealth of native Hawaiian cultural resources, beliefs and ongoing practices associated with the proposed project area and immediate vicinity. The results of this CIA present a number of possible mitigation measures for the landowner/developer’s consideration. The following recommendations are offered as a way to begin to address some of the concerns expressed by study participants in the statements presented in Section 5 and Section 6 and mitigate potential adverse effects to Hawaiian cultural resources, beliefs and practices:

	1. In light of statements made by some community participants regarding the proposed revetment *makai* of ‘Aliomanu road, and that for at least one community member who strongly felt that the revetment should be excluded, it is suggested that: a. Alternatives for structures *makai* of the road should be evaluated and the pros and cons of each alternative presented to the community. b. At all times, a balanced approach with consideration of potential, unintended impacts to the shoreline, ocean currents and fish life, and cultural access to the project area is recommended. 2. Based on the concern expressed by three community participants that the project area is adjacent or near the sand dunes of Anahola Bay, it is recommended that “extreme caution” be exercised while conducting the road repair work. In the event that any human remains or other significant cultural deposits are encountered during the course of project activities, all work in the immediate area should stop and the SHPD, OHA, and the Kaua‘i/Ni‘ihau Island Burial Council should be promptly notified. 3. OHA recommends that, “lateral access to shoreline resources should be afforded to the fullest extent possible during construction and ensured at the conclusion of construction activities.” Further, OHA suggests the implementation of “best management practices” in order “to address compliance with state water quality standards such as turbidity and any oil or fuel spills during construction activity.” 4. Community contact Mr. James Torio recommends that, “if a revetment wall is built, that some layer of sand catchment produced by wave action be placed some 20-30 feet in the water’s edge…wave action causes sand to be delivered and is introduced naturally.” 5. Community contacts Mr. Mike and Mrs. Sondra Grace suggest the building of a bridge that would facilitate the use of the other ‘Aliomanu Road, instead of constantly fixing the road at an area they consider to be too small.

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Section 1 Introduction

1.1 Project Background

At the request of Oceanit, Cultural Surveys Hawai’i, Inc. (CSH) prepared this CIA for the proposed ‘Aliomanu Road Repair Project, Anahola Ahupua‘a, Kawaihau District, Kaua‘i, TMK: [4] 4-8-018:029, 999. The proposed project consists of the repair of an approximately 350-meter long portion of ‘Aliomanu Road and the construction of a shoulder and wall *makai* (east) of the road.

The project area is generally south of Kuaehu Point, east of Kuhio Highway, north of Anahola Bay, and west of the ocean. Specifically the project is the section of ‘Aliomanu Road that has been damaged by high surf. These repairs will only involve the road and the filled area *makai* of the road, but will not intrude into the area *mauka* of the road as depicted on the 1998 US Geological Survey Topographic map (Figure 1), a tax map (Figure 2), and on a modern aerial photograph (Figure 3).

1.2 Document Purpose

The project requires compliance with the State of Hawai‘i environmental review process [Hawai‘i Revised Statutes (HRS) Chapter 343], which requires consideration of a proposed project’s effect on cultural practices and resources. At the request of Oceanit, CSH undertook this CIA. Through document research and cultural consultation efforts, this report document provides information pertinent to the assessment of the proposed project’s impacts to cultural practices (per the OEQC’s *Guidelines for Assessing Cultural Impacts*). The document is intended to support the project’s environmental review and may also serve to support the project’s historic preservation review under HRS Chapter 6E-42 and Hawai‘i Administrative Rules Chapter 13-284.

1.3 Scope of Work

The scope of work for this CIA includes:

1. Examination of cultural and historical resources, including Land Commission documents, historic maps, and previous research reports, with the specific purpose of identifying traditional Hawaiian activities including gathering of plant, animal, and other resources or agricultural pursuits as may be indicated in the historic record.
2. Review of previous archaeological work at and near the subject parcel that may be relevant to reconstructions of traditional land use activities; and to the identification and description of cultural resources, practices, and beliefs associated with the parcel.
3. Consultation with knowledgeable parties regarding traditional cultural practices at or near the parcel; present uses of the parcel; and/or other (non-Hawaiian) practices, uses, or traditions associated with the parcel.
4. Preparation of a report summarizing the results of these research activities.

Figure 1. Portion of US Geological Survey Topographic Map, Anahola Quad (1998), showing location of area of proposed work

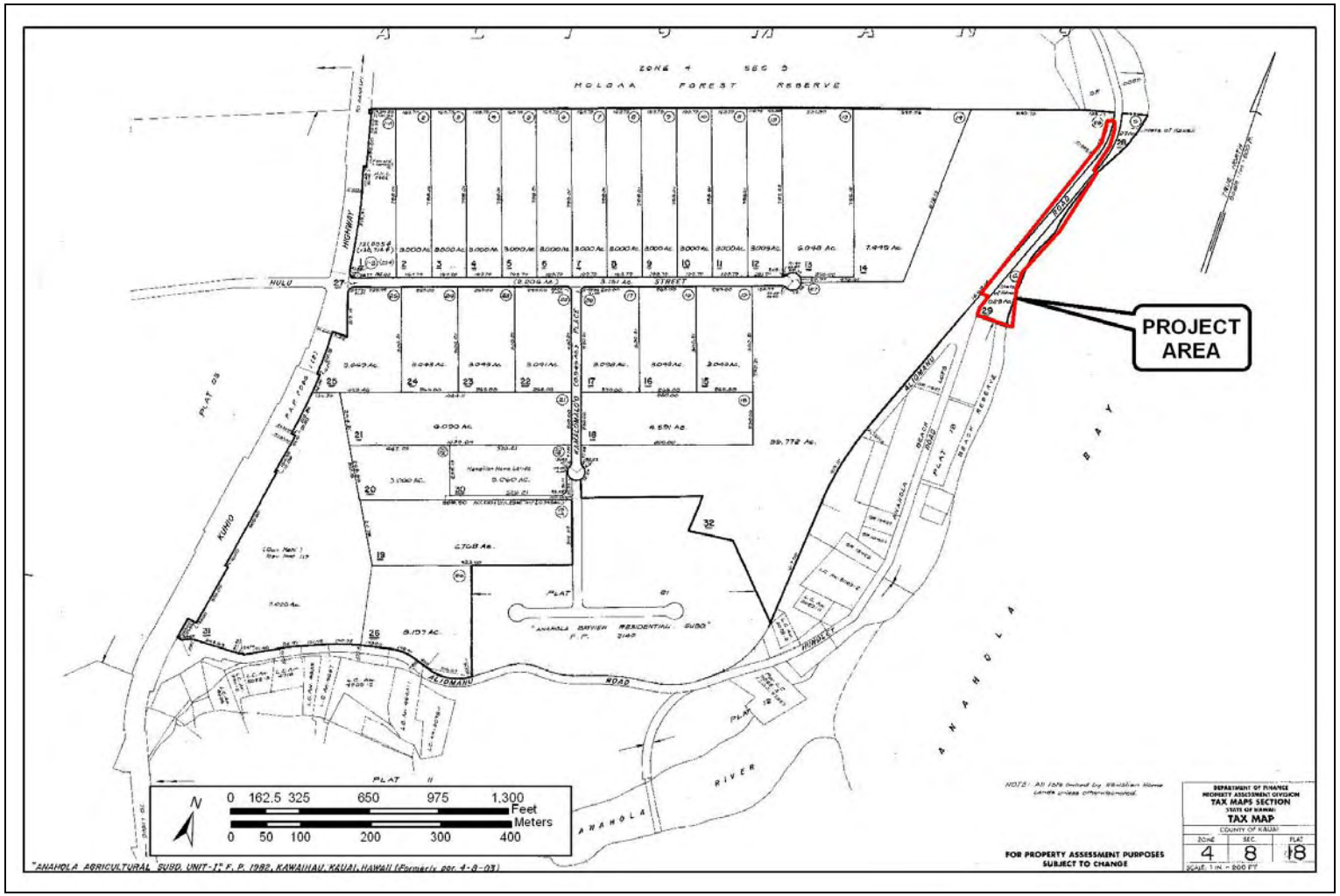

Figure 2. Tax map (4-8-018) with overlay of area of proposed work

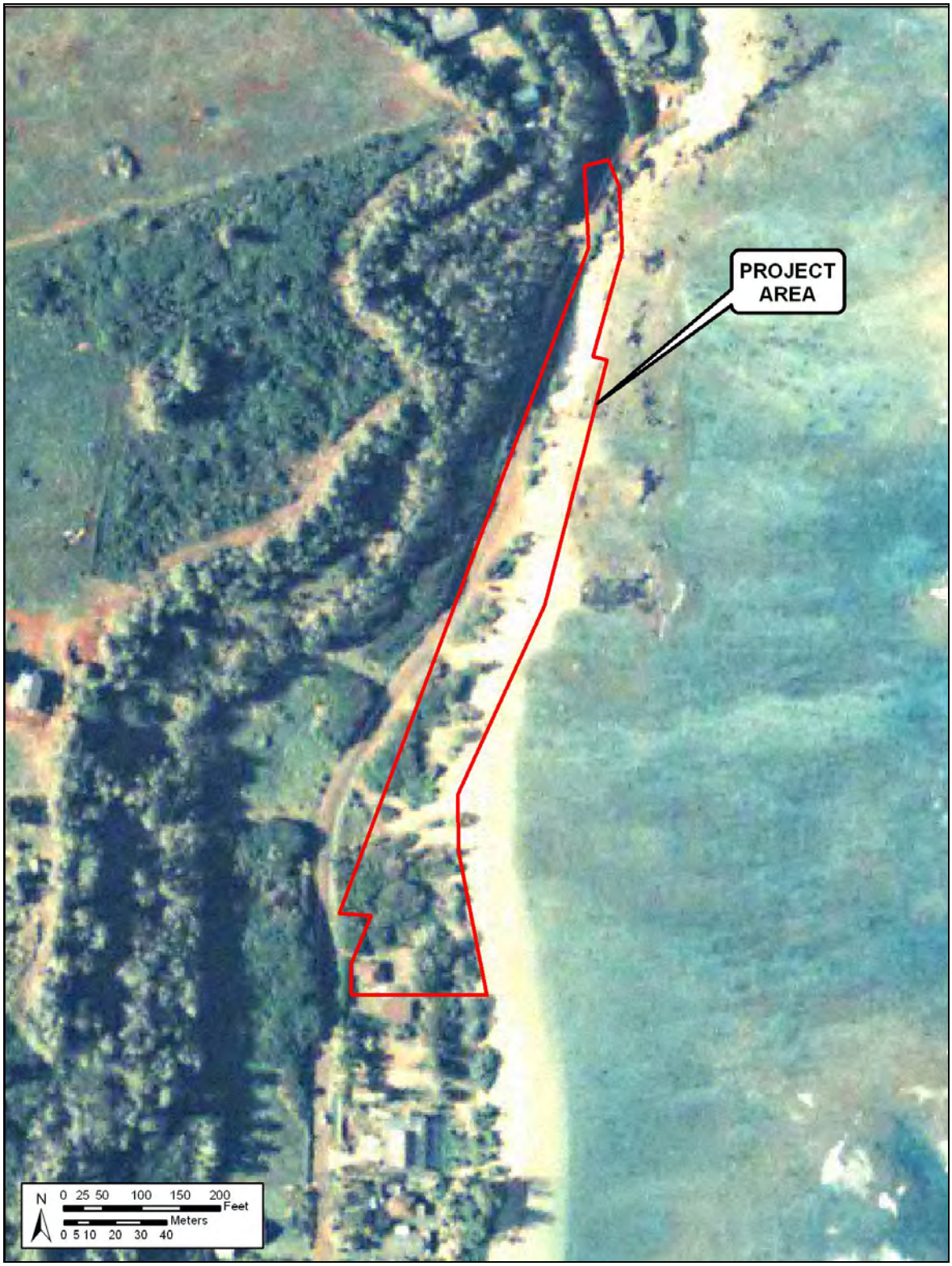

Figure 3. Aerial photograph, with overlay of area of proposed work

1.4 Environmental Setting

1.4.1 Natural Environment

The proposed project area is in the northeastern-most portion of Anahola, and on the northeast coast of Kaua‘i. Anahola is in the district of Kawaihau, traditionally called Ko‘olau. Anahola Ahupua‘a, comprised of 6,327 acres is the largest of the *ahupua‘a* within the district. The *ahupua‘a* also contains the largest river in the district, Anahola River, that was previously surrounded by numerous agricultural terraces. Handy and Handy (1972:422) measured the cultivation surrounding Anahola River as 1,200 meters wide.

The project area ranges in elevation from sea level to approximately 20 feet above mean sea level. Annual rainfall along the Ko‘olau coast ranges from 25 to 150 inches (Armstrong 1973). Dunes and alluvial benches adjacent to the Anahola River characterize the coastal region of Anahola and overlie Koloa Volcanic Series lavas that are approximately 1.5 million years old (Macdonald and Abbott 1970).

Soil within the project area consists of Beaches (Figure 4). Beaches (BS) occur as sandy, gravelly, or cobbly areas on all the Hawaiian Islands. They are washed and rewashed by ocean waves. The beaches consist mainly of light-colored sands derived from coral and seashells, although a few beaches are dark-colored because their sands are from basalt and andesite (Foote et al. 1972). Burials have been found within beaches sand throughout the islands.

