

CONSERVATION DISTRICT USE APPLICATION (CDUA)

All permit applications shall be prepared pursuant to HAR 13-5-31

State of Hawaii	File No.: Acceptance Date: Assigned Planner:	180-Day Expiration Date: for DLNR Use
PROJECT NAME 'Aliomanu Road	Repair	
Conservation District Subzone	: Resource	
Identified Land Use: R-5 Marir lands	ne Construction (D-1) Drec	dging, filling, or construction on submerged
(Identified Land Uses are foun	d in Hawaiʻi Administrativ	e Rules (HAR) §13-5-22 through §13-5-25)
Project Address: 'Aliomanu Ro	oad	
Tax Map Key(s): 4-8-018:028,0)29	District: Anahola
Ahupua'a: 'Aliomanu County: Kaua'i		Island: Kaua'i
Proposed Commencement Da	te: 04-2020	Proposed Completion Date: 04-2021
Estimated Project Cost: \$2,20		
TYPE OF PERMIT SOUGHT	Board Permit []	Departmental Permit
ATTACHMENTS		
	roject cost for Board Pern nental Permits (<i>ref §13-5-</i> 3	nits, but no less than \$250, up to a maximum of 32 through 34).
5 250 Public Hearing Fee <i>(\$250 pl</i>	•	13-5-40)
\boxtimes 20 copies of CDUA (5 hard +	15 hard or digital conies)	
		
	Assessment (EA) <i>or</i> Draft /	' Final Environmental Impact Statement (EIS)
☑ Draft / Final Environmental A or Statement of Exemption☑ State Historic Preservation I	Assessment (EA) <i>or</i> Draft / Division HRS 6E Submittal	
 ☑ Draft / Final Environmental A or Statement of Exemption ☑ State Historic Preservation I (dlnr.hawaii.gov/shpd/revieus) 	Assessment (EA) <i>or</i> Draft / Division HRS 6E Submittal ew-compliance/forms)	Form
 ☑ Draft / Final Environmental A or Statement of Exemption ☑ State Historic Preservation I (dlnr.hawaii.gov/shpd/revie ☑ Management Plan or Compression 	Assessment (EA) <i>or</i> Draft / Division HRS 6E Submittal ew-compliance/forms) ehensive Management Pla	Form an (<i>ref §13-5-39)</i> if required
 ☑ Draft / Final Environmental A or Statement of Exemption ☑ State Historic Preservation I (dlnr.hawaii.gov/shpd/revieus) 	Assessment (EA) or Draft / Division HRS 6E Submittal ew-compliance/forms) ehensive Management Pla etermination (ref Hawai'i	Form an (<i>ref §13-5-39</i>) if required <i>Revised Statutes 205A)</i>
 ☑ Draft / Final Environmental A or Statement of Exemption ☑ State Historic Preservation I (dlnr.hawaii.gov/shpd/revie) ☑ Management Plan or Compr ☑ Special Management Area D ☑ Shoreline Certification (ref § 	Assessment (EA) or Draft / Division HRS 6E Submittal ew-compliance/forms) ehensive Management Pla etermination (ref Hawai'i 13-5-31(a)(8)) if land use i	Form an (<i>ref §13-5-39</i>) if required <i>Revised Statutes 205A)</i>
 ☑ Draft / Final Environmental or or Statement of Exemption ☑ State Historic Preservation I (dlnr.hawaii.gov/shpd/revie) ☑ Management Plan or Compr ☑ Special Management Area D ☑ Shoreline Certification (ref §) ☑ Kuleana documentation (ref) 	Assessment (EA) or Draft / Division HRS 6E Submittal ew-compliance/forms) ehensive Management Pla etermination (ref Hawai'i 13-5-31(a)(8)) if land use i §13-5-31(f)) if applying fo	Form an (<i>ref §13-5-39</i>) if required <i>Revised Statutes 205A</i>) as subject to coastal hazards.

REQUIRED SIGNATURES

Applicant
Name: Department of Public Works
Title; Agency: County of Kauai
Mailing Address: 4444 Rice Street, Suite 275
Lihue, HI 96766
Contact Person & Title: Lyle Tabata, Deputy County Engineer
Phone: (808) 241-4994
Email: Itabata@kauai.gov
Interest in Property:
Signature: Lyle Tabata Digitally signed by Lyle Tabata Date: 2019.04,08 07:57:26 -10'00' Date:
Signed by an authorized officer if for a Corporation, Partnership, Agency or Organization
Landowner (if different than the applicant)
Name: Same as applicant
Title; Agency:
Mailing Address:
Phone:
Email:
Lyle Tabata Digitally signed by Lyle Tabata Date: 2019,04,08 07:57:58 Signature: Date:
For State and public lands, the State of Hawai`i or government entity with management control over the parcel shall sign as landowner.
Agent or Consultant
Agency: Oceanit
Contact Person & Title: Dayananda Vithanage, Ph.D., P.E., Technical Director
Mailing Address: 828 Fort Street Mall, Suite 600_
Honolulu, HI, 96813
Phone: (808) 531-3017
Email: dvithanage@oceanit.com
Signature: Date: Date:
For DLNR Managed Lands
State of Hawai`i
Chairperson, Board of Land and Natural Resources State of Hawai'i
Department of Land and Natural Resources P.O. Box 621
Honolulu, Hawaifi 06800 0621

Signature:	Date:

PROPOSED USE

Total size/area of proposed use (indicate in acres or sq. ft.): 0.42 acres total (0.13 acres of road repair + 0.29 acres of revetment)

Please provide a detailed description of the proposed land use(s) in its entirety. Information should describe what the proposed use is; the need and purpose for the proposed use; the size of the proposed use (provide dimensions and quantities of materials); and how the work for the proposed use will be done (methodology). If there are multiple components to a project, please answer the above for each component. Also include information regarding secondary improvements including, but not limited to, grading and grubbing, placement of accessory equipment, installation of utilities, roads, driveways, fences, landscaping, etc.

Attach any and all associated plans such as a location map, site plan, floor plan, elevations, and landscaping plans drawn to scale (ref §13-5-31).

The proposed repair consists of rebuilding the damaged section of 'Aliomanu Road to a two-lane road with a rock revetment on the seaward (makai) side, as shown in the attached Figure 1. The rock revetment would protect the road from wave damage and erosion and prevent soil erosion runoff into the ocean. The revetment design consists of boulder rocks and a concrete curb along the roadway. The design retains the rocky nature of the existing shoreline, allowing the contractor to use some of the boulders that exist in the project footprint for the revetment structure. In February 2019, DHHL granted a lease in perpetuity to the County of Kauai for the use of this portion of land for the road repair.

The proposed repair and revetment would construct an approximately 390-foot long boulder rock revetment with concrete rubble masonry (CRM) curb walls and a grouted riprap end section along 'Aliomanu Road (refer to construction drawings). To construct the revetment, toe stones will be buried 4 feet below mean sea level (MSL) and the top of the revetment will reach an elevation of approximately +10 feet MSL. Excavated soil not needed to shape the embankment will be removed from the project site. Excavated rocks will be used to build the revetment. All construction activities will take place landward (mauka) of the mean higher high water (MHHW) and out of navigable U.S. waters and federal jurisdiction. 'Aliomanu Road will be repaired with 270 linear feet (LF) of aspalt concrete (A.C.) pavement, three 25 LF transitions, and one 70 LF concrete pavment piece. Each section will be nine feet wide. The revetment would lie seaward (makai) of the road and would be separated by a concrete rubble masonry curbwall transition. Over the course of its expected 50-year lifetime, the proposed revetment may require maintenance to address damage due to large storm events and settling of the structure. Roadway maintenance will likely occur at 15-year intervals.