Very little vegetation is present within the project area since most of the area consists of an asphalt road with areas of exposed road grade, and the beach.

1.4.2 Built Environment

The project area contains a portion of ‘Aliomanu Road. There are no structures within the project area.

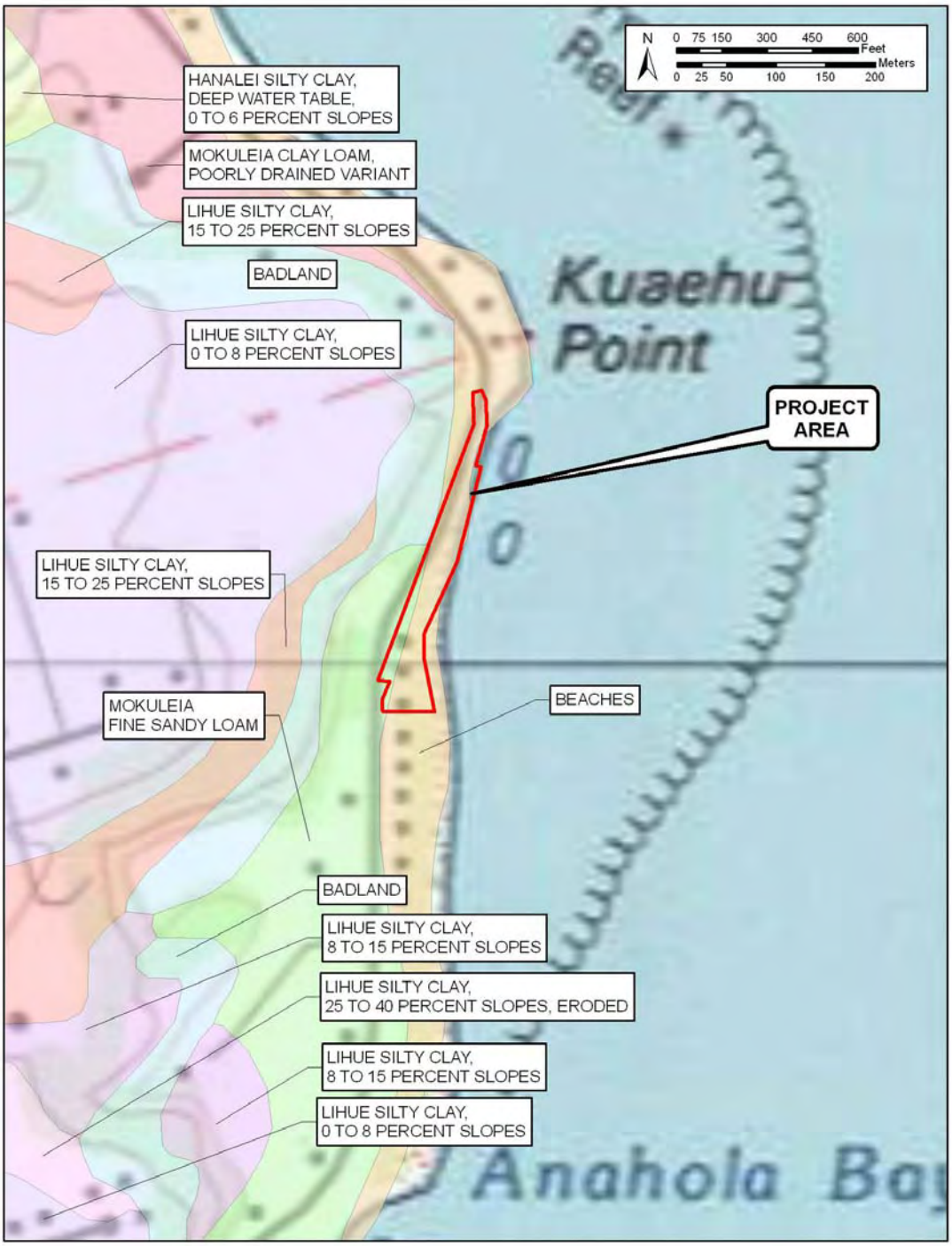

Figure 4. Overlay of the Soil Survey of the State of Hawai‘i (Foote et al. 1972), indicating the soil type within the study area

Section 2 Methods

2.1 Methods

Historical documents, maps and existing archaeological information pertaining to the historic properties in the vicinity of this project were researched at the SHPD library, the Cultural Surveys Hawai‘i library, and the University of Hawai‘i’s Hamilton Library. Kaua‘i/Ni‘ihau Island Burial Council, OHA and members of other community organizations were contacted in order to identify potentially knowledgeable individuals with cultural expertise and/or knowledge of the study area and the surrounding vicinity. Information on Land Commission Awards was accessed through Waihona Aina Corporation’s Māhele Data Base (www.waihona.com). The names of potential community contacts were also provided by colleagues at CSH familiar with people who live in or around the project area. Some of the prospective community contacts were not available to be interviewed as part of this project. For a complete list of individuals and organizations contacted see Table 3, Section 5.

Section 3 Traditional Background

3.1 Overview

Anahola was named after a *mo‘o* or lizard who changed forms; in the ocean he was a merman, and on land, a man. Another *mo‘o*, Pehu-iki, was the guardian of the pond at the mouth of Anahola River called “Alaweo.” The pond was named after the native goosefoot shrub growing on the pond’s banks. Pehu-iki is said to have had three daughters who were often seen sitting on the banks of Alaweo pond combing their long hair. The four *mo‘o* slept in the cave of Hāhā-lina, “to grope through the stickiness” (Wichman 1998:90-91).

The *ahupua‘a* of ‘Aliomanu (lit. “scar made by birds”) lies to the north and the *ahupua‘a* of Kamalomalo‘o (lit. “dry loincloth”) to the south. The northern boundary of the *ahupua‘a* is at Kuaehu Point (lit. “silent, still, lonely”) just north of the project area, and the southern boundary of the *ahupua‘a* is at Lae Līpoa (lit. “līpoa seaweed point”). Coastal zones similar to the project area were traditionally utilized for marine resources, habitation, burials, and ceremonial structures that were often associated with fishing (Bennett 1930).

Clark (2002:12) describes ‘Aliomanu Beach and reef just to the north of the project area. This narrow calcareous sand beach is fronted by a long, wide, shallow reef that is famous for its *limu*.

> The reef is one of the island’s famous seaweed harvesting sites for *limu kohu*, or *Asparagopsis taxiformis*. This prized edible seaweed is found elsewhere in Hawai‘i, but local consumers believe the best *limu kohu* comes from Kaua‘i and specifically from the reefs at ‘Aliomanu, Ka‘aka‘aniu, and Pīla‘a. Commercial harvesting on these reefs has for generations been the domain of a small group of Hawaiian families from Anahola and Moloa‘a, the communities closest to the reefs. *Limu kohu* grows at the edge of the reef where there is a constant flow of water from breaking waves. After it is harvested and cleaned, it is soaked overnight in fresh water to reduce its iodine flavor, drained, and lightly salted. If it is to be sent to market, it is rolled into tight balls. Hawaiians differentiate between *limu kohu līpehe*, a milder flavored light red variety, and *limu kohu koko*, a stronger flavored dark red variety. (Clark 2002:12)

3.2 Mo‘olelo Associated with Specific Place Names

3.2.1 Hōkū-‘alele

The largest peak in Anahola is Hōkū-‘alele, which means “star messenger,” “shooting star,” or “comet.” Tradition tells us that a “three-terraced, paved temple about a hundred feet square with a low wall” was on top of this peak. Lā‘ieikawai and her twin sister Lā‘ielohelohe were born in Ko‘olau, O‘ahu, where their father was a great chief. Lā‘ieikawai and her sister were separated at birth and hidden because their father had sworn to kill any of his daughters that were born before he had a son. It is said that there was a prayer tower on the peak of Hōkū‘alele from which the prophet Hulumāniani announced that Lā‘ieikawai would eventually settle on Kaua‘i (Wichman 1998:91). The peak beside Hōkū-‘alele is Kalalea (“prominent”), and today is called

Kong Mountain, or King Kong’s Profile. Traditionally the shape of the peak was believed to be a shark fin.

3.2.2 Lahemanu

One of the legendary accounts associated with Anahola relates how a large rectangular rock on the slopes of Hōkū‘alele is said to have once been a man who was punished for spying on Lahemanu while she was bathing. Lahemanu was the daughter of an Anahola chief.

The story describes how Lahemanu bathed in a clear pool beneath a cliff in the waters of Anahola. She was so beautiful that her father requested that a maid watch over and protect her from the eyes of others. One day the maid sensed that a man was watching Lahemanu so the next time she went to bathe, Lahemanu brought her *kahuna* to look out for her. When the man realized he had been caught watching Lahemanu, he ran up onto the mountain ridge above the clear pool. He stopped to rest halfway up the ridge and the *kahuna* cast a spell turning the man into stone, where he still sits to this day (Armitage and Judd 1944).

3.2.3 Pōhaku o Kāne

In a mountain near Anahola there is an opening that was made by a mighty chief who threw his spear through the mountain until it came to rest in a stream bed, petrified a few miles *mauka*. Pōhaku-loa speaks of two brothers and a sister who after a long journey, arrived at Kaua‘i. The sister elected to stay on the reef just off Hā‘ena where, as warned, *limu* covered her and *‘opihi* clung to her hair. Pōhaku-loa made it to shore but laid down to rest a few hundred feet inland where he is seen amongst the *pū hala* trees (pandanus or screw pine, *Pandanus odoratissimus*), covered by moss. The other brother, determined to climb the cliffs, would have failed without the assistance of Kāne who helped Pōhaku to the crest of the ridge. That is why the high point is known as Pōhaku o Kāne (Armitage and Judd 1944).

3.2.4 The Arrow and the Swing

The boy Hiku had a special arrow that found its way into the possession of a beautiful princess named Kawelu. When he went to retrieve it, he fell in love with Kawelu and her possessions. Awed by her beauty, Hiku stayed with her for five days until he became annoyed that she would not give him food. He returned to his home, but she followed him because she realized that she loved him. Unable to follow Hiku’s trail through dense vines, Kawelu died. Grieving his loss, Hiku called out to Lolupe, the god that brings lovers together again, to help him find his lost love. Lolupe gave Hiku a plan to retrieve Kawelu from the land of the dead. He and his friends created the largest swings ever; they could reach down to the land of the dead where he used the swing to distract King Muli and to take Kawelu back to the living. He took her spirit and brought it to her body where she came back to life after a little *lomilomi* (massage). Kawelu and Hiku lived many years together making baskets and thanking Lolupe (Knudsen 1946).

Section 4 Historical Background

4.1 Overview

Much of the knowledge of traditional land use patterns is based on recorded information during the early post-Contact period and later oral reports. Although few early visitors reported on Anahola, traditional Hawaiian economy was based on agricultural production, marine exploitation, livestock-raising, and wild plant and bird collection.

4.1.1 Late 1700s – 1850

Early reports relate that Anahola was a small village surrounded by fertile fields.

George Vancouver (1798:221-223) examined the east coast of the island from his ship in 1793 and stated that it was the “most fertile and pleasant district of the island . . .” However, he did not anchor or go ashore due to inhospitable ocean conditions.

In 1840, Peale and Rich, with Charles Wilkes’ United States Exploring Expedition (1844), traversed the coastline on horseback heading north from Wailua:

> The country on the way is of the same character as that already seen. They passed the small villages of Kuapau [Kapa‘a], Keālia, Anehola [Anahola], Mowaa, and Kauharaki, situated at the mouths of the mountain streams, which were closed with similar sand-bars to those already described. These bars afforded places to cross at, though requiring great precaution when on horseback. The streams above the bars were in most cases, deep, wide, and navigable a few miles for canoes. Besides the sugarcane, taro, etc., some good fields of rice were seen. The country may be called open; it is covered with grass forming excellent pasture-grounds, and abounds in plover and turnstones, scattered in small flocks. (Wilkes 1844:69)

In 1849 William Patterson Alexander toured the island of Kaua‘i and described Anahola as:

> ...chequered with kalo patches, and studded with houses ... a delightful view from the south side. The Anahola river, one of the finest on the island, flows through the valley, and spreading near its mouth into a broad sheet of water, surrounds a little islet which has a romantic appearance. (Alexander 1991:123)

4.1.2 Early Population Estimates

Missionaries began taking censuses in Hawai‘i in 1823, however Anahola’s population was not counted until 1847. The population at that time was 280 people, and thus it was the second most populated *ahupua‘a* on the northern shores of Kaua‘i. However, the drastic depopulation of the Hawaiian Islands following the introduction of Western disease has been documented in a number of sources (Bingham 1847; Stannard 1989; Bushnell 1993). According to one estimate, the population of Hawaiians and part-Hawaiians fell from approximately 300,000 in 1778 to 82,593 by 1850 (Schmitt 1968:43, 74). It is thus likely that the population of Anahola prior to the first census was significantly higher.

4.1.3 Māhele Records

During the 1848 privatization of land in Hawai‘i known as the Māhele, 86 individual *kuleana* claims were submitted and 64 claims were granted in Anahola (Table 1). No individual *kuleana* Land Commission Awards (LCA) were awarded in the current project area. Most of the awards are in the delta area or within proximity to Anahola River with the majority of the *ahupua‘a* held by the crown (Indices of Awards 1929).