Two Environmental Assessments (EA) were prepared for this project: the first in 2009 and a second in 2018. The second EA was prepared to update the first EA to include the potential impact of projected sea level rise on the proposed project and evaluates alternative means for re-establishing a safe and reliable vehicular access.

EXISTING CONDITIONS

Please describe the following, and attach maps, site plans, topo maps, colored photos, and biological or archaeological surveys as appropriate:

Existing access to site:

Access to the site is from 'Aliomanu Road, which runs from Kuhio Highway along the Anahola Stream and north along the shoreline to a subdivision at 'Aliomanu Bay.

Existing buildings/structures:

There are no structures other than the damaged road and remnants of an old rock revetment at the site.

Existing utilities (electrical, communication, gas, drainage, water & wastewater):

There are power poles that run along the mauka side of 'Aliomanu Road until they cross to the makai side just north of the project site. There is an active subsurface water line along the road with a valve connection to an existing blow out facility on the ocean side of the road. Storm drainage water from the mauka hillside crosses the road over a depression in the road surface.

Physiography (geology, topography, & soils):

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

Kaua'i 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 Kaua'i is made up of 10 soil associations. Soil association in the vicinity of the project site consists of the Līhu'e-Puhi soils (SCS, 1972). The Līhu'e-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 and occur mainly along the coastline. The Mokuleia soils consist of well-drained soils found along the coastal plains and are 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 active geologic erosion.

Hydrology (surface water, groundwater, coastal waters, & wetlands):

There are no suface water resources in the project area. The nearest fresh water resource is the Anahola Stream, which discharges about 500 yards south of the project site. Rain water runoff from the hillside and the higher areas mauka of the project site sheet flows across a depression in the road surface. This feature will be retained in the road repair and revetment design.

There are no groundwater resources in the area.

There are no wetland resources in the vicinity of the project site.

The shoreline and the nearshore area in the vicinity of the project site is a combination of sand, rock and a reddish clay. Water circulation is driven by variable wave set up produced by the complex nearshore topography. These factors include the local wind climate and water exchange through the offshore fringing reef. The dominant littoral currents flow towards the Anahola Stream mouth where surplus sand interferes with stream outflow. Poor sand supply to the project site and the loss from the littoral drift have resulted in the current erosion and damage to the road.

Sea level rise is predicted to be between 18 inches and 4.5 feet over the next 100 years. Current National Oceanic and Admospheric Administration (NOAA) tide data shows an annual sea level rise of 1.75 millimeters. The proposed road is about 10 feet above mean sea level (MSL) and can accommodate this sea level rise within the design lifetime of 50 years.

Geometric mean turbidity generally varied between 1.0 and 1.8 nephelometric turbidity units (NTUs) at the project site. Turbidity near the Anahola Stream mouth was higher, likely due to the influence of the stream disharge. The Anahola Stream, located south of the roadway repair site, is listed as 303(d) Impaired Water by the State of Hawai'i's Department of Health for nutrients and turbidity.

The site is prone to hurricanes and tsunamis. The repair design addresses hurricane waves but not tsunami wave forces.

Flora & fauna (indicate if rare or endangered plants and/or animals are present):

Shoreline vegetation on the mauka side of the roadway is dominated by ironwood and naupaka. On the makai side of the road, naupaka and tree heliotrope were the dominant species found on the upper beach zones.

The endangered Hawaiian monk seal has been observed basking on the rocks just south of the project site. NOAA is aware of the monks seal's presence in this area. The endangered Hawaiian Hoary Bat is commonly seen in this area and tends to forage at dawn and dusk during non-construction hours. No endangered waterbirds were seen in the vicinity of the project area.

There is a fringing reef roughly 600 feet offshore of the site. The eastern side of the nearshore area at the site consists of rock substrate crusted with corraline algae with patches of microalgae, including Halemida. Occasional coral heads and finger coral were present, and the coral coverage is about five percent. No corals were observed on the west side; the benthic algae were less diverse, less abundant, and shorter in stature, presumably due to the increased wave energy and abrasion in this surge zone. Minimal impacts to marine resources are expected as all work will take place above the MHHW line.

Natural hazards (erosion, flooding, tsunami, seismic, etc.):

Natural hazards consist mainly of tsunami, sea level rise, flooding, earthquakes, and hurricanes. The proposed roadway lies within the tsunami evacuation zone. Wave heights recorded from the 1946 and 1960 tsunamis were 18 and 6 feet, respectively. These wave heights would overtop the roadway. Effects of sea level rise over design life of the structure (i.e., 50 years) were taken into account in the revetment design.

According to the Flood Insurance Rate Map (FIRM), 'Aliomanu Road from Anahola Stream to Kuaehu Point is within the VE Zone with a flood elevation of 10 feet. VE designation indicates a coastal flood zone with high velocities from wave action. Base flood elevation has been determined.

The island of Kaua'i has a low rating of Zone 1 for seismic activity from earthquakes. However, structures were designed to comply with appropriate Federal and County design standards to minimize damage.

Hurricanes can cause severe 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 were designed and constructed in accordance with appropriate Federal and County standards.

Historic & cultural resources:

There are no known archaeological sites in the vicinity of the project site. However, presence of subsurface cultural resources is always a possibility. An onsite archaeologist will monitor excavation and make recommendations in the event that subsurface archaeological resources are uncovered.

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.

EVALUATION CRITERIA

The Department or Board will evaluate the merits of a proposed land use based upon the following eight criteria (ref §13-5-30(c))

1. The purpose of the Conservation District is to conserve, protect, and preserve the important natural and cultural resources of the State through appropriate management and use to promote their long-term sustainability and the public health, safety, and welfare. (ref §13-5-1) How is the proposed land use consistent with the purpose of the conservation district?

The proposed project will repair the existing roadway in order to promote a safe access for the public. The new revetment will protect the new road embankment from future wave damages and will also preserve the natural coastline from further erosion. Currently, erosion of the red soil increases turbidity in the nearshore water. The revetment will prevent further erosion, resulting in water quality improvement. Best management practices (BMPs) will be used during construction to avoid pollutants from construction activity from entering the water. No significant impacts to natural and cultural resources are expected from the project.

2. How is the proposed use consistent with the objectives of the subzone of the land on which the land use will occur? (ref §13-5-11 through §13-5-15)

The project is in the Resource subzone of the Conservation District. The objective of this subzone is to develop, with proper management, areas to ensure sustained use of the natural resources of these areas. The proposed road repair and revetment construction is consistent with the identified land use termed R-5 Marine Construction, sub section (D-1). This may be carried out with a Land Board Permit. The land use description is: "Dredging, filling, or construction on submerged lands." The road protection revetment will require dredging for placing the revetment toe, filling with the rock revetment, and filling with clean dredged sand along a 56-foot section at the south end, moving rocks from the nearshore area to use in the revetment, and placing graded rock and native soil fill to build a road base for road repair. Since the certified shoreline follows the damaged seaward edge of the road, the new road shoulder and a strip of pavement will also be in the conservation district.

3. Describe how the proposed land use complies with the provisions and guidelines contained in chapter 205A, HRS, entitled "Coastal Zone Management" (see 205A objectives on p. 9).

Section 205A-2 (b) Objective (4) of the Chapter 205A HRS states that the objective for Coastal Ecosystems is "protect valuable coastal ecosystems, including reefs, from disruption and to minimize adverse impacts on all coastal ecosystems". Reducing erosion of the road embankment will improve water quality by reducing turbidity from red earth erosion and adverse impacts on the limu kohu that grows on the shallow reef flat and is collected by local residents.

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

The proposed revetment will have a positive impact on the shoreline and ocean waters. The revetment will protect the road embankment and reduce shoreline erosion. It will also reduce the amount of eroded sediment that enters the ocean. Access to the 'Aliomanu community served by the damaged road will be restored, which will have a positive impact on the community. The proposed land use is not expected to have adverse long-term impacts.

5. Describe how the proposed land use, including buildings, structures and facilities, is compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels.

The proposed road repair does not include any buildings or other structures. A rock revetment to protect the road embankment and road repair is the only additional land use. This proposed use is the same as the existing use and does not change the physical conditions or capabilities of the affected parcels.

6. Describe how the existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon.

Currently, portions of the 'Aliomanu Road have been damaged and collapsed as a result of shoreline erosion. This project will improve the environmental aspects of the land by reducing the erosion and water quality degradation. There should be little, if any, change to the natural beauty or open space characteristics.

7. If applicable, describe how subdivision of land will not be utilized to increase the intensity of land uses in the Conservation District.

This is not applicable. The proposed project does not involve subdivision land and will not increase the intensity of land uses in the Conservation District.

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

The proposed land use will restore the site to pre-existing conditions. The repairs to 'Aliomanu Road and construction of the rock revetment will allow the roadway to be used again as it was originally intended and will prevent further erosion. Currently, the road provides only one lane for traffic. This partially restricts emergency vehicle access and impacts public health and safety. The project will open up two lanes and positively impact the public health, safety, and welfare of the area residents by allowing the road to be safe, protected, and accessible.

CULTURAL IMPACTS

Articles IX and XII of the State Constitution, other state laws, and the courts of the State, require government agencies to promote and preserve cultural beliefs, practices, and resources of Native Hawaiians and other ethnic groups.

Please provide the identity and scope of cultural, historical, and natural resources in which traditional and customary native Hawaiian rights are exercised in the area.

Both a cultural impact assessment (Final Cultural Impact Assessment for the `Aliomanu Road Repair Project, Anahola Ahupua`a, Kawaihau District, Kaua`i, TMK: [4] 4-8-018:029, 999) and an archaeological assessment (Final Archaeological Assessment for the `Aliomanu Road Repair Project, Anahola Ahupua`a, Kawaihau District, Kaua`i, TMK: [4] 4-8-018:029, 999) were prepared for this project. A 6E-42 Historic Preservation review was conducted for the Final Archaeological Assessment and accepted by the the State Historic Preservation Division (SHPD) on in 2009 (Attachment C). Both assessments are included in the project's environmental assessment. The Cultural Impact Assessment (CIA) outlined the following:

- The outer reef off the damaged road is one of Hawai'i's most famous resources for the prized seaweed limu kohu;
- Anahola River was once surrounded by numerous Hawaiian agricultural terraces, with cultivation in the area measured as wide as 1,200 meters. Coastal zones similar to the project area were traditionally utilized for marine resources, habitation, burials, and ceremonial structures related to fishing;
- 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; Hoku-`allele, which is the largest peak in Anahola; Lahemanu (daughter of an Anahola chief); limu kohu gathering; fishing; Pohaku o Kane; and the boy Hiku, who created a swing to retrieve the spirit of Princess Kawelu from the land of the dead; and
- The project area, especially the shoreline, has been used for fishing for 'owama and other species and for traditional voyaging. It is also a feeding area and a resting area for monk seals. There are several 'heiau in the vicinity including Kuhua Heiau.

The findings of the CIA suggest that there are several areas of cultural interest and concern.

Identify the extent to which those resources, including traditional and customary Native Hawaiian rights, will be affected or impaired by the proposed action.

Gathering and fishing may be partially restricted in the immediate construction area during construction for the safety of the public. Sand bag barriers and BMPs will be used during construction to minimize turbidity in nearshore waters that may temporarily impact relevant resources adjacent to the work area.

What feasible action, if any, could be taken by the Board of Land and Natural Resources in regards to your application to reasonably protect Native Hawai'i rights?

The Board of Land and Natural Resources could require the use of BMPs to minimize turbidity in nearshore waters during construction that may impact native Native Hawai`i rights.

OTHER IMPACTS

Does the proposed land use have an effect (positive/negative) on public access to and along the shoreline or along any public trail?

The proposed land use will have a positive effect on public access by repairing the road so that residents and visitors can safely travel along the shoreline.

Does the proposed use have an effect (positive/negative) on beach processes?

Beach processes at the project site are strongly affected by wind, waves, and Kuaehu Point, which has rocks that extend seaward to form a natural groin. There is a house with a sandbag revetment at the point at the north end of the project site. The rock structure of Kuaehu Point causes a shadow area to the south of increased erosion that is enhanced by a break in the reef through which waves move to the shoreline. The combination appears to move sand south. There are relatively strong southerly currents near the south end of the project site that also appear to move sand toward the sand bar at the Anahola Stream. The new revetment will protect the road embankment from the wave erosion.

Will the proposed use cause increased sedimentation?

All work will be conducted above the MHHW line; however, there is the potential for the project to have a short term effect on water quality during construction activities if runoff occurs. BMPs will be followed to mitigate any detrimental affects on the environment. Sand bags or berms shall be placed around the sections of the wall under construction to prevent construction-based water turbidity. Once construction is complete, no increased runoff or sedimentation are expected.

Will the proposed use cause any visual impact on any individual or community?

Although the roadway repair and revetment construction will alter the existing shoreline, the project will return the road to pre-erosion conditions and add a revetment that will look similar to the existing rocks. No visual obstructions are expected as the elevation of the roadway and revetment is approximately 20 feet below mauka lands. Residents living mauka of the roadway will not be able to see the roadway and rock revetment. To those living in either direction along the shoreline, the view will not be significantly changed.

Please describe any sustainable design elements that will be incorporated into the proposed land use (e.g. the use of efficient ventilation and cooling systems; renewable energy generation; sustainable building materials; permeable paving materials; efficient energy and water systems; efficient waste management systems; etc.).

The proposed land use is a shore and roadway protection revetment. The underlayer of the revetment will consist of a geotextile fabric that will prevent turbid water from entering the nearshore water. This will assist in improved sustainable water quality for nearshore flora and fauna.

If the project involves landscaping, please describe how the landscaping is appropriate to the Conservation District (e.g. use of indigenous and endemic species; xeriscaping in dry areas; minimizing ground disturbance; maintenance or restoration of the canopy; removal of invasive species; habitat preservation and restoration; etc.)

No landscaping is planned for the project. Natural coastal vegetation such as naupaka is expected to inhabit the area following the completion of construction activities.

Please describe Best Management Practices that will be used during construction and implementation of the proposed land use.

All construction work will take place on land mauka of the MHHW line. As an environmental precaution to prevent any runoff from the construction site entering the ocean, and isolate any construsction re;ated sediments from contaminating adjacent areas, a sand bag barrier will be placed between the makai edge of the construction area and the ocean. Emergency oil absorbant pads and a spill kit will be on site should any small petroleum product spillage occur. In the unlikely event of a larger spill, Pacific Environmental Corportation will be called. Equiment operators will inspect their machines daily to check for leaks. Any required maintenance will be done offsite using methods to not pollute the water and land area. A Best Management Practices (BMP) plan describing this is attached as Attachment B.

Please describe the measures that will be taken to mitigate the proposed land use's environmental and cultural impacts.

Construction BMPs will be utilized to mitigate the environmental impacts of the proposed land use (Attachment B). Cultural impacts will be mitigated by employing an onsite archaeologist who will monitor excavation and make recommendations in the event that subsurface archaeological resources are uncovered.