Māhele records are an important resource for determining land-use during the first half of the 19th century. In general, Anahola claims included *lo‘i kalo* (irrigated terrace for taro), *wauke* (paper mulberry, *Broussonetia papyrifera*), and *noni* (Indian mulberry, *Morinda citrifolia*). Additional parcels were used for house lots, ponds, and some *māla* (garden, cultivated field) of *noni* and *wauke.* The claims for *lo‘i* (wet land) and *kula* (dry land) suggest that people were producing a wide range of crops such as yams, sweet potatoes, and squashes. These crops were likely being sold or traded. House lots were for the most part located on the coast with *lo‘i* parcels on either side of Anahola River to take advantage of the fertile soil and fresh waters of the river’s wide floodplain.

Handy and Handy (1972:423) describe the area:

> There are old abandoned terraces along its banks far upstream, there are old loi from two to four miles inland along Anahola River and its tributary Ka‘alaua Stream and below their point of juncture there are many loi on the flats along the river banks as it meanders through its wide gulch. The delta is three-fourths mile wide, and this was all terraced.

Three LCAs were awarded south of the project area, 5022, 5023, and 5078. Each of the awarded properties contained *lo‘i*, *wauke*, and a house lot (Table 1 and Figure 7 below present information on LCAs in Anahola).

Table 1. Land Commission Award Claims in Anahola

LCA #	Claimant	‘Ili	Land Use	Awarded
00440!	Pua‘ahinehune			No
0069*K	Kaehu, J. W.			No
03030	Kawaimakanui	Palawai, Pauko	House lot	Yes
03411B	Paupau	Kalaiula, Hope	Lo‘i (wetland) or mo‘o (strip), house lot	Yes
04406!	Pa‘a			No
04526	Opae	Keawaakaehu Keakaawaehu	Lo‘i, ‘āpana (lot), wauke (mulberry)	Yes
04530	Ohao	Puoio,Kapahupoko, Kawaikapu	Lo‘i, wauke, house lot	Yes
04535	Upai			No
04538	Ehuelua			No
04547	Anahola	Puamano, Papaihiapohaka	Lo‘i, wauke, house lot	Yes
04554	Walanaeku	Koolaukai, Koolaukani, Koolauhani	Lo‘i, wauke, house lot	Yes
04556	Wailau			No
04559	Wahie	Kaihulu, Palikoa	Lo‘i, wauke,	Yes
04581	Huluhulu	Kanapaa, Kapuonunui,	Lo‘i, wauke, house lot	Yes
04590	Kekuaiki	Hahalina, Kahalina	Lo‘i, wauke, house lot	Yes
04591	Hulu	Kuakemana, Paanoho	Lo‘i, wauke, house lot	Yes
04593	Haili	Haili	Lo‘i, wauke, house lot	Yes
04594	Hiapo			No

LCA #	Claimant	‘Ili	Land Use	Awarded
04611	Pokake	Kapapa, Hanaiki	Lo‘i, wauke, house lot	Yes
04621	Pehuiki	Hoolakaupu, Kapuapala, Kahononahala	Lo‘i, wauke, house lot	Yes
04624	Paa	Kukuluaukai, Paea	Lo‘i, wauke, house lot	Yes
04627	Paia	Kapukalio, Kapoko	Lo‘i, wauke, house lot	Yes
04632	Poopoo			No
04640	Pua‘a	Keakimoma, Keokala	Lo‘i, wauke, house lot	Yes
04643	Piawe	Pukoenieni, Anahola	Lo‘i, wauke, house lot	Yes
04619	Pohaku			No
04651	Po‘opo‘o	Anahola	Lo‘i, wauke, house lot	Yes
04652	Puaeae			No
04655	Puaokekau, wahine	Kakaea	Lo‘i, wauke, house lot	Yes
04656	Puoa	Kanaua, Kapoko	Lo‘i, house lot	Yes
04657	Puaunahi	Hikii, Paeia	Lo‘i, wauke, house lot	Yes
04690	Nalawaia	Kealohi	Lo‘i, wauke, house lot	Yes
04693	Luahele	Palawai, Koananai	Lo‘i, wauke, house lot	Yes
04694	Lono 1 & 2	Puoio, Kumunana	Lo‘i, wauke, house lot	Yes

LCA #	Claimant	‘Ili	Land Use	Awarded
04694B	Lonoiki	Ananakini, Kaluoopu	Lo‘i, wauke, noni	Yes
04699	Lupaieie			No
04711	Mailou	Hakaea, Makaikai	Lo‘i, wauke, house lot	Yes
04712	Makaino	Hioka, Kioka	Lo‘i, wauke, house lot	Yes
04718	Maumau	Anahola	Lo‘i, wauke, house lot	Yes
04719	Makaolo	Hoopala	Lo‘i, wauke, house lot	Yes
04721	Makakane			No
04722	Mahilauawa	Palawai	Lo‘i,‘āpana, noni	Yes
04724	Mona	Kamoku, Kamuliwai	Lo‘i, wauke, house lot	Yes
04727	Mailou	Pikau, Kekau	Lo‘i, house lot,	Yes
04728	Makaino	Mamani	Lo‘i, wauke, house lot	Yes
04730	Manamana	Kalaiwahiwai, Kamuliwai	Lo‘i, wauke, house lot	Yes
04731	Makuakane	Kanapaa, Pouka	Lo‘i,	Yes
04760-1	Naelele	Palawai, Pukalio	Lo‘i, noni, House lot	Yes
04754	Naololi	Pukoanini, Kaupake	Lo‘i, noni, wauke, house lot	Yes
04777	Nanukuwaiki	Kauapa, Kumuahane	Lo‘i, wauke, house lot	Yes

LCA #	Claimant	‘Ili	Land Use	Awarded
04780	Naiwi	Mamania, Kaluanui	Lo‘i, wauke, house lot	Yes
04782	Nakea	Pauko	Lo‘i, noni, house lot	Yes
04797!	Mailou			Wrong Number
04879	Inoaole			No
04879B	Inoaole			No
04909	Kaeleu	Kamalupe, Kaloula, Olelokana	Lo‘i, wauke, house lot	Yes
04913	Kanuhu	Olokuiha, Kamokuapi	Lo‘i, house lot	Yes
04916	Kumukou	Kanakini, Piwaha	Lo‘i, wauke, house lot	Yes
04935	Koleaka	Kalahiki, Hikii	Lo‘i, house lot	Yes
04971	Kalehua	Kanamoa, Kapuakea	Lo‘i, wauke, house lot	Yes
04980	Kuohu	Puuoio, Olelokana	Lo‘i, wauke, house lot	Yes
04981	Kalima‘ele‘ele wahine	N/L	Lo‘i, noni, house lot	Yes
04984	Kole / Kale	Papooulu, Kealuaahokia	Lo‘i, kula, house lot	Yes
04987	Keanuhawai‘i	Pauku, Kaupapa	Lo‘i, noni, house lot	Yes
05022	Kunane	Kamalupa, Puoni	Lo‘i, wauke, house lot	Yes
05023	Kolia, D	Pukoenieni, Kanakahikio	Lo‘i, wauke, house lot	Yes

LCA #	Claimant	‘Ili	Land Use	Awarded
05248	Kaehu, J. W.			No
05078	Kawaaiai	Kahalepua, Pohakumano	Lo‘i, wauke, house lot	Yes
05083	Kiei	Kanakawale, Hikii	Lo‘i, wauke, house lot	Yes
05084	Kaniku	Palikoa, Puapala	Lo‘i, ulu, house lot,	Yes
05089	Kuhaimoana	N/L	Lo‘i, wauke, noni	Yes
05099	Kauhaialae	Puuomano, Olelokana	Lo‘i, wauke, house lot,	Yes
05102	Kuihu	Puuoniunu, Papahikiloaka	Lo‘i, wauke, house lot,	Yes
05104	Kawaohia	Olokauha, Cahill	Lo‘i, wauke, house lot,	Yes
05105	Kawailoa	Pika, Malama	Lo‘i, house lot,	Yes
05106	Kawailoa			Wrong Number
05112	Kupukupu			No
05141	Kaukai	Kuloa, Koapupu	Lo‘i, wauke, house lot,	Yes
05142	Kaliuwa‘a			Wrong Number
05143	Ka‘ahiki			No

LCA #	Claimant	‘Ili	Land Use	Awarded
05170	Kalawaia	Ananakini, Hakaea	Lo‘i, wauke, house lot,	
05190	Kekuaiki		Lo‘i, wauke, house lot,	No
05199	Kuoha	Puamano, Kaluaoopu	Lo‘i, noni, house lot,	Yes
05205	Kaholomoana	Halalua	Lo‘i, wauke, house lot,	Yes
05391	Hilo	Kaakaulua, Papakolea	Lo‘i,‘āpana, house lot,	Yes
09581!	Huluhulu			Wrong Number

4.1.4 1850-1900

In 1852, Inter-island Steamers launched their first attempt at service. In August of that year, the Marianne capsized on her trip from Kaua‘i to Honolulu. Many of the native Hawaiians on board swam to shore, some with children on their backs, to Anahola Bay. This was just one of the many events that began the twenty-year struggle for inter-island steamers. By 1914, the inter-island steamers were finally profitable with 47 regular ports or landings, one of which was in Anahola (Thomas 1983: 31, 133).

Commissioner of Boundaries

In 1862, the Hawaiian Legislature created the Office of Commissioner of Boundaries to determine the exact boundaries of previously un-surveyed *ahupua‘a*. Previously, some *ahupua‘a* had only been defined in the Māhele by traditional names. In 1874, the boundary commission met to identify the boundaries of Anahola through native Hawaiian landmarks. “All persons who had received awards for their lands by names only were required to appear before the Commissioners to have their boundaries determined and identified” (Chinen 1958:23). Based on oral testimony of *kama‘āina*, maps were drawn using their reference points. The testimonies of two Anahola *kama‘āina*, Kauniahi and Pihuiki, were taken and transcribed. Boundary commission testimony for Anahola *ahupua‘a* contains one significant point of reference, Kuaehu, that is mentioned several times. Located on the coast at the northern boundary line of the *ahupua‘a*, just north of the current project area, Kuaehu is said to be a place of sacrifice in the olden days by Kauniahi and a place of worship by Pihuiki.

Although Bennett (1931) described several *heiau* in Anahola, he did not identify a *heiau* within the vicinity of Kuaehu. The *kama‘āina* also described a resting place called “Ahole” just

mauka of Kuaehu. The boundary also references a road that comes up from Keālia to Kilauea and crosses at Keao‘opu. A third reference point, Papa‘aloa, marked Anahola’s southern boundary. Papa‘aloa is on the coast where the peninsula crosses into a fishpond.

Sugar Plantations and Rice Cultivation

Following the Māhele, private land ownership began to change land usage. Sugar plantations quickly developed and by 1877, eight sugar plantations had been established on Kaua‘i. The same year, Makee Sugar Company began cultivating sugar in Anahola. The sugar fields were located on the southern side of Anahola stream and in the delta areas. While the 1878 W.D. Alexander survey map does not provide many details, it shows the “Makee Sugar Company” name extending to the coast of Anahola (Figure 5).

Like most well-watered areas in Hawai‘i, rice crops began replacing former *lo‘i kalo* in the second half of the 1800s. Chinese settlers purchased lands and converted *lo‘i* terraces adjacent to the Anahola River into rice fields. By 1892, Anahola was a rice farming district that was controlled by Mana and Hee Fatt from Kapa‘a. Rice production co-existed with the nearby sugar plantations until the 1930s when rising costs of production and competition from California caused a decline in rice production (Char and Char 1979:13-14).

Travelers passing through Anahola described “rice fields as far as one can see” (Damon 1931:358). Traveling north beyond the village of Anahola, “rugged, inaccessible bluffs meet the beating of waves and the strong sweep of trade winds at the northeastern corner of the Island” (Castle 1917:155). The 1914 Wall survey map shows the extent of agricultural endeavors surrounding Anahola River (Figure 6).

The current project area is located north of the sugar plantation and rice-growing areas and was land held by the Hawaiian government.