SINGLE FAMILY RESIDENTIAL STANDARDS

Single Family Residences must comply with the standards outlined in HAR Chapter 13-5, Exhibit 4. Please provide preliminary architectural renderings (e.g. building foot print, exterior plan view, elevation drawings; floor plan, etc.) drawn to scale.

SIZE OF LOT

	Existing	Proposed	Total
Proposed building			
footprint			
Paved areas/			
impermeable surfaces			
Landscaped areas			
Unimproved areas			

SETBACKS	Front:	Side:	Back:	
SHORELINE PE	ROPERTIES			
Average	e Lot Depth (ALD	D): Av	verage annual coastal ero	sion rate:
Minimu	m shoreline set	back based on Exhibit	4:	
Actual s	shoreline setbac	k or proposed structur	re:	

MAXIMUM DEVELOPABLE AREA

The Maximum Developable Area includes all floor areas under roof, including first, second, and third stories, decks, pools, saunas, garage or carport, and other above ground structures.

Maximum Developable Area based on Exhibit 4:

Actual Developable Area of proposed residence:

Actual height of the proposed building envelope as defined in Exhibit 4:

COMPATIBILITY

Provide justification for any propose deviation from the established residential standards.

How is the design of the residence compatible with the surrounding area?

If grading is proposed, include a grading plan which provides the amount of cut and fill. Has grading or contouring been kept to a minimum?

CHAPTER 205A - COASTAL ZONE MANAGEMENT

Land uses are required to comply with the provisions and guidelines contained in Chapter 205A, Hawai'i Revised Statutes (HRS), entitled "Coastal Zone Management," as described below:

- Recreational resources: Provide coastal recreational opportunities accessible to the public.
- **Historic resources:** Protect, preserve, and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.
- **Scenic and open space resources:** Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources.
- **Coastal ecosystems:** Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.
- **Economic uses:** Provide public or private facilities and improvements important to the State's economy in suitable locations.
- **Coastal hazards:** Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution.
- Managing development: Improve the development review process, communication, and public participation in the management of coastal resources and hazards.
- **Public participation:** Stimulate public awareness, education, and participation in coastal management.
- **Beach protection:** Protect beaches for public use and recreation.
- Marine resources: Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

CERTIFICATION

I hereby certify that I have read this completed application and that, to the best of my knowledge, the information in this application and all attachments and exhibits is complete and correct. I understand that the failure to provide any requested information or misstatements submitted in support of the application shall be grounds for either refusing to accept this application, for denying the permit, or for suspending or revoking a permit issued on the basis of such misrepresentations, or for seeking of such further relief as may seem proper to the Land Board.

I hereby authorize representatives of the Department of Land and Natural Resources to conduct site inspections on my property. Unless arranged otherwise, these site inspections shall take place between the hours of 8:00 a.m. and 4:30 p.m.

Lyle Tabata

Digitally signed by Lyle Tabata
Date: 2019.04.12 14:03:39 -10'00'

Lyle Tabata, Deputy County Engineer

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I hereby authorize_____Dayananda Vithanage of Oceanit_____to act as my representative and to bind me in all matters concerning this application.