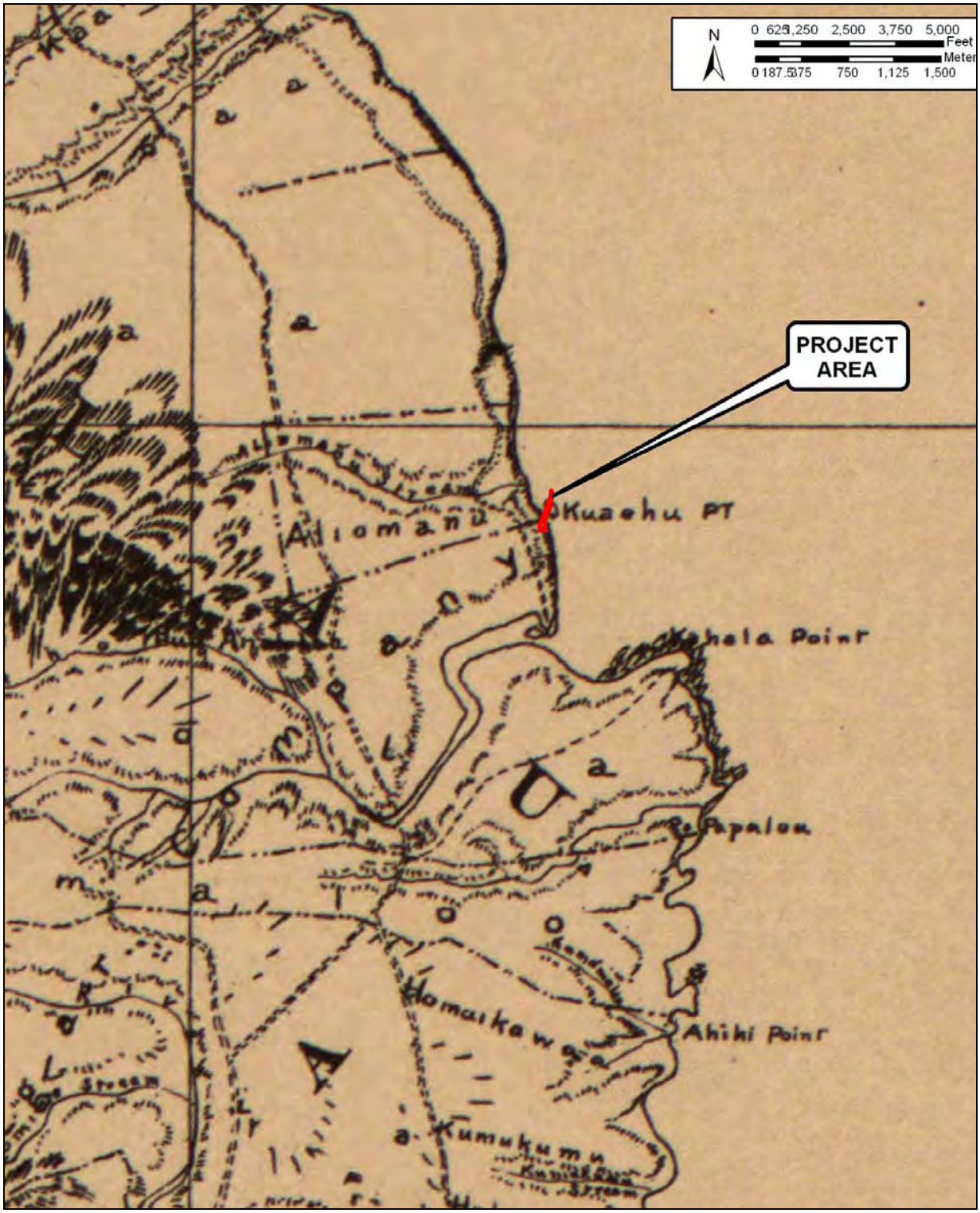

Figure 5. Portion of 1878 Alexander survey map with overlay of project area

4.1.5 1900-present

The Ahukini Terminal & Railway Company was formed in 1920 to establish a railroad to connect Anahola, Keālia, and Kapa‘a to Ahukini Landing and “provide relatively cheap freight rates for the carriage of plantation sugar to a terminal outlet” (Condé and Best 1973:185). The rail system in Anahola traveled along the coast to a landing (Figure 6) that had been built in Anahola Bay in the early 1800s. In 1934, the Lihue Plantation Company absorbed the Ahukini Terminal & Railway Company and Makee Sugar Company (Condé and Best 1973:167). The railway and rolling stock formerly owned by Makee Sugar Company became the Makee Division of the Lihue Plantation. At the same time, in addition to hauling sugar cane, the railroad was also used to haul plantation freight including “fertilizer, etc...canned pineapple from Hawaiian Canneries to Ahukini and Nāwiliwili, pineapple refuse from Hawaiian Canneries to a dump near Anahola and fuel oil from Ahukini to Hawaiian Canneries Co., Ltd.” (Hawaiian Territorial Planning Board 1940:11). Shortly after the Lihue Plantation gained ownership of the railroad, passenger cars ran on the tracks. The last railroad tracks were removed in 1959 (Hilton 1990:378). The tracks still appear on the 1955 Dunn survey map (Figure 7) but are not shown on the 1963 USGS map (Figure 8).

Lihue Plantation closed in November 2000 (Ruehl 2001). Towns dependent on sugar cultivation and production suffered after the closing of the plantation; however, the growing tourist industry has begun to ease the economic affects. The plantation’s fields in Anahola that were formerly Crown Lands reverted to the Department of Hawaiian Home Lands.