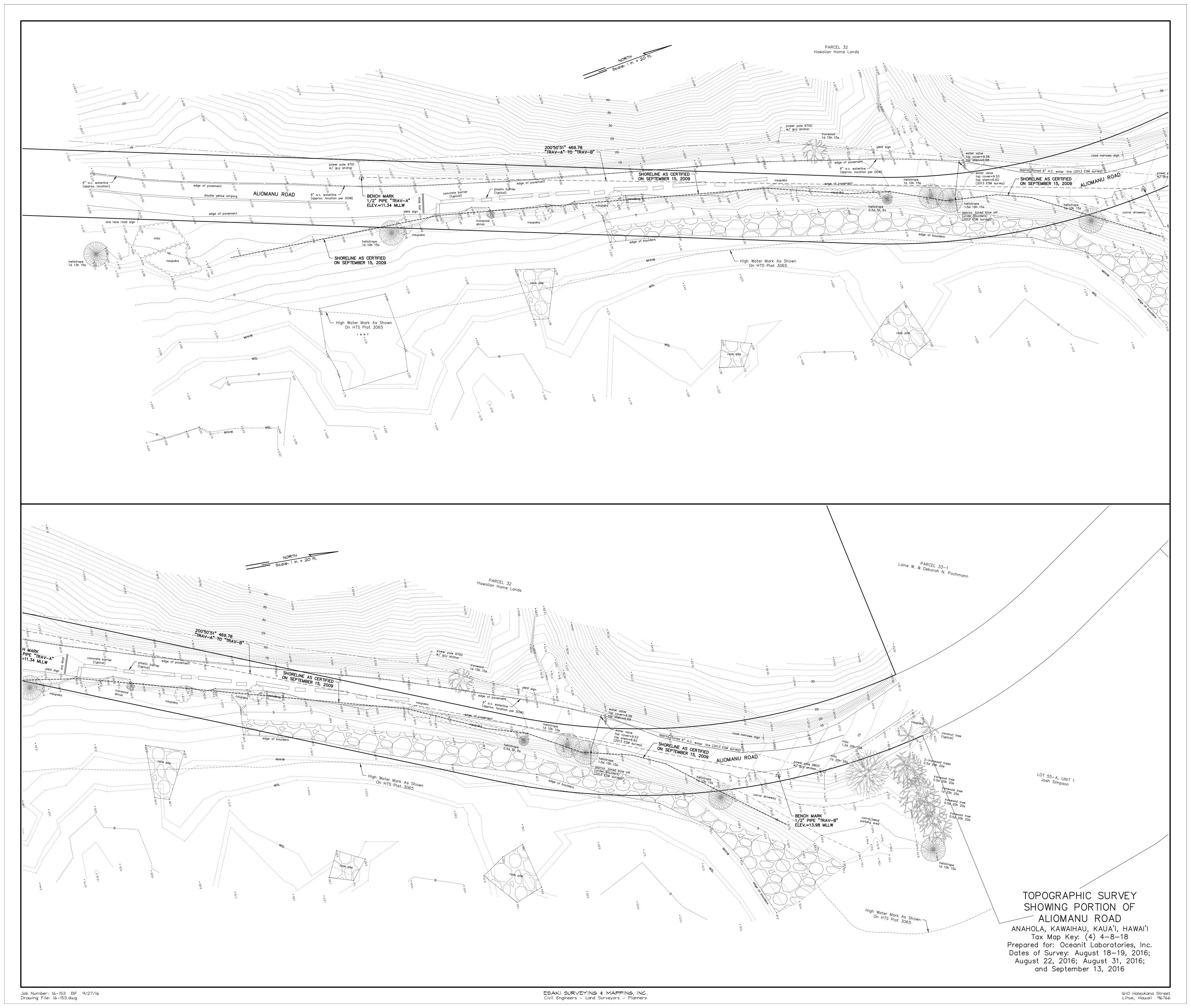
Lyle Tabata

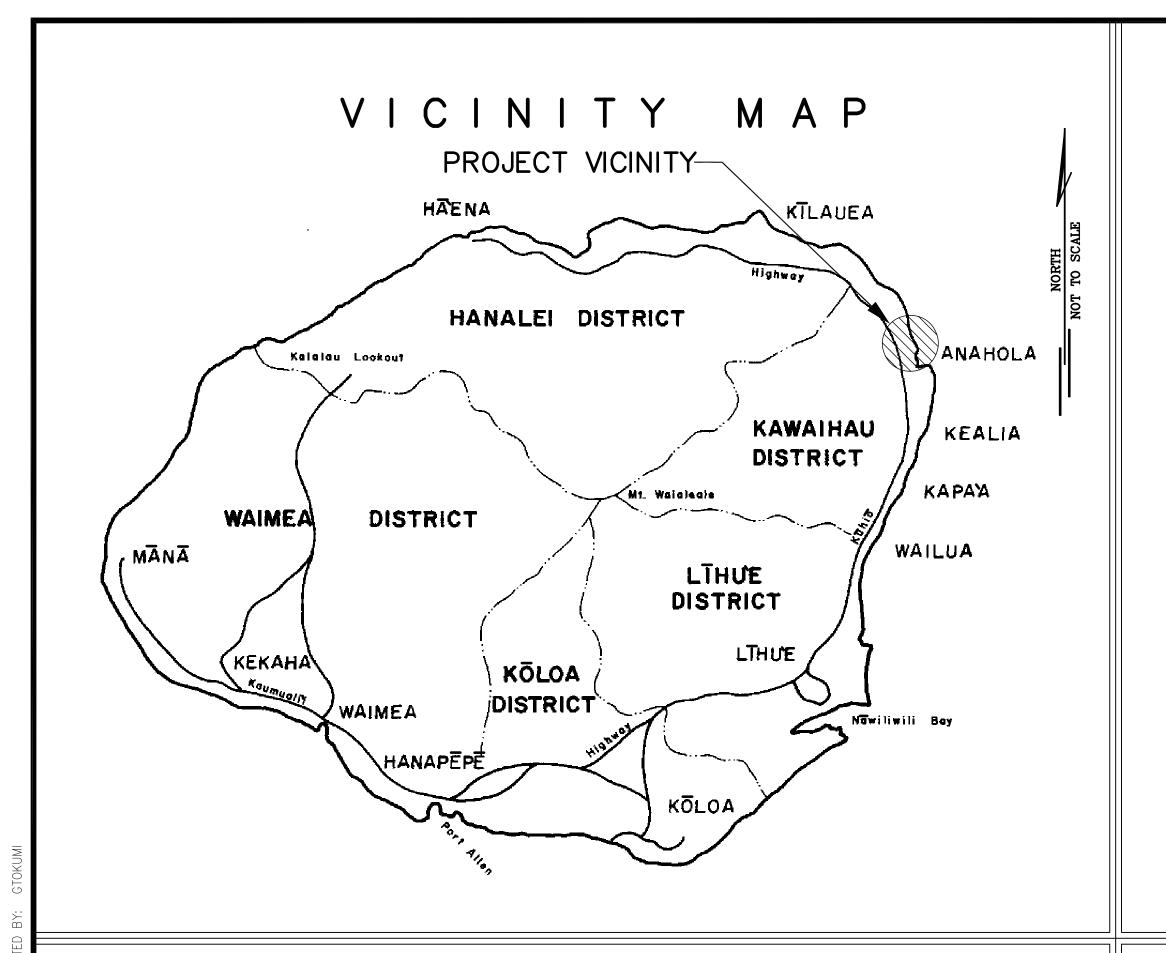
Digitally signed by Lyle Tabata Date: 2019.04.12 14:04:07 -10'00'

Lyle Tabata, Deputy County Engineer



Figure 1: Location map of the 'Aliomanu Road Repair Site





DEPARTMENT OF PUBLIC WORKS COUNTY OF KAUA`I CONSTRUCTION PLANS FOR

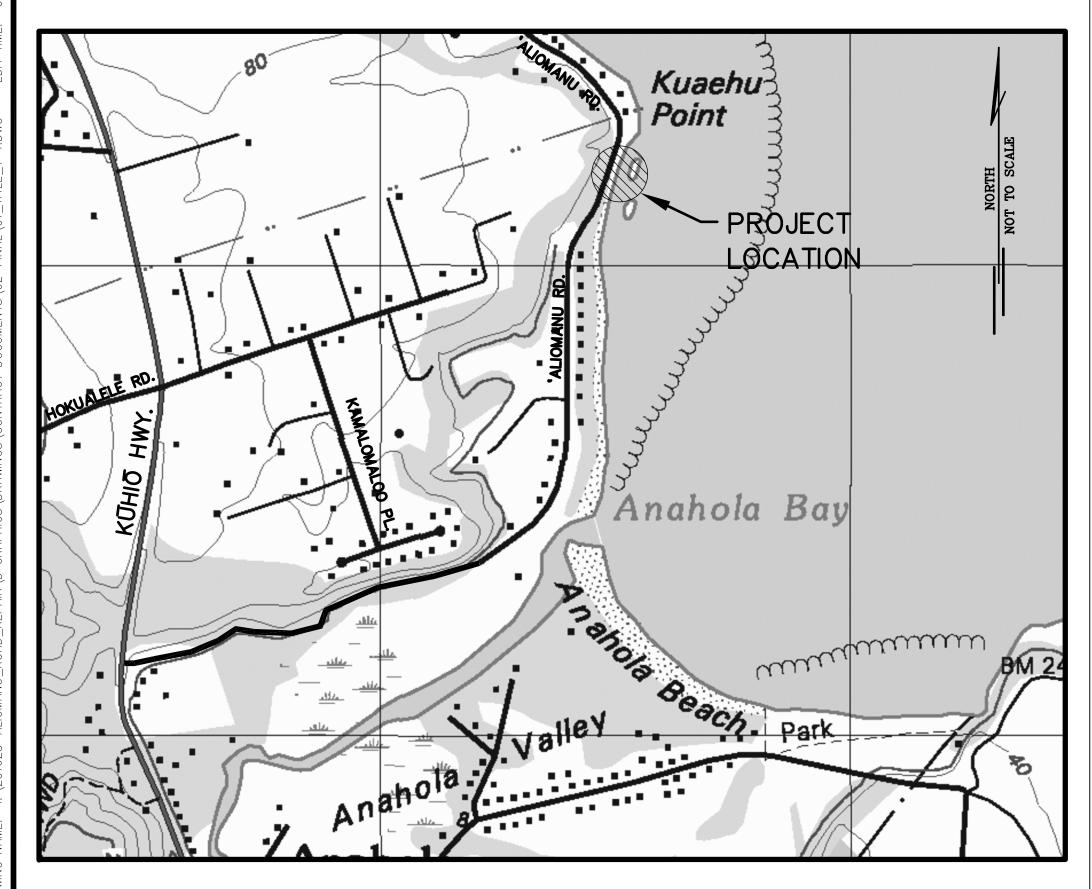
`ALIOMANU ROAD REPAIR

ANAHOLA, KAWAIHAU, ISLAND OF KAUA'I, HAWAI'I

PREPARED BY:



LOCATION MAP



SHEETINDEX

NUMBER	NUMBER	DESCRIPTION OF DRAWINGS
T-1	1	TITLE SHEET
T-2	2	GENERAL NOTES
T-3	3	WATER NOTES
T-4	4	UTILITY NOTES
T-5	5	LIST OF ABBREVIATIONS
C-1	6	EXISTING CONDITIONS
C-2	7	EROSION CONTROL PLAN
C-3	8	DEMOLITION PLAN
C-4	9	PLAN & PROFILE
C-5	10	CROSS SECTIONS - 1: STA 0+35 TO 1+50
C-6	11	CROSS SECTIONS - 2: STA 2+00 TO 3+60
C-7	12	CROSS SECTIONS - 3: STA 3+95 TO 4+85
DT-1	13	TYPICAL ROCK REVETMENT SECTIONS
DT-2	14	TYPICAL ROADWAY DETAILS
DT-3	15	CONCRETE PAVEMENT DETAILS
DT-4	16	BLOW-OFF WATERLINE DETAILS
TC-1	17	TRAFFIC CONTROL PLAN - DURING WORKING HOURS
TC-2	18	TRAFFIC CONTROL PLAN - DURING NON-WORKING HOURS