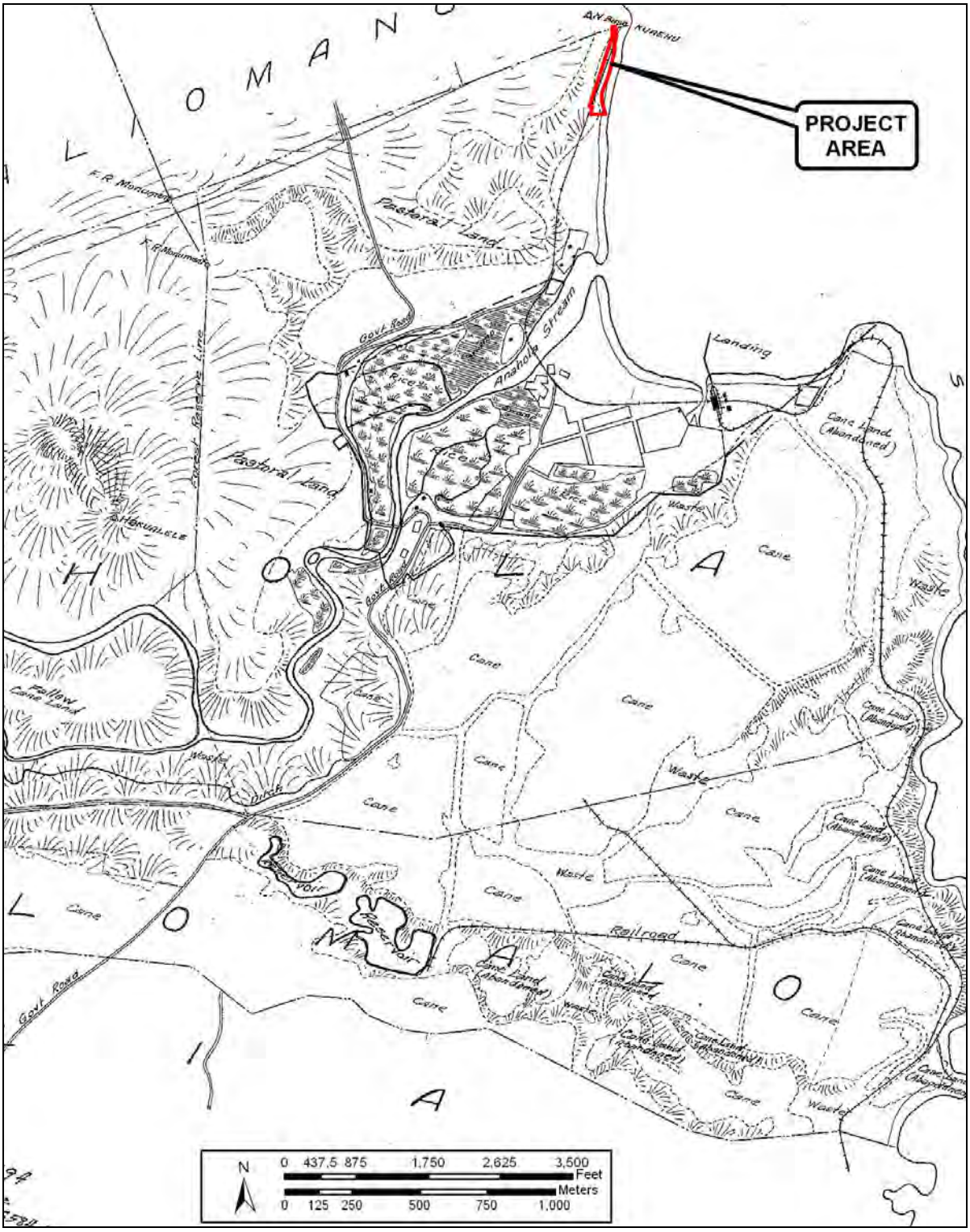

Figure 6. Portion of 1914 Wall survey map with overlay of project area

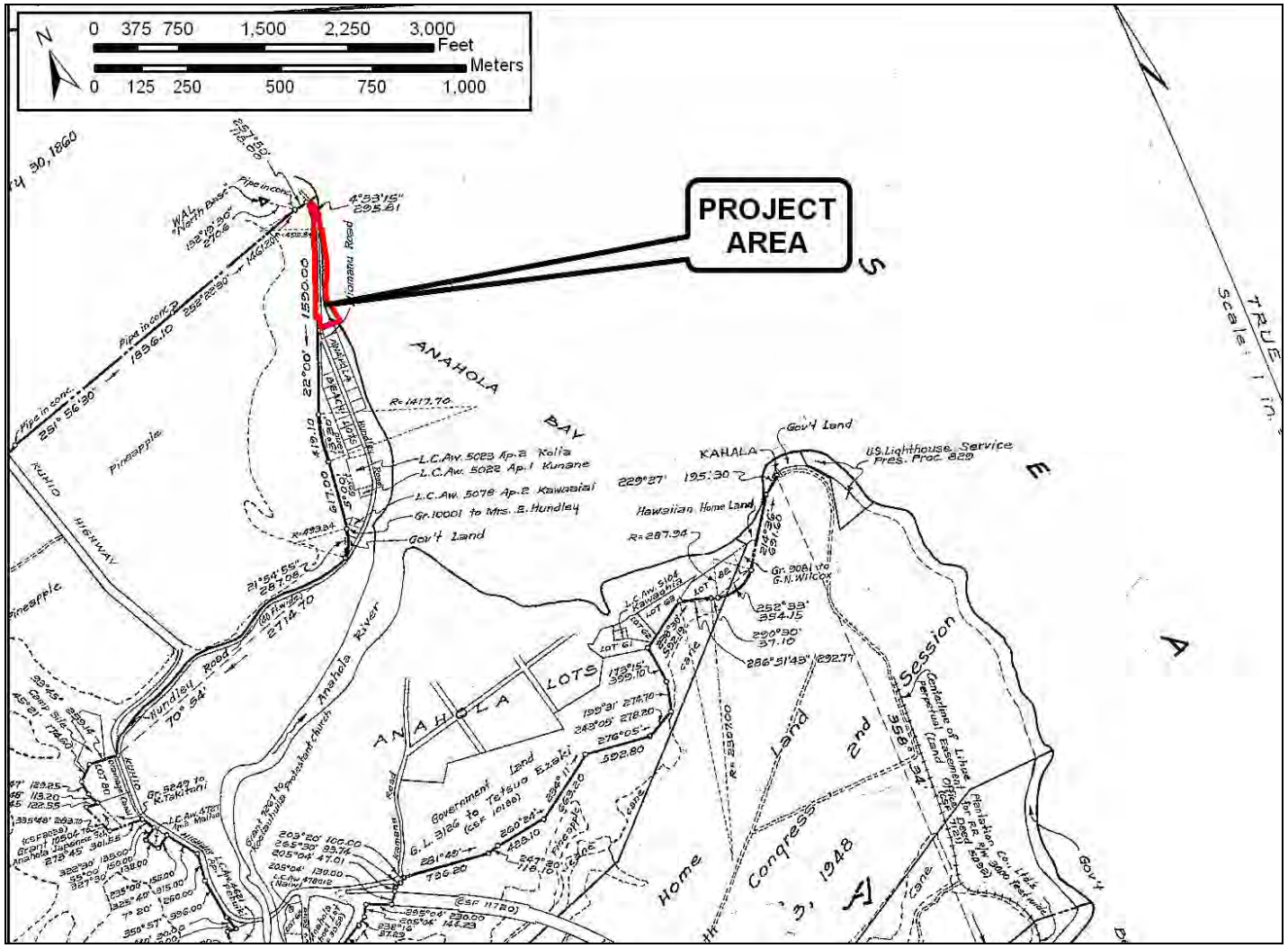

Figure 7. Portion of 1955 Dunn survey map with overlay of project area

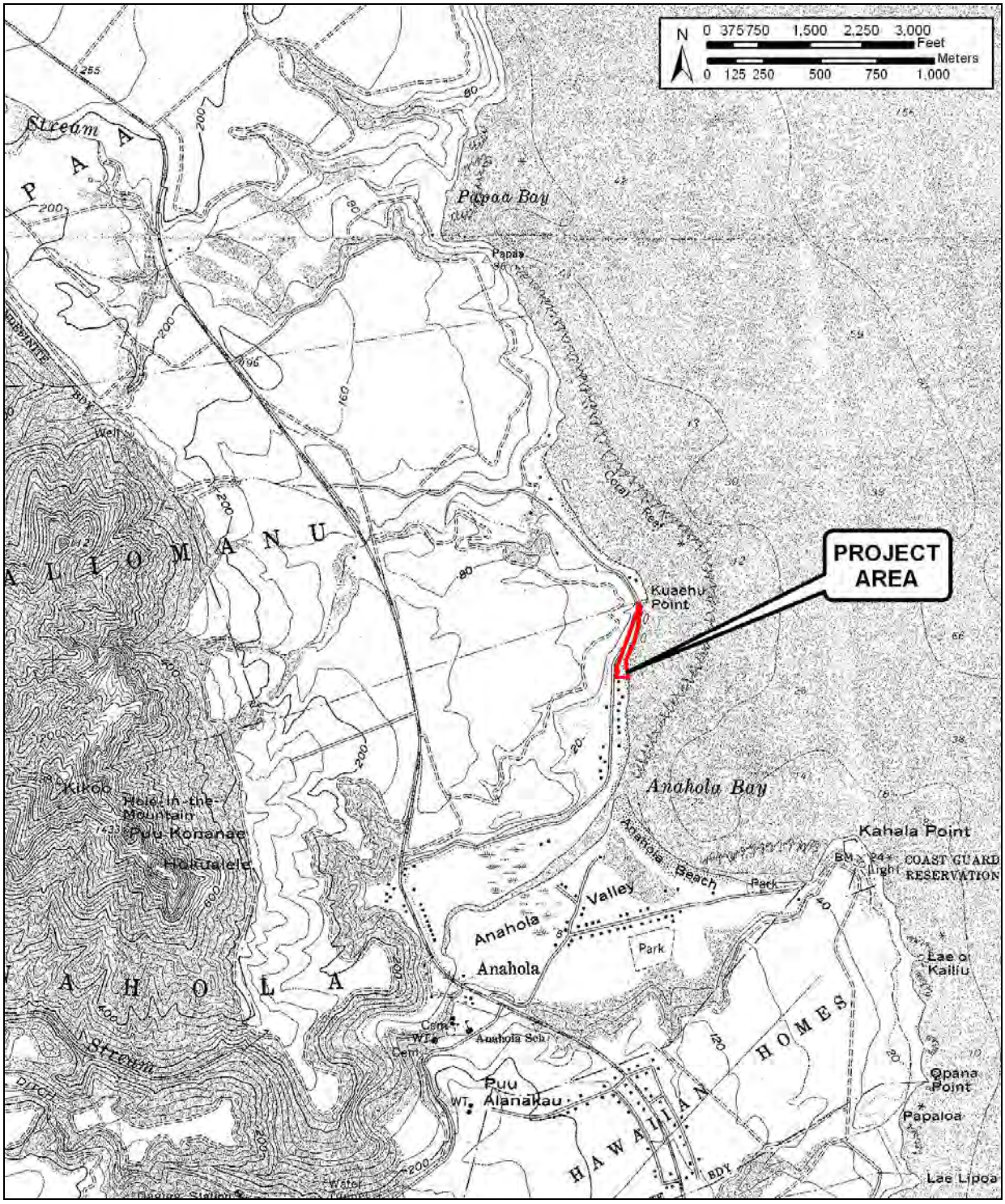

Figure 8. 1963 USGS topographic map with overlay of project area

Section 5 Archaeological Research

5.1 Overview

Although no archaeological studies have been conducted in the present project area, a few have been conducted within its vicinity. A discussion of the findings follows with a list of these projects presented in Table 2 and locations shown on Figure 9. The projects are listed in date order, from oldest to the most recent, and show the author, type of study, and findings.

5.2 Previous Archaeological Findings at the Vicinity of Project Area

Wendell Bennett conducted the first systematic archaeological survey on the Island of Kaua‘i in the late 1920s. Bennett examined and recorded 202 sites on the island and five sites in Anahola.

> Site 113. Aikanaka heiau, at Anahola Point near the end of the bluff on the south side of the bay. Described by Thrum as, “A small heiau, about 40 feet in size. All destroyed.” One large rock marks the spot of this heiau in the cane field.
>
> Site 114. Paeaea Heiau, back of Anahola bay inland from the government road on the north side of the valley, a low site that gives a poor view of the country. Described by Thrum as, “A small round heiau, walls 8 feet high not thick; class not known.”
>
> Site 115. Kuhua Heiau, on the edge of the north bluff of Anahola Valley, about half way between the government road and the sea bluff. It has an excellent view of the valley. The site is now marked by a few tumbled walls in a pineapple field.
>
> Site 116. Dune burials, in the dunes around Anahola bay, many bones that have been found as burials have been uncovered by the shifting sand.
>
> Site 117. Taro terraces, the inland part of Anahola Valley has the usual taro lines, though the edges of the valley are too steep for much cultivation. On the flats near the mouth of the valley, taro is still grown. (Bennett 1931:129)
>
> Site 113, Aikanaka Heiau, and Site 116 are on Anahola Bay and south of the project area. Site 115, Kuhua Heiau, is on ‘Aliomanu Road and south of the project area. The two other sites are inland.

A 1979 survey of upland Hawaiian Homes Farmlands found one site (-473) that was identified as the remains of an animal enclosure. Only two of the four walls remained standing (Kikuchi 1979).

A 1983 cursory survey within the Kēalia Forest Reserve found two sites. SIHP 50-30-04-471 is a C-shaped shelter, and -472 consists of agricultural terraces (Kikuchi 1983).

A reconnaissance project (Ota 1985) by Hawaiian Homelands was undertaken to identify the remains of two previously described *heiau*, ‘Aikanaka (site 113) and Kuhua (site 115). The reconnaissance substantiated reports by Thrum (1907) and Bennett (1931) that the *heiau* were “destroyed” as no remains were found.

Table 2. Previous Archaeological Research at Anahola

Reference	Location	Nature of Study	Findings
Bennett 1931		Island-wide survey	Identified five sites in Anahola
Kikuchi 1979	Anahola, 4-4-8-01:1	Site Survey	
Kikuchi 1983	Reservoir site, Anahola farm plots	Cursory Survey	
Ota 1985	Anahola 4-4-9-10:1,2,3,5. 4-8-various	Archaeological Reconnaissance	Confirmed that the two *heiau* in the Anahola vicinity are destroyed (Bennett’s sites 113 & 115)
Denham et al. 1992	‘Aliomanu Ahupua‘a 4-9-04:1	Archaeological Inventory Survey	Subsurface testing found one fire pit site radiocarbon dated to AD 1483 to 1680
Hammatt and Ida 1992	‘Aliomanu Ahupua‘a 4-9-05, por. 4	Archaeological Inventory Survey	SIHP -1896; inadvertently found burial and cultural layer
McMahon 1992a	Just south of Kuaehu Point	Inadvertently found burial	SIHP -1881; left in situ
McMahon 1992b	Just south of Kuaehu Point	Inadvertently found burial	SIHP -1882; left in situ
Taniguchi 1996	4-8-18:24	Anahola community meeting	Reviewed remnants of Kuhua Heiau (Bennett’s site 115)
Dixon et al. 1997	Anahola Subdivision G and G1 (TMK 4-8-12:6 & 4-8-18-26)	Archaeological Inventory Survey	SIHP # 50-30-04-627 with seven features associated with pre-Contact habitation and radiocarbon dated to AD 1455-1675
McGerty and Spear 1999	Anahola Beach Park, TMK 4-8-14:6	Archaeological Inventory Survey	No findings
Rechtman and Dougherty 2001	38 acres of Dept. of Hawaiian Homelands, TMK 4-4-8-	Archaeological Inventory Survey	Identified SIHP -877, the remains of a former *lo‘i* field, during backhoe trenching. AMS dated to a 2 Sigma calibrated range of AD 1520-1950

	03:05, por. 16		

Figure 9. Portion of US Geological Survey Topographic Map, Anahola Quad (1998), showing previously identified sites and archaeological projects conducted within the vicinity of the project area

Denham et al. (1992) conducted an archaeological inventory survey just north of the current project area in the ‘Aliomanu *ahupua‘a*. One fire pit site was found and radiocarbon dated to AD 1483 to 1680. Artifacts including glass fragments, basalt fragments, buttons, metal and ceramics were also found. Survey results indicated this area was inhabited for many years, and LCA documents for the land awards in the vicinity provided written evidence of land usage.

A 1992 archaeological inventory survey conducted by Cultural Surveys Hawai‘i (Hammatt and Ida 1992) reported on SIHP 50-30-4-1896, which contained a burial and a cultural layer. The survey was conducted in the coastal area at the border of ‘Aliomanu and Pāpa‘a *ahupua‘a*, north of the project area, and in an area that is similar to the current project area. Site -1896 is located at the slope/beach interface along a bank approximately 60 ft. *mauka* of the high tide line. It is at the base of a slope primarily comprised of terrestrial deposits with some marine sand.

Two sites (1881/1882) were found approximately 500 m south of the project area after Hurricane Iniki. Site -1881 is a burial that was found by the owner of a private residence when he attempted to build a fence (McMahon 1992a). Site -1882 is a burial that was found during the excavation of an *imu* (McMahon 1992b).

In 1996, the Department of Hawaiian Home Lands invited the elders of the Anahola community to a community meeting regarding Kuhua Heiau (-0115; Bennett’s site 115). No one that was born and raised in Anahola attended the meeting, but community members viewed Kuhua Heiau from ‘Aliomanu Road. Only limited remains of the *heiau* were found. Nancy McMahon (SHPD) also stated that the integrity of the *heiau* had been destroyed long ago (Taniguchi 1996).

Dixon et al. (1997) conducted an archaeological inventory survey of an Anahola subdivision approximately 450 m southwest of the current project area and just to the north of the northeast terminus of the ‘Aliomanu Road spur. One site, SIHP # 50-30-04-627 with seven features was found beneath the 1-foot deep plow zone and radiocarbon dated to AD 1455-1675. This pre-Contact Hawaiian habitation site and features had been previously disturbed by modern agricultural practices. Dixon et al. (1997) recommended monitoring in this area for future projects.

Two large boulders with several circular and linear worn depressions on their surfaces were located on the *mauka* side of ‘Aliomanu Road during the same survey. The boulders suggest a pre-Contact marine subsistence focus along the Anahola shoreline related to “the practice of chumming the water with pounded fish remains, poison, and perhaps *kukui* nut oil in order to spear fish rising to feed on the bait - a practice often conducted at night by torch light” (Dixon et al. 1997). The depressions on the rock face are described by Kirch (1985:273) as bait cups.

During the 1999 archaeological inventory survey of Anahola Beach Park, south of the project area, six test pits were excavated. No cultural material was found and no recommendations were made, although a caveat regarding the traditional use of sand dunes for burials was presented (McGerty and Spear 1999).

Rechtman Consulting (Rechtman and Dougherty 2001) conducted an archaeological inventory survey of approximately 38 acres of Department of Hawaiian Homelands inland from Anahola Bay and southwest of the project area. No surface features were observed and one site (SIHP -877), the remains of a former *lo‘i* field, was found during backhoe trenching. A charcoal

sample found within the *lo‘i* remains was AMS dated to a 2 Sigma calibrated range of AD 1520-1950. No further archaeological work was recommended although subsurface testing prior to development of a particular lot (#12) that may contain remnants of site -877 was recommended.

Section 6 Community Consultation

Throughout the course of this CIA, an effort was made to contact and consult with Hawaiian cultural organizations, government agencies, and individuals who might have knowledge of and/or concerns about cultural resources and practices specifically related to the project area. A number of attempts (2-7) were made to contact individuals, organizations, and agencies apposite to the subject CIA. This effort was made by letter, e-mail, telephone and in person. In the majority of cases, letters along with a map and aerial photograph of the project area were mailed with the following text:

> At the request of Oceanit, Cultural Surveys Hawai‘i, Inc. (CSH) is conducting a CIA for the ‘Aliomanu Road Repair Project located in Anahola Ahupua‘a, Kawaihau District, on the island of Kaua‘i. Tax Map Keys: (4) 4-8-018: 029, 999. The project is the restoration of a 500-foot stretch of road along the Anahola coast and where applicable, includes repairing the road to pre-erosion conditions on the makai side and a revetment makai of the repaired road to attenuate the waves and reduce erosion. Please see the attached USGS and aerial view maps.
>
> Although the restoration will be limited to just the specific area along the coast, this CIA will include the entire ahupua‘a of Anahola. We are seeking your kōkua and guidance on any of the following aspects of this study:
>
> - General history and present and past land use of the Anahola Area.
> - Knowledge of cultural sites which may be impacted by future development of the Anahola Area- for example, historic sites, archaeological sites, and burials.
> - Knowledge of traditional gathering practices in the Anahola Area, both past and ongoing.
> - Cultural associations of the Anahola Area, such as legends and traditional uses.
> - Referrals of *kūpuna* or elders and *kama‘āina* who might be willing to share their cultural knowledge of the Anahola Area and the surrounding *ahupua‘a* lands.
> - Any other cultural concerns the community might have related to Hawaiian cultural practices within or in the vicinity of the Anahola Area.

The results of the community consultation effort are presented in Table 3 and succeeding sections below. Section 6 (Kama‘āina “Talk Story” Interviews) presents the results of formal interviews conducted for the subject CIA.