APPROVED

COUNTY ENGINEER, DEPT. OF PUBLIC WORKS COUNTY OF KAUA'I	DATE
MANAGER AND CHIEF ENGINEER, DEPT. OF WATER COUNTY OF KAUA'I	DATE
DIRECTOR, PLANNING DEPARTMENT COUNTY OF KAUA'I	DATE
KAUA'I ISLAND UTILITY COOPERATIVE	DATE
HAWAIIAN TELCOM	DATE
OCEANIC TIME WARNER CABLE	DATE
SANDWICH ISLES COMMUNICATIONS INC.	DATE

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- 2. PERMITS SHALL BE OBTAINED BY THE CONTRACTOR.
- 3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONFORMANCE WITH THE APPLICABLE PROVISIONS OF THE WATER QUALITY AND WATER POLLUTION CONTROL STANDARDS CONTAINED IN HAWAII ADMINISTRATIVE RULES, TITLE 11, CHAPTER 54, "WATER QUALITY STANDARDS", AND TITLE 11, CHAPTER 55, "WATER POLLUTION CONTROL", AS WELL AS CHAPTER 14 OF THE REVISED ORDINANCES OF HONOLULU, AS AMENDED. BEST MANAGEMENT PRACTICES SHALL BE EMPLOYED AT ALL TIMES DURING CONSTRUCTION.
- 4. THE CONTRACTOR SHALL CONDUCT ALL TESTS SPECIFIED AND BE RESPONSIBLE FOR EXPENSES INCURRED IN CONDUCTING THESE TESTS.
- 5. VERIFY AND CHECK ALL DIMENSIONS AND DETAILS SHOWN ON THE DRAWINGS PRIOR TO THE START OF CONSTRUCTION. IF DIMENSIONAL ERRORS OR CONFLICTS OCCUR, THE CONTRACTOR SHALL NOTIFY THE ENGINEER AND SHALL WAIT FOR CLARIFICATION BEFORE RESUMING OR COMMENCING WORK ON THE DISCREPANCY ITEM.
- 6. DIMENSIONS TAKE PRECEDENCE OVER SCALE.
- 7. THE DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY TO PROTECT THE STRUCTURE DURING CONSTRUCTION. SUCH MEASURES INCLUDE, BUT ARE NOT LIMITED TO, BRACING, SHORING FOR LOADS DUE TO CONSTRUCTION EQUIPMENT, WIND, SEISMIC, ETC. OBSERVATION VISITS TO THE SITE BY THE ENGINEER SHALL NOT INCLUDE INSPECTION OF THE ABOVE ITEMS.
- 8. ALL MATERIALS SHALL CONFORM TO THE DRAWING AND SPECIFICATIONS.
- 9. THE CONTRACTOR SHALL COORDINATE THE STORAGE OF HIS MATERIAL WITH THE OIC.
- 10. THE CONTRACTOR SHALL MAINTAIN ONE TRAFFIC LANE FOR LOCAL TRAFFIC. ALIOMANU ROAD SHALL NOT BE CLOSED WITHOUT PERMISSION FROM THE ENGINEER. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL TRAFFIC CONTROL DEVICES IN CONFORMANCE WITH THE "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS". AND TO THE SATISFACTION OF THE ENGINEER.
- 11. RESTRICT ALL VEHICLES, MATERIAL STOCKPILES AND EQUIPMENT TO WITHIN THE CONTRACT LIMIT LINES. ANY TOOLS, MATERIALS, EQUIPMENT, FENCING, ETC. THAT THE CONTRACTOR KEEPS IN THIS AREA ARE STORED AT THE CONTRACTOR'S RISK. IF OTHER SHORT TERM STORAGE AREAS ARE NEEDED, THEY MAY BE ARRANGED THROUGH THE ENGINEER.
- 12. NO CONSTRUCTION EQUIPMENT SHALL BE PARKED WITHIN THE FACILITY ROADWAYS IN SUCH A MANNER THAT THE EQUIPMENT WILL OBSTRUCT THE NORMAL MOVEMENT AND SIGHT DISTANCE OF THE DRIVING MOTORIST, EXCEPT DURING ACTUAL WORKING HOURS.
- 13. DAMAGE OUTSIDE THE CONTRACT ZONE LIMITS AS A RESULT OF CONSTRUCTION OPERATIONS SHALL BE RESTORED TO ITS ORIGINAL, BETTER CONDITION. SUCH RESTORATION SHALL BE TO THE SATISFACTION OF THE ENGINEER.
- 14. ALL WORK CALLED FOR ON THE PLANS AND NOT ITEMIZED IN THE PROPOSAL AND ALL WORK NOT CALLED FOR BUT REQUIRED FOR THE CONSTRUCTION OF THIS PROJECT, SHALL BE CONSIDERED INCIDENTAL.
- 15. CONDITIONS OF THE WORK: ALL WORK SHALL BE PERFORMED IN A PROFESSIONAL AND WORKMANSHIP—LIKE MANNER. CONTRACTOR SHALL NOTIFY THE COUNTY ENGINEER SHOULD CONDITIONS EXIST WHICH WILL PREVENT SUCH PERFORMANCE AND/OR ANY ADDITIONAL WORK TO BE PERFORMED BEFORE STARTING WORK.

CONSTRUCTION NOTES

- 1. WORK ON A PUBLIC STREET AREA MAY BE PERFORMED ONLY BETWEEN THE HOURS OF 8:00 A.M. AND 3:30 P.M. MONDAY THROUGH FRIDAY, EXCEPT ON HOLIDAYS RECOGNIZED BY THE COUNTY OF KAUAI, AND COUNTY FURLOUGH DAYS UNLESS OTHERWISE PERMITTED IN WRITING BY THE COUNTY ENGINEER.
- 2. NO GRADING BETWEEN 7 P.M. TO 7 A.M. ON ANY GIVEN DAY OR ON SATURDAYS, SUNDAYS AND HOLIDAYS WITHOUT WRITTEN PERMISSION FROM THE COUNTY ENGINEER AND THE STATE DEPARTMENT OF HEALTH.
- 3. CONTRACTOR TO NOTIFY PUBLIC WORKS DEPARTMENT FIVE (5) BUSINESS DAYS PRIOR TO COMMENCING ANY GRADING WORK. WHEN COMPLETED AND READY FOR FINAL INSPECTION; NOTIFY PUBLIC WORKS DEPARTMENT INSPECTION SECTION.
- 4. CONSTRUCTION PLANS ARE VALID FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF APPROVAL; IF CONSTRUCTION DOES NOT COMMENCE WITHIN THIS ONE—YEAR TIME FROM THE DATE OF APPROVAL THE CONSTRUCTION PLANS WILL NEED TO BE RESUBMITTED TO ALL APPROVING AGENCIES FOR REVIEW, APPROVAL, AND RECERTIFICATION OF THE PLAN.
- 5. ALL GRADING, GRUBBING AND STOCKPILING WORK SHALL BE PERFORMED IN ACCORDANCE WITH COUNTY OF KAUAI ORDINANCE NO. 808.
- 6. DURING CLEANING OPERATIONS, THE CONTRACTOR SHALL SUPPLY A WATER TRUCK FOR DUST CONTROL PURPOSES UNTIL VEGETATION HAS REESTABLISHED ITSELF. EXCESS WATER, INCLUDING SILT AND DIRT SHALL NOT BE ALLOWED TO RUN-OFF THE PROPERTY.
- 7. THE CONTRACTOR SHALL REMOVE ALL SILT AND DEBRIS RESULTING FROM HIS WORK AND DEPOSITED IN DRAINAGE FACILITIES, ROADWAYS, AND OTHER AREAS. THE COST INCURRED FOR ANY REMEDIAL ACTION BY THE COUNTY ENGINEER SHALL BE PAYABLE BY THE CONTRACTOR.