Table 3. Summary of Community Consultation

Name	Affiliation, Background	Comments
Ching, Mr. Milton	Kama‘āina	CSH mailed letter and figures on Aug. 28, 2008. Mr. Ching replied on Sept. 4. See below table. CSH sent follow-up email on Oct. 14.
Drake, Ms. Lyah	Kaua‘i Museum, Education Outreach Coordinator/Art Gallery Director	CSH emailed letter and maps on Nov. 5, 2008. Ms. Drake replied on Nov. 6, stating: “…I am a homesteader in Anahola. Unfortunately, I don't have the cultural & historical answer you seek. But, I did call someone I know who is very knowledgeable about this topic. He will be calling you soon to talk story…
Grace, Mr. Mike and Mrs. Sondra	Kama‘āina	CSH mailed letter and maps on Aug. 27, 2008. CSH called on Oct. 10, and interviewed Mr. and Mrs. Grace on Oct. 13. See below table.
Hubbard, Mr. Mark	Kaua‘i Island Burial Council, Former Chair	CSH emailed letter and maps on Aug. 27, 2008. Mr. Hubbard replied and stated that the project will be put on October agenda for the council. He referred CSH to Nani Rogers and Milton Ching. CSH sent follow-up email on Nov. 7. Mr. Hubbard replied on Nov. 8, stating that the council has been busy with a controversial issue and the project did not get on the agenda. He also stated that he resigned as chair.
Ka‘uhane, Mr. Kamahalo	Kanuikapono Charter School, President	CSH emailed letter and maps on Nov. 19, 2008 and Mr. Ka‘uhane replied the same day. CSH sent follow up email on Nov. 23. On Dec. 11, CSH interviewed Mr. Ka‘uhane. See below.
Kekua, Ms. Kehaulani	Kumu Hula	CSH emailed letter and maps on Oct. 18 and Nov. 5, 2008. CSH sent

Name	Affiliation, Background	Comments
		follow up email on Nov. 13 and Nov. 14. CSH called on Dec. 8 but was not able to reach Ms. Kekua. CSH emailed follow-up letter on Dec. 8 and Dec. 15.
Kruse, Mr. John	Kaua‘i Island Burial Council, Kawaihau Regional Rep.	CSH emailed letter and maps on Aug. 27, 2008. CSH sent follow-up email and maps on Oct. 9 and again on Nov. 7.
Lovell-Obatake, Ms. Cheryl	Kama‘āina	CSH mailed letter and maps on Aug. 27, 2008. CSH called on Oct. 10 and re-sent maps and letter via email on Oct. 13. CSH called on Oct. 22 and was unable to leave message. CSH called and left message on Nov. 7.
Lovell Jr., Mr. Hosea Kaina	Kupuna, Kama‘āina	CSH was referred to Mr. Lovell Jr. by Mr. Milton Ching on Sept. 4, 2008. Mr. Ching noted in his email to CSH that he will contact Mr. Lovell Jr. and ask his *mana‘o* regarding Anahola.
Makepa, Mr. Sam	Fisherman, Kama‘āina	CSH met Mr. Makepa while touring the project site on Dec. 11, 2008. See Mr. Makepa’s statement below.
Nāmu‘o, Mr. Clyde:	OHA, Administrator	CSH mailed letter and maps on Aug. 27, 2008. Mr. Nāmu‘o replied on Oct. 6. See below table.
Oi, Mr. Tommy	DLNR, Division of Land Management	CSH emailed letter and maps on Aug. 27, 2008. CSH mailed letter and maps on Oct. 9 and again on Nov. 7.
Paik, Ms. Linda Kaleo	SHPD, Cultural Specialist, History and Culture Division	CSH emailed letter and maps on Aug. 27, 2008. CSH sent letter and maps again on Oct. 31. Ms. Cayan from SHPD replied via email and letter dated Nov. 5, 2008. See below table.
Perry, Mr. Warren	Royal Order of Kamehameha, Kaumali‘i	CSH emailed letter and maps on Aug. 27, 2008. CSH sent follow up

Name	Affiliation, Background	Comments
	Chapter no. 3	email on Oct. 9 and again on Nov. 7.
Pomroy, Ms. Sharon	Kama‘āina	CSH mailed letter and maps on Aug. 27, 2008. CSH called and left message Oct. 10. Ms. Pomroy supplied statement on Oct. 22. See below table.
Torio, Mr. James	Anahola Homesteaders Council, Executive Director	CSH contacted Mr. Torio on Oct. 18 and Oct. 27, 2008. Mr. Torio replied via email on Oct. 27. See below table.
Torio, Ms. Ipo	Kanuikapono Public Charter School, Executive Director	CSH sent letter and maps via email on Oct. 30, 2008. CSH sent follow-up email on Nov. 6 and on Nov. 13.
Trugillo, Mr. William	Ka Leo o Kaua‘i, Information Specialist	CSH emailed letter and maps on Aug. 27, 2008. CSH sent email follow-up on Oct. 9 and Nov. 7.
Tsuchiya, Mr. Rick	Kauai Historic Preservation Review Commission, County Planner	CSH emailed letter and maps on Aug. 27, 2008. Mr. Tsuchiya replied and stated that the project will be put on the KHPRC’s Sept. 4 minutes. See below table.
Yonenaka, Mr. Lloyd	Dept. of Hawaiian Homelands, Information and Community Relations Administrator	CSH sent letter and maps via email on Nov. 5, 2008. Mr. Yonenaka replied on Nov. 6, stating he will review information. CSH sent follow-up email on Nov. 13, and Mr. Yonenaka replied the same day. See below table.

PHONE (808) 594-1888 FAX (808) 594-1865

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

HRD08/3793B

October 6, 2008

Brian Cruz, Cultural Research Specialist
Cultural Surveys Hawai'i
P.O. Box 1114
Kailua, Hawai'i

Re: Cultural Impact Assessment
'Aliomanu Road Repair Project
Anahola Ahupua'a, Kawaihau District, Kaua'i
Tax Map Key: (4) 4-8-018:029 and 999

Aloha e Mr. Cruz,

The Office of Hawaiian Affairs (OHA) is in receipt of your August 27, 2008 letter initiating consultation for a cultural impact assesment ahead of the proposed repair and restoration of a 500-foot stretch of the 'Aliomanu Road along the Anahola coast. Based on the information contained within your letter, the project will is intended to repair the road to pre-erosion conditions and will include construction of a revetment makai of the road to attenuate waves and reduce erosion.

Numerous cultural sites are known to exist within Anahola makai. 'Aikanaka Heiau located at Anahola Point; Paeaea located at the back of Anahola Bay inland from the government road; and Kuhua Heiau located on the edge of Anahola Valley. While these heiau may not be located within the limits of the proposed project area, they do provide some indication as to the traditional cultural significance of the larger area. Iwi Kūpuna are known to exist within the sand dunes and deposits throughout Anahola Bay. Thus, OHA, urges extreme caution when conducting the road repair work because of the road's location immediately adjacent to sand deposits on the north side of Anahola Bay.

OHA seeks assurances that the proposed revetment construction in order to attenuate wave action will not adversely affect the surf breaks within Anahola Bay. Furthermore, OHA is concerned that because of the dynamic nature of the shoreline in this area, construction of the proposed revetment could cause accretion and secretion on either side of the revetment. In this scenario, additional revetments would be constructed to mitigate erosion, resulting in the entire

Brian Cruz, Cultural Research Specialist
Cultural Surveys Hawai'i
October 6, 2008
Page 2

stretch of shoreline being "hardened". Lateral access to shoreline resources should be afforded to the fullest extent possible during construction and ensured at the conclusion of construction activities. Best management practices should be implemented to address compliance with state water quality standards such as turbidity and any oil or fuel spills during construction activity.

OHA recommends that consultation occur with the Anahola Homesteaders Council, Members of the Kaua'i/Ni'ihau Island Burial Council and Kehaulani Kekua. Please remember that this list is not all encompassing, and we are sure additional individuals and/or organizations will be identified as you move forward with your consultation process.

Thank you for initiating consultation at this early stage and we look forward to the opportunity to review the completed cultural impact assessment. Should you have any questions, please contact Keola Lindsey, Lead Advocate-Culture at (808) 594-1904 or keolal@oha.org.

'O wau iho nō me ka 'oia'i'o,

Clyde W. Nāmu'o
Administrator

C: OHA Kaua'i CRC Office

Figure 10. Office of Hawaiian Affairs October 6, 2008 response

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RUSSELL Y. TSUJI
FIRST DEPUTY

KEN C. KAWAHARA
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

STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

November 5, 2008

MEMORANDUM

Log No: 2008.4734
Doc No: 0810PC06
Culture

TO: Margaret Magat, Researcher
Cultural Surveys Hawaii, Inc.
P.O. Box 1114, Kailua, HI 96734

FROM: Phyllis Coochie Cayan P. Coochie Cayan
History and Culture Branch Chief

Subject: 'Aliomanu Road Repair Project, Anahola Ahupua'a, Kawaihau District, Island of Kaua'i.
TMK: (4) 4-8-018:029,999.

This is in response to your letter dated October 30, 2008 for the 'Aliomanu Road Repair Project, Anhaola Ahupua'a, Kawaihau District, Island of Kauai. We apologize for this late response as you noted that an earlier letter was sent to Ms. Paik on August 27, 2008 with no reply to date.

As you may know and agree, it is the people of the place that best know their 'aina and who can provide the best answers to the aspects of the study that you are researching.

Below is a short list of folks who are active in the community and in Anahola who may be interested in assisting you with the history, the cultural sites, traditional cultural practices and other cultural concerns. We have found that a local talk story format works well with na po'e who may be more comfortable in an informal setting and thus share mana'o more easily.

Sharon Pomroy, Native Hawaiian farmer in Anahola	pomroys001@hawaii.rr.com
Department of Hawaiian Homelands – Kauai	808-587-6367
Office of Hawaiian Affairs – Ms. Kaliko Santos, Kauai Office	808-274-3141
The Kupuna Program at Alu Like Inc. – Kauai Office	
The Hawaiian Studies Program at Kauai Community College	
The Kauai Museum	

We hope this short list helps you begin to do outreach in the community and that folks are willing to kokua and share their knowledge of the traditional and cultural practices of the ahupua'a of Anahola that include but not limited to fishing, farming, weaving, canoe building and sacred places.

Any questions, please call me at 808-692-8015. Mahalo for your patience in this matter.

c: Dr. Pua Aiu, Ph.D., SHPD Administrator
Nancy McMahon, Deputy SHPO and Kauai Island Archaeologist
John Kruse, Acting Chairman, Kauai-Niihau Islands Burials Council

Figure 11. Division of State Parks, State of Hawai‘i, Dept. of Land and Natural Resources

COUNTY OF KAUAI
PLANNING DEPARTMENT
4444 RICE STREET, SUITE A473
LIHUE, KAUAI, HAWAII 96766-1326

MEMORANDUM

DATE: September 9, 2008

TO: Cultural Survey's Hawaii, Inc. Attn. Brian Cruz

FROM: Kauai Historic Preservation Review Commission

SUBJECT: Cultural Impact Assessment (CIA) For Aliomanu Road repair Project, Kauai TMK 4-8-18:29,999

The Kauai Historic Preservation Review Commission (KHPRC) met on September 4, 2008 to review your letter requesting input regarding potential impacts to cultural practices as a result of the proposed project.

Based on the information presented and discussions on the matter, the KHPRC accepted the letter for the record and the following was offered:

- That the applicant consult with the State Historic Preservation Division (and Burial Council), the Department of Hawaii Homelands and the Office of Hawaiian Affairs;
- That a community input program (eg. Flyers, notices, meeting with community association, newspaper, canoe clubs, civic clubs, etc.) be initiated by the applicant to obtain information on cultural practices or resources in the project area;
- That individual KHPRC members contact CSH directly with the names of kupuna in the area who may participate in the consultation process;
- That reference checks be undertaken at the Kauai Historical Society, Kauai Museum, State Archives, Bishop Museum, Libraries, Place Names resource documents, and LCA's.

Please feel free to contact us should you have any questions regarding this matter.

Mahalo.

cc: State Historic Preservation Division

Figure 12. Kauai Historic Preservation Review

6.1 Other Statements and Brief Responses

6.1.1 Mr. James Torio

Mr. James Torio is the Executive Director of the Anahola Homesteaders Council. He has been involved with Project Faith which aims to help Native Hawaiians become self-sufficient economically. Mr. Torio was recently awarded with an Environmental Justice Award from the Environmental Protection Agency for his work. In an email to CSH on Oct. 27, 2008 he noted:

> Sea erosion is no different from soil when MAN (or humans) take disrespectful actions to change the topography in the area. What is amusing to this inquiry is the County and State did absolutely nothing to correcting the wrong deeds by a few landowners who decided to build revetment walls to save their property at the expense of others without adequate consultation of permitting. Thus come erosion to other parts of the sea coast.
>
> While it’s maybe necessary on the part of the Government to do the right thing, I'm concerned that more erosion along this coast line will continue if the project is built on more rocks, boulders, and perhaps concrete. While this may be the only course of action currently been decided on, it’s apparent more needs to be added.
>
> Personally I support correcting the wrong in this area but if only rocks and boulders are introduced, then it’s my opinion that this is a band-aid fix. I suggest the following inclusion be added.
>
> 1. If a revetment wall is built, that some layer of sand catchment produced by wave action be placed some 20-30 feet in the water’s edge. I have personal knowledge of seeing how sand is re-introduced fronting the wall when the sea waves turns in its natural state. Wave action causes sand to be delivered and is introduced naturally.
>
> 2. Further study including community dialog should be introduced for those neighbors closest to the road improvement [and] should continue with the broader community kept in the loop. The reason for this is future possibility of continued erosion to the sea line if only a wall is built and no provision for sand retention is included. Thank you.