CONSTRUCTION NOTES (CONT'D)

8. BEST MANAGEMENT PRACTICES (BMPS) SHALL BE EMPLOYED AT ALL TIMES TO THE MAXIMUM EXTENT PRACTICABLE TO PREVENT DAMAGE BY SEDIMENTATION, EROSION OR DUST TO STREAMS, WATERCOURSES, NATURAL AREAS AND THE PROPERTY OF OTHERS.

NOTES FOR CONSTRUCTION WITHIN COUNTY RIGHT-OF-WAY

- 1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE COUNTY OF KAUAI DEPARTMENT OF PUBLIC WORKS "STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION" DATED SEPT. 1984, AS AMENDED OF THE DEPARTMENT OF PUBLIC WORKS, CITY AND COUNTY OF HONOLULU, AND THE COUNTIES OF KAUAI, MAUI AND HAWAII, AND THE "HAWAII STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 2005" AND ITS AMENDMENTS, IF THERE IS ANY CONFLICT BETWEEN THE DOCUMENTS, THE MORE BENEFICIAL RESULT SHALL BE USED. THE COUNTY ENGINEER WILL DETERMINE WHICH IS THE MOST BENEFICIAL.
- 2. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING UTILITIES WHETHER SHOWN ON THE PLANS OR NOT, AND SHALL BE RESPONSIBLE FOR THE REPAIR OR REPLACEMENT OF SAME IN THE EVENT OF DAMAGES DUE TO HIS CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL COORDINATE HIS WORK WITH THE RESPECTIVE UTILITY COMPANIES.
- 3. THE CONTRACTOR SHALL PROVIDE, INSTALL, AND MAINTAIN ALL NECESSARY SIGNS, LIGHTS, FLARES, BARRICADES, MARKERS, CONES AND OTHER PROTECTIVE FACILITIES AND SHALL TAKE ALL NECESSARY PRECAUTIONS FOR THE PROTECTION AND FOR THE CONVENIENCE AND SAFETY OF THE PUBLIC TRAFFIC. ALL SUCH PROTECTIVE FACILITIES AND PRECAUTIONS TO BE UNDERTAKEN SHALL CONFORM WITH RULES AND REGULATIONS GOVERNING THE USE OF TRAFFIC CONTROL DEVICES AT WORK SITES ON OR ADJACENT TO PUBLIC STREETS AND HIGHWAYS ADOPTED BY THE HIGHWAY SAFETY COORDINATOR AND U.S. FEDERAL HIGHWAY ADMINISTRATION MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS DATED 2003 AND ITS AMENDMENTS.
- 4. THE CONTRACTOR SHALL NOTIFY THE DEPT. OF PUBLIC WORKS AND THE STATE D.O.T. 48 HOURS BEFORE THE COMMENCEMENT OF ANY UTILITY WORK TO SCHEDULE A FIELD REVIEW AND SECURE APPROVAL OF THE PROPOSED UTILITY LINE LOCATION WITHIN THE COUNTY RIGHT—OF—WAY.
- 5. FIELD ADJUSTMENTS THAT ARE ACCEPTED BY THE STATE D.O.T. SHALL BE MADE AS DIRECTED BY THE DEPT. OF PUBLIC WORKS PRIOR TO THE COMMENCEMENT OF ANY UTILITY LINE WORK.
- 6. THE CONTRACTOR SHALL APPLY AND PAY FOR ANY NECESSARY CONSTRUCTION PERMITS PRIOR TO THE START OF CONSTRUCTION. A ROAD PERMIT SHALL BE OBTAINED FROM THE DEPT. OF PUBLIC WORKS.
- 7. THE CONTRACTOR SHALL PROVIDE AT LEAST ONE (1) CLEAR LANE FOR TRAFFIC MOVEMENT AT ALL TIMES.
- 8. THE EXISTING PAVEMENT SHALL BE SAW-CUT PRIOR TO STARTING ANY TRENCHING WORK.
- 9. ANY PAVEMENT OUTSIDE THE CONTRACT ZONE LIMITS DAMAGED AS A RESULT OF CONSTRUCTION OPERATION SHALL BE RESTORED TO ITS ORIGINAL OR BETTER CONDITION AS DIRECTED BY THE COUNTY ENGINEER AND ACCEPTED BY THE STATE D.O.T.
- 10. A TEMPORARY COLD MIX PATCH SHALL BE APPLIED IMMEDIATELY UPON COMPLETION OF BACKFILLING OPERATION AND SHALL BE MAINTAINED UNTIL A PERMANENT PATCH IS AUTHORIZED BY THE DEPT. OF PUBLIC WORKS.
- 11. NO MATERIAL, AND/OR EQUIPMENT SHALL BE STOCKPILED OR OTHERWISE STORED WITHIN COUNTY RIGHT-OF-WAY EXCEPT AT LOCATIONS DESIGNATED IN WRITING AND APPROVED BY THE COUNTY ENGINEER.
- 12. NO CONSTRUCTION EQUIPMENT SHALL BE PARKED WITHIN THE ROAD RIGHT—OF—WAY IN SUCH A MANNER THAT THE EQUIPMENT WILL OBSTRUCT THE NORMAL MOVEMENT AND SIGHT DISTANCE OF THE DRIVING MOTORIST, EXCEPT AT LOCATIONS DESIGNATED IN WRITING AND APPROVED BY THE COUNTY ENGINEER.
- 13. DURING NON-WORKING HOURS, ALL SIGNS WHICH ARE NOT APPLICABLE TO CONSTRUCTION ACTIVITY, SUCH AS "MEN WORKING" OR "FLAGMAN AHEAD" SHALL BE COVERED OR LAID DOWN. HOWEVER, ALL SIGNS NECESSARY FOR THE SAFETY OF THE PUBLIC SHALL BE MAINTAINED.
- 14. ANY PAVEMENT MARKINGS, STRUCTURES, AND APPURTENANCES DAMAGED BY THE CONTRACTOR SHALL BE REPLACED OR REPAIRED TO THE SATISFACTION OF THE DEPT. OF PUBLIC WORKS AND THE STATE D.O.T.
- 15. DURING NON-WORKING HOURS, ALL TRENCHES SHALL BE COVERED WITH A SAFE NON-SKID BRIDGING MATERIAL AND ALL LANES SHALL BE OPEN TO PUBLIC VEHICULAR AND PEDESTRIAN TRAFFIC.
- 16. THE CONTRACTOR SHALL MAINTAIN, TO THE SATISFACTION OF THE DEPT. OF PUBLIC WORKS AND THE STATE D.O.T. THE AREA WORKED WITHIN THE COUNTY RIGHT—OF—WAY, INCLUDING ANY REPAIRS TO PAVEMENT AND SHOULDER DAMAGED AS A RESULT OF THE INSTALLATION WORK, FOR A PERIOD OF ONE {1} YEAR FROM THE DATE OF FINAL INSPECTION AS NOTED BY THE DEPT. OF PUBLIC WORKS AND THE STATE D.O. T. THE CONTRACTOR SHALL UNDERTAKE REPAIRS EXPEDITIOUSLY WHENEVER DIRECTED BY THE CHIEF ENGINEER AND THE STATE D.O.T. DURING THE MAINTENANCE PERIOD.

NOTES FOR CONSTRUCTION WITHIN COUNTY RIGHT-OF-WAY

- 17. ALL WORK INCLUDING REPAIR OF DAMAGED PAVEMENT AND SHOULDER SHALL BE INSPECTED AND APPROVED BY THE DEPT. OF PUBLIC WORKS AND ACCEPTED BY THE STATE D.O.T. ALL UNAPPROVED WORK SHALL SHALL BE CONSIDERED UNACCEPTABLE AND SHALL BE REWORKED AND CORRECTED AS, DIRECTED BY THE DEPT. OF PUBLIC WORKS, AT THE CONTRACTOR'S EXPENSE.
- 18. DAMAGED SHOULDERS SHALL BE RESTORED TO A CONDITION EQUAL TO OR BETTER THAN EXISTING CONDITION.
- 19. THE CONTRACTOR SHALL CONDUCT HIS OPERATIONS SO AS TO OFFER THE LEAST POSSIBLE OBSTRUCTION AND INCONVENIENCE TO THE PUBLIC AND HE SHALL HAVE UNDER CONSTRUCTION NO GREATER LENGTH OR AMOUNT OF WORK THAT HE CAN PROSECUTE PROPERLY WITH DUE REGARDS TO THE RIGHTS OF THE PUBLIC.
- 20. THE CONTRACTOR SHALL RETAIN THE SERVICES OF A GEOTECHNICAL ENGINEER, LICENSED IN THE STATE OF HAWAII, FOR QUALITY CONTROL. CERTIFICATION FROM THE GEOTECHNICAL ENGINEER SHALL BE SUBMITTED TO THE DEPT. OF PUBLIC WORKS AT THE COMPLETION OF THE PROJECT. GEOTECHNICAL ENGINEER SHALL CERTIFY THAT THE COMPLETED CONSTRUCTION WORK MEETS THE REQUIREMENTS OF THE "STANDARD SPECIFICATIONS". GEOTECHNICAL ENGINEER SHALL ALSO SUBMIT TEST RESULTS AS REQUESTED BY THE DEPT. OF PUBLIC WORKS.
- 21. ALL EXISTING DRAINAGE FLOW CONDITIONS SHALL BE MAINTAINED.
- 22. THE CONTRACTOR SHALL HOLD A PRECONSTRUCTION MEETING WITH THE CONSTRUCTION—DESIGN SECTIONS OF THE DEPARTMENT OF PUBLIC WORKS BEFORE COMMENCING ANY WORK
- 23. CONTRACTOR SHALL EXERCISE EXTREME CAUTION TO PRESERVE BENCHMARKS (SURVEY MONUMENTS) WHENEVER THE CENTER OF A SURVEY MONUMENT IS LESS THAN THREE (3) FEET FROM THE EDGE OF CONSTRUCTION. THE CON TRACTOR SHALL RETAIN A LICENSED SURVEYOR TO REFERENCE THE LOCATION OF SAID SURVEY MONUMENT.
- 24. BENCHMARKS THAT ARE DISTURBED OR DESTROYED SHALL BE RESTORED UNDER A LICENSED SURVEYOR'S DIRECTION. COPIES OF FIELD NOTES, DESCRIPTIONS AND NEW VALUES OF THE NEW BENCHMARK SHALL BE SENT TO THE DEPARTMENT OF PUBLIC WORKS SURVEY SECTION FOR REVIEW AND APPROVAL PRIOR TO RESTORATION.
- 25. DRIVEWAYS SHALL BE KEPT OPEN UNLESS OWNERS OF THE LOTS USING THESE RIGHTS OF WAYS ARE OTHERWISE PROVIDED FOR SATISFACTORILY.

PUBLIC HEALTH SAFETY AND CONVENIENCE NOTES

- 1. CONTRACTOR SHALL OBSERVE AND COMPLY WITH ALL FEDERAL, STATE, AND LOCAL LAWS REQUIRED FOR THE PROTECTION OF PUBLIC HEALTH, SAFETY AND ENVIRONMENTAL QUALITY.
- 2. THE CONTRACTOR AT HIS/HER EXPENSE, SHALL KEEP THE PROJECT AREA AND SURROUNDING AREA FREE FROM RUBBISH, DUST, NOISE, EROSION, ETC. THE WORK SHALL BE DONE IN CONFORMANCE WITH THE AIR AND WATER POLLUTION CONTROL STANDARDS AND REGULATIONS OF THE STATE DEPARTMENT OF HEALTH.
- 3. NO CONTRACTOR SHALL PERFORM ANY CONSTRUCTION OPERATION SO AS TO CAUSE FALLING ROCKS, SILT OR DEBRIS IN ANY FORM TO FALL, SLIDE OR FLOW ONTO ADJOINING PROPERTIES, STREETS OR NATURAL WATERCOURSES. SHOULD SUCH VIOLATION OCCUR, THE CONTRACTOR SHALL IMMEDIATELY MAKE ALL REMEDIAL ACTIONS AS NECESSARY AND THE COSTS INCURRED FOR ANY REMEDIAL ACTION SHALL BE PAYABLE BY THE CONTRACTOR.
- 4. THE CONTRACTOR'S ATTENTION IS DIRECTED TO CHAPTER 46, PUBLIC HEALTH REGULATIONS, DEPARTMENT OF HEALTH, STATE OF HAWAI'I, "COMMUNITY NOISE CONTROL," IN WHICH MAXIMUM PERMISSIBLE NOISE LEVELS HAVE BEEN SET. IF THE CONSTRUCTION WORK REQUIRES A PERMIT FROM THE DIRECTOR OF HEALTH, THE CONTRACTOR SHALL OBTAIN A COPY OF CHAPTER 46 AND BECOME FAMILIAR WITH THE NOISE LEVEL RESTRICTIONS AND THE PROCEDURES FOR OBTAINING A PERMIT FOR THE CONSTRUCTION ACTIVITIES. APPLICATION AND INFORMATION ON VARIANCES ARE AVAILABLE FROM THE ENVIRONMENTAL HEALTH SERVICES DIVISION, 1250 PUNCHBOWL ST., HONOLULU, HI 96813 OR BY TELEPHONE (586–4700).
- 5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONFORMANCE WITH THE APPLICABLE PROVISIONS OF CHAPTER 54, WATER QUALITY STANDARDS, AND CHAPTER 55, WATER POLLUTION CONTROL, OF TITLE 11, ADMINISTRATIVE RULES OF THE STATE DEPARTMENT OF HEALTH. THE CONTRACTOR SHALL CONFORM TO THE REQUIREMENTS OF THE BEST MANAGEMENT PRACTICES PLAN (BMP) FOR THE PROJECT.

HISTORIC PRESERVATION NOTES

1. SHOULD HISTORIC REMAINS SUCH AS ARTIFACTS, BURIALS, CONCENTRATIONS OF SHELL OR CHARCOAL BE ENCOUNTERED DURING CONSTRUCTION ACTIVITIES, WORK SHALL CEASE IMMEDIATELY IN THE IMMEDIATE VICINITY OF THE FIND, AND THE FIND SHALL BE PROTECTED FROM FURTHER DAMAGE. THE CONTRACTOR SHALL CORDON OFF THE AREA AND IMMEDIATELY NOTIFY THE PLANNING DEPARTMENT AT (808) 241–4050 AND THE STATE HISTORIC PRESERVATION DIVISION AT (808) 692–8015, WHO WILL ASSESS THE SIGNIFICANCE OF THE FIND AND RECOMMEND THE APPROPRIATE MITIGATION MEASURES