6.1.2 Mr. Milton Ching

Mr. Milton Ching is a *kama‘āina* whose ancestors come from Anahola. In an email sent to CSH on Sept. 4, 2008, Mr. Ching stated the following:

> According to the LDS church records, my great-great-great-great, Kaehu(k) was born in Anahola in 1789, this is substantiated with the Lahaina Luna school records of 1841, where he is listed as being born in Anahola, and was residing in Kealia. His brother, Kohale(k) provided testimony in the Great Māhele of 1848 for Anahola. I can be reached via e-mail and will respond later as to the other information you are requesting. I know of another person, namely Hosea Kaina

> Lovell, Jr, now 82 years and residing in Anahola. I will speak to him and ask him to share about Anahola. My wife's grand aunt also resided in Anahola and was one of the original awardees for the 999 year lease with DLNR, back in 1909; her name was Mrs. William Alapai Kahanu, I will check my records as to her death date.

6.1.3 Mr. Lloyd Yonenaka

Mr. Lloyd Yonenaka is with the Dept. of Hawaiian Homelands. In an email to CSH to Nov. 13, 2008 he replied:

> We don't have the type of knowledge in house of the area that would be helpful to you. One referral I had was to contact Mr. Kamahalo Kauhane, Executive Director of Kanuikapono Public Charter School in Anahola. He can be contacted via e-mail at kamahalo@kanuikapono.org and you can tell him you were referred her to him by Kaipo Duncan, Land Agent from the Department of Hawaiian Home Lands. Kamahalo is knowledgeable of the area and can refer you to prominent elders and kupuna in the community.

6.1.4 Mr. Sam Makepa

CSH spoke briefly to Mr. Sam Makepa on Dec. 11, 2008 while touring the project site. Mr. Makepa is a local fisherman whose ‘*ohana* has lived in the area for generations. He noted that *makai* of the project area is a large fish feeding area where there is a channel that fish enter into and swim with the current to feed. There is also another channel which they use to exit back out into the sea. Mr. Makepa is sure that the building of a sea wall would kill the reef and destroy this fish-feeding zone. “This reef system is fragile and our *kūpuna* fishermen are concerned. Balance is desired for this area,” he said.

Section 7 Kama‘āina “Talk Story” Interviews

Kama‘āina and *kūpuna* with knowledge of Anahola Ahupua‘a and the proposed project area were contacted for participation in this assessment. The approach of CSH to cultural impact studies affords these community contacts an opportunity to review transcriptions and/or interview notes and to make any corrections, deletions or additions to the substance of their testimony.

Presented below are brief backgrounds of each participant, followed by their comments and concerns about the proposed project area.

7.1 Mr. Mike and Mrs. Sondra Grace

CSH interviewed Mr. and Mrs. Grace via telephone on Oct. 13, 2008. They have lived in Anahola since 1986 and have been married for 25 years. Mr. Grace is a Native Hawaiian and both are active in the Hawaiian independence movement. They own and operate ‘Ili Noho Kai o Anahola Bed and Breakfast.

When CSH asked Mr. Grace about his *mana‘o* (ideas, thoughts, theories) regarding the proposed ‘Aliomanu Road Repair Project, he stated:

> The project is all right. The road can be a little better.The problem is the engineering people are all wrong. I don’t know if the state and the Hawaiian Homes people can get together and lend them some land and dig in the side of the mountain to make the road wider.
>
> Or if they can’t do that, why don’t they get the old bridge that was there. everybody forgot the old bridge, and there’s two ‘Aliomanu roads…It used to be one before. It was the main road before. They can go on the other way to their homes, instead of spending money on sandbags every year. Use money to build the bridge to come around the other ‘Aliomanu to go to their homes. It will be cheaper for them instead of paying those guys to fix the road to put sand bags every year. It’s costing taxpayer’s big money.

Mrs. Grace concurred with her husband. She stated the following regarding the proposed road repair.

> The main thing my husband is saying is you don’t fix the spot where the sand is; it is too small an area. As an alternative, why not build a bridge where the old one used to be. It could even be a two-way bridge because it is not on the ocean. It is over a swampy area where the bridge could be wide enough.

CSH asked Mrs. Grace if she knows of any cultural resources, sites or practices that may be impacted by the proposed ‘Aliomanu Road Repair project. She noted fishing practices and resources, such as the *‘owama* which are prevalent in the ocean by the proposed road repair. Also known as *‘oama* (*Mullidae sp.*), *‘owama* is the young of the *weke* or goatfish.

> There’s regular ‘*owama* fishing there. ‘*Owama* is a tiny fish they catch with bamboo. The old-timers use to love that. They pop up in different areas. Fishing of course is going to be affected every time they build on the shoreline.

Mrs. Grace also stated that there is one endangered Hawaiian monk seal (*Monachus schauinslandi)* by the area of the road repair project. The seal can be regularly found sleeping and resting most of the time.

7.2 Ms. Sharon A. Pomroy

CSH interviewed Ms. Pomroy by telephone on Oct. 22, 2008. She is the proprietor of Lehua Mamo Flower Farm in Anahola, where everything grown is strictly used for food, *lei*(s) or flower arrangements. Born in 1949 on O‘ahu, Ms. Pomroy has been farming on her *mauka* (upland) Hawaiian Homelands land for the last 12 years. In 2007, she was appointed by Governor Lingle to be a member of the ‘Aha Kiole Advisory Committee. The committee is charged with forming an ‘*aha moku* (district assembly) council system that will advise the Department of Land and Natural Resources on how to integrate ancient Hawaiian practices while managing Hawai‘i’s natural resources.

When asked her *mana‘o* on cultural sites, practices and resources in the Anahola area, Ms. Pomroy stated the following:

> Anahola has very few remaining sites that have relations to the Kānaka Maoli culture. Having been under cultivation for both sugar and pineapple, many of the sites have vanished. Where there is [a] significant structure is at the western end of Hokualele Road. In this area *mauka* of Hokualele Road are many stone walls that have fallen into disrepair. Archaeologists who have looked at the walls believe them to be farm terraces. Some of the residents believe it to be a *heiau*. This area has been significantly impacted from large trees growing in the area that have rooted beneath the walls causing most of them to collapse. The eastern end of Hokualele Road is on the hill above the ‘Aliomanu road erosion site. The present road is believed to have been built on a *mauka/makai* Na Ala Hele trail. Some folks who live on Hokualele Road say they have seen Night Marchers on this path. This includes several members of my ‘*ohana* who have seen Night Marchers. Also in the same general area as the stone wall sites is a burial area that old-timers say are pre-historic burials. Near the proposed road reconstruction area in the ocean near the shoreline are three large boulders. Story is those *pōhaku* were *po‘e kanaka* [Hawaiian people] who had defied a *kapu* [prohibition] and were turned to stone for their defiance.
>
> Where Anahola Rd. and Kukuihale Rd. meet near the ocean above Anahola Beach Park is a site that some folks believe to be a Luakini Heiau [temple where chiefs prayed and human sacrifices were made]. Some folks also say there is a *leina* [place where spirits leap into the nether world] in the same area but no one can locate or pinpoint that site. There are known sand dune burials all along Anahola Bay from Smith's Beach where the park and camp grounds are to the south bank of Anahola stream.

> Very few of the people living in Anahola are from Anahola. Most folks moved there when DHHL opened Anahola for Homesteaders. One family has lived in the area prior to the overthrow. They are descendants of Konohiki whose management went from the north bank of Kealia stream to the area known today as Larson's Beach. This Konohiki kuleana included the valley of Moloa‘a, Papa‘a, ‘Aliomanu, Anahola, Kamalomalo‘o and Kēalia.

When asked what she thinks of the proposed ‘Aliomanu road repair project, Ms. Pomroy stated:

> As a native Hawaiian living on a Homestead in Anahola, I am not pleased that DHHL lands will be taken to make a new road into ‘Aliomanu. There was a time when Aliomanu Road looped from Kuhio Hwy. in Anahola Valley to the shoreline and back to Kuhio Hwy. in Papa'a. Many years ago, someone brought a lot and closed off the road near the north end of ‘Aliomanu Bay. This leaves two ‘Aliomanu Roads that dead-end within sight of each other. Over the past 20 years, *po e haole* [foreign people] have purchased all of the beach front property along ‘Aliomanu Bay and close the shoreline access into ‘Aliomanu shoreline. Several property owners have built walls along the shoreline to stop the erosion of their property. These walls have changed the current flow along the shoreline and are responsible for the erosion of ‘Aliomanu Road. They have also caused two homes along the shoreline to lose their front yards and both homes have been condemned because of this erosion. In order for the residents to have a road to get to their property, we must give up more DHHL land.
>
> I do not like to see this happen. Since these people deny the public access to ‘Aliomanu Bay, why should the native Hawaiians give up land to allow them to continue to keep us out of our traditional fishing and gathering grounds?

7.3 Mr. Kamahalo Ka‘uhane

CSH interviewed Mr. Kamahalo Ka‘uhane, president of Kanuikapono Public Charter School, while touring the project area and environs on Dec. 11, 2008. The school offers a Hawaiian culture-based educational program from kindergarten to grade 12, and its students are avid users of the environment as part of their curriculum. According to Mr. Ka‘uhane, the land in and around the project area is utilized by the students of Kanuikapono.

Mr. Ka‘uhane first shared his *mana‘o* regarding the construction of the proposed seawall and road repair via email on Nov. 19, 2008.

> I spoke with a few community members as well as local fisherman that are concerned about this project. They view it as a huge problem that will fix ‘Aliomanu’s area temporarily. The long-term affect will be the erosion happening on the shorelines on both sides of the proposed 500 ft. wall. Our ahupua‘a has already been affected by the water diversions up mauka thus causing a change in our ocean’s currents. We have a dried-up river on the Kapa‘a side of the bay that has no water going into the ocean. On the other end of Anahola Bay (Princeville

> side), our river mouth’s water level and water movement has dropped tremendously. For a whole month, I witnessed three machines moving sand from the river mouth for temporary revetment down the street. Our community and local fishermen were not too happy. Because of that temporary fix, there’s already a change in that river mouth that has affected our fish life. Reef fishes are being seen washing up. Data must be seen and the rationale of why the planners felt that taking sand from the river mouth was the most logical place to bag sand??? Especially since the moi fish needs to move up river? Was that the only option?

On Dec. 11, 2008 Mr. Ka‘uhane took CSH on a tour of several sites used by the students as well as the actual project area. The first stop on the tour was the construction site where the Kanuikapono Charter School intends to construct a new facility that will assist in the growth of both the school and the town. Kanuikapono envisions a community revival where families will come and be involved, and where the school will serve as bridge into education for 21st century ‘*āina*-based learning in Anahola.

Regarding Kanuikapono’s vision for the school, Mr. Ka‘uhane said:

> Our goal, our vision, is to create an authentic learning environment that is the 21st century *ahupua‘a*. Our children will learn about *ahupua‘a* resource management at all levels of the *ahupua‘a* including what is done up in the mountains, on the flat land, on the shore, and in the sea. They will be educated in *hula*, the chants, astronomy, planning, how to track fish, how to build and navigate canoes, how to take care of the reefs, how to conduct water and soil tests; this will be our curriculum. At the high school level, we will provide concentrations in environmental stewardship, performing arts, and *ahupua‘a* resource management. The environment is their learning lab.

Mr. Ka‘uhane believes that the new school facilities will allow them to expand their program, and it will also increase the number of children the school can accommodate. Currently, there is a long waiting list of children who would like to be part of the charter school’s program, but the present facilities are not large enough to meet the high demand. The school is K-12 certified, and it is recognized by the State Board of Education as one of only 25 Hawaiian charter schools. This is the only one on the east side of Kaua‘i and its students travel from as far as Hā‘ena to Wailua.

A few blocks from the project site, Mr. Ka‘uhane pointed out the oceanfront where Hawaiian Homeland properties and private homes can be found. He showed the ‘Aliomanu River mouth where sand had been dredged and taken by developers for over a month.

Figure 13. Nearby site where heavy dredging was done. According to Mr. Kauhane, water quality here has been poor since the dredging was completed.

He discussed the many concerns being voiced from people in the community and the parents of students attending the charter school over the removal of sand:

> They brought in this heavy machinery, and we were watching them work. We saw what they were doing and began questioning what impact is that going to have on our reefs? What impact is that going to have on the Anahola *ahupua‘a* system? Already we have seen a major shift in the current quality of water in the area. It has turned really brown.

Mr. Ka‘uhane explained that at the ‘Aliomanu River mouth, an outlet of water is supposed to come out from down the mountain. However, according to him, the stream is not flowing because of a private owner up in the *ahupua‘a* diverting the water. “Our bay is shifting because of choices like these,” he said.

When CSH asked about the cultural sites, Mr. Ka‘uhane indicated the various stone walls that are likely be a *heiau*. He noted that through research, it was determined that this *heiau* is called “Kuhua.”

Figure 14. Kuhua Heiau near project site.

Closer to the project area, he pointed out the roadblocks along the erosion line, making travel unsafe on both sides of the road.

Figure 15. Project site with roadblocks

Mr. Ka‘uhane noted that the project area is an important part of the school’s program to teach children how to study the reef, *limu*, and traditional voyaging. In answer to CSH’s question why the school uses this particular area, Mr. Ka‘uhane responded that the reef is shallow enough at the project area to be used by students:

> This is really the perfect place for our program. I want to know, if they come in and build this seawall, how are we going to enter with our canoes? What is going to be the impact on our ability to use this site to instruct a future generation of children educated in the traditional ways? How are we going to get our boat in the water? What is the beach going to look like? As you can see now, it is quite secluded. Not many people come out here. Is that going to change once they restore the road and build the seawall? Are more people going to be here? Also the area is known for its *limu kohu* which is particular to Kaua‘i, and that is important. We do not want this project to affect the area where our kids can be learning.

Figure 16. Photo of the project area by the ocean. It is currently in use by students of the charter school who study the reef, pick *limu*, and launch canoes.

Figure 17. The neighboring property by the project site contains a home that is falling into the water because of coastal erosion.

Mr. Ka‘uhane would like planners to think about how this proposed project might alter erosion patterns and how it might change the shoreline and currents. He urged the consideration of the effects of past projects like the ones up the road from the project area where homeowners built a seawall that resulted in the erosion and destruction of their neighbors’ properties.

> There have been numerous unintended impacts caused by development all along the shorelines of Kaua‘i. Reefs have been destroyed, water patterns have been altered, erosion has occurred in unexpected places. What are going to be the unintended impacts of this project? A lot of money is going into the rock details of this project but at what cost for the future? For whose benefit is this project?

In the likelihood that *iwi* will be found and disturbed, Mr. Ka‘uhane said:

> I just want to say to them, please be conscious that this is an ocean site with sand dunes, and there were a lot of wars in this area. There are going to be bones in the sand. Also, please be aware that there is always a reason for placement within the *ahupua’a*. They (*kūpuna*, ancestors) were experts. They were way more advanced than what we are today.
>
> There is a heaviness in this area because of the heavy building and use of ceremonial things. A lot of *heiau* have been desecrated in this area. [At] Aikanaka Heiau on the southern bluff once stood a 40 ft wall. There is a sense of pride in

> the culture that is being renewed here. A sense of respect and reverence is being felt about some of the sites.

Mr. Ka‘uhane shared that several *kūpuna* have told him of a possible alternative road. However, there are no specific maps or plans that he can offer to CSH at this time. During the interview, he emphasized concerns about the proposed seawall, as well as some concerns about the ‘Aliomanu road repairs. A possible mitigation effort that Mr. Ka‘uhane would like to propose is that repairs be done to the road, but the ocean is left alone.

Section 8 Cultural Landscape of the Project Area

Discussions of specific aspects of traditional Hawaiian culture as they may relate to the project area are presented below. This section examines resources and practices identified within the project area in the broader context of the encompassing Anahola Ahupua‘a landscape. Excerpts from *kama‘āina* interviews are incorporated throughout this section where applicable.

8.1 Hawaiian Habitation and Agriculture

The major wet-taro-growing lands appear to be south of the project area, where cultivation around the Anahola River was measured as 1,200 meters wide (Handy and Handy (1972:422). Although mid-19th Māhele records show no individual *kuleana* Land Commission Awards (LCA) were awarded in the current project area, many of the land awards were in the delta area or close to Anahola River. On the river’s wide floodplain were numerous agricultural terraces that were remarked upon by various writers (Alexander 1991 edition: 123: Wilkes 1844: 69); Anahola claims indicate *lo‘i kalo* (irrigated terrace for taro), *wauke* and *noni* with additional parcels used for house lots. Ponds and *māla* of *noni* and *wauke* were also prevalent.

Claims for both *lo‘i* and *kula* indicate that people were growing sweet potatoes, yams, and squashes for trade and for selling. House lots were usually located along the coast while *lo‘i* parcels were situated on both sides of the Anahola River where fresh water and fertile soil were abundant. Three LCAs were awarded south of the project area: 5022, 5023, and 5078. Each of the awarded properties contained *lo‘i*, *wauke*, and a house lot.

None of the community participants had any specific information on traditional habitation and agricultural practices in the vicinity. Traditional habitation does not appear to be indicated for the project area or its immediate vicinity as no LCA claims were made and the location is not conducive to agricultural cultivation.

8.2 Marine and Freshwater Resources

The project area is located in front of Anahola Bay, with ‘Aliomanu Beach and reef nearby. Ancient Hawaiians who lived near or around the vicinity of the project area would have been able to take advantage of the abundant marine resources. In addition, the project area is about 1,500 feet away from the fresh waters of Anahola River, where Kānaka Maoli would have found fresh water fish. Gathering *limu* was most likely prevalent in the past, and to this day, the long, wide and shallow reef remains famous for the quality of its *limu*. Families from Anahola and nearby communities continue to harvest the *limu kohu* that grows at the reef’s edge where waves constantly break (see Clark 2002:12).

Mr. and Mrs. Grace shared that fishing practices and resources are prevalent by the project area. Mrs. Grace noted that *‘owama* is a tiny fish that is caught with bamboo by “old-timers.” There is also an endangered Hawaiian monk seal that regularly sleeps and rests by the area of the proposed road repair. Mr. Ka‘uhane discussed the regular use of the project area’s shoreline by Kanuikapono Charter School students to learn about the reef and to pick *limu*. He also mentioned the area as being used by local fishermen. Mr. Makepa also stated that the project area is a large

fish feeding area where there is a channel that fish can enter into and another channel to exit out once they are done feeding.

8.3 Burials

The project area is situated along the coastline were burials have been inadvertently found. Two burials (SIHP-1881/1882) were inadvertently found approximately 500 meters south of the project area after Hurricane Iniki, and the remains of one individual were found just across the Papa‘a Ahupua‘a boundary, north of the project area. The burials indicate that pre-Contact land use in Anahola was not restricted to the valley floor.

Ms. Sharon Pomroy and Mr. Kamahalo Ka‘uhane along with OHA cautioned about the likelihood of burials being found near or within the project area. Mr. Ka‘uhane emphasized that “this is an ocean site with sand dunes, and there were a lot of wars in this area. There are going to be bones in the sand…”

8.4 Wahi Pana (Storied Places)

The project area is associated with general *mo‘olelo* about Anahola as well as its geographical features. One of the narratives is about how Anahola was named after a *mo‘o* who changed forms; while in the ocean he was a merman and while on land, a man. Another *mo‘olelo* tells of the tallest peak in Anahola which is Hōkū-‘alele, which means “shooting star,” “comet,” or “star messenger.” It is said that a paved, three-terraced temple was on top, where a prophet announced the prophecy that Lā‘ieikawai would settle on Kaua‘i.

The legend of Lahemanu tells of the origin of a large rectangular rock on the slopes of Hōkū-‘alele, which was once a man punished for spying on Lahemanu, the beautiful daughter of a chief. A similar narrative was told by community member Ms. Pomroy, who shared that near the proposed reconstruction of the ‘Aliomanu Road are three large boulders in the ocean. The three *pōhaku* are said to be “*po‘e kanaka* who had defied a *kapu* and were turned to stone for their defiance.”

Other *mo‘olelo* from both historical and community participant sources described the prized quality of marine resources by the project area, namely the *limu kohu*. In other *mo‘olelo*, the sacred nature of the Anahola area is emphasized. Ms. Pomroy shared that where Anahola Road and Kukuihale Road meet near the ocean above Anahola Beach Park is a *luakini heiau*. She said there is also a place to leap to the spirit world or *leina* in the same area. Ms. Pomroy noted that the eastern end of Hokualele Road is on the hill above the project area. She stated that those living on this road have seen “Night Marchers,” as the road was built on a *mauka/makai* Na Ala Hele Trail, referring to a belief that on certain nights a procession of ghosts popularly known as “night marchers” (*huaka‘i pō*) can be seen and heard as they travel to familiar places they once frequented in life.

Contributors to this CIA including Ms. Pomroy noted the presence of several *heiau*, which they stated have been damaged or destroyed. Mr. Ka‘uhane pointed out the presence of Kuhua Heiau and Aikanaka Heiau, while OHA listed three: Aikanaka Heiau located at Anahola Point, Kuhua Heiau on the edge of Anahola Valley, and Paeaea Heiau at the back of Anahola Bay inland from the government road.

Section 9 Summary and Recommendations

At the request of Oceanit, Cultural Surveys Hawai‘i Inc. (CSH) prepared this CIA for the proposed ‘Aliomanu Road Repair Project, Anahola Ahupua‘a, Kawaihau District, Kaua‘i, TMK: [4] 4-8-018:029, 999.

Background research shows:

1. Located in the Kawaihau district, traditionally known as Ko‘olau, the project area is north of Anahola River and immediately south of Kuaehu Point, and south of ‘Aliomanu Beach and reef. The reef is one of Hawai‘i’s most famous resources for the prized seaweed *limu kohu*, or *Asparagopsis taxiformis*.
2. Anahola River was once surrounded by numerous agricultural terraces, with cultivation measured as 1,200 meters wide (Handy and Handy 1972:422). Coastal zones similar to the project area were traditionally utilized for marine resources, habitation, burials, and ceremonial structures related to fishing.
3. Radiocarbon dating of a fire pit just north of the current project area in the ‘Aliomanu *ahupua‘a* suggests occupation of this area may date from AD 1483 to 1680.
4. The project area is associated with specific *mo‘olelo* about: the origin of Anahola, named after a *mo‘o* who changed forms, Hōkū-‘alele which is the largest peak in Anahola, Lahemanu (daughter of an Anahola chief), *limu kohu* gathering, fishing, Pōhaku o Kāne, and the boy Hiku who created a swing to retrieve the spirit of Princess Kawelu from the land of the dead.

Attempts were made to contact a total of 20 people for the purposes of this CIA; 13 people responded and 4 *kūpuna* and/or *kama‘āina* were interviewed for more in-depth contributions. The findings of this CIA suggest that there are several areas of cultural interest and concern regarding the proposed ‘Aliomanu Road Repair Project. Community consultation shows:

6. Two participants would like to see a community dialogue with those living close to the road as well as the broader Anahola community as there is concern about continued erosion if only a wall is constructed and there is no provision made for sand retention. A balanced approach was suggested.
7. Four community participants stated that the revetment will change the natural wave action of the shoreline, affect fish life, kill the reef and cause unintended erosion in other places. They pointed to past revetment projects along neighboring properties close to the project area which have led to a change in ocean currents, to water resources drying up, and further erosion. They expressed concern that the project will merely be a “temporary” fix that can lead to more problems.
8. OHA noted the possibility that “the proposed revetment could cause accretion and secretion on either side of the revetment. In this scenario, additional revetments would be constructed to mitigate erosion, resulting in the entire stretch of shoreline being ‘hardened’.”

9. Three community contacts noted that the project area is immediately located next to the sand dunes on the north side of Anahola Bay, where *iwi kūpuna* have been found.
10. The project area and the environs, especially the shoreline, have a long history of use by Kānaka Maoli (native born) for a variety of cultural activities including *limu kohu* gathering, fishing for *‘owama* (*Mullidae sp*., goatfish) as well as other species, and traditional voyaging. The project area is also a known resting place for the endangered Hawaiian monk seal (*Monachus schauinslandi*) and is a large fish feeding area.
11. Three community contacts mentioned the existence of a possible alternative road, namely the other ‘Aliomanu Road that has been cut off from the other end.
12. According to Mr. Kamahalo Ka‘uhane, the project area is an ideal place to provide opportunities for traditional learning for students.
13. Three participants noted the existence of several heiau in the vicinity of the project area, including Kuhua Heiau.
14. Ms. Sharon Pomroy noted the presence of “Night Marchers” (*huaka‘i pō* or *pō kāne*) on the Hokualele Road above the project area.

The findings of this CIA indicate that there is a wealth of native Hawaiian cultural resources, beliefs and ongoing practices associated with the proposed project area and immediate vicinity. The results of this CIA present a number of possible mitigation measures for the landowner/developer’s consideration. The following recommendations are offered as a way to begin to address some of the concerns expressed by study participants in the statements presented in Section 5 and Section 6 and mitigate potential adverse impacts to Hawaiian cultural resources, beliefs and practices:

15. In light of statements made by some community participants regarding the proposed revetment *makai* of ‘Aliomanu road, and that for at least one community member who strongly felt that the revetment should be excluded, it is suggested that:
    a. Alternatives for structures *makai* of the road should be evaluated and the pros and cons of each alternative presented to the community.
    b. At all times, a balanced approach with consideration of potential, unintended impacts to the shoreline, ocean currents and fish life, and cultural access to the project area is recommended.
16. Based on the concern expressed by three community participants that the project area is adjacent or near the sand dunes of Anahola Bay, it is recommended that “extreme caution” be exercised while conducting the road repair work. In the event that any human remains or other significant cultural deposits are encountered during the course of project activities, all work in the immediate area should stop and the SHPD, OHA and the Kaua‘i/Ni‘ihau Island Burial Council should be promptly notified.
17. OHA recommends that “lateral access to shoreline resources should be afforded to the fullest extent possible during construction and ensured at the conclusion of construction activities.” Further, OHA suggests the implementation of “best

management practices” in order “to address compliance with state water quality standards such as turbidity and any oil or fuel spills during construction activity.”

18. Community contact Mr. James Torio recommends that “if a revetment wall is built, that some layer of sand catchment produced by wave action be placed some 20-30 feet in the water’s edge…wave action causes sand to be delivered and is introduced naturally.”
19. Community contacts Mr. Mike and Mrs. Sondra Grace suggest the building of a bridge that would facilitate the use of the other ‘Aliomanu Road, instead of constantly fixing the road at an area they regard to be too small.

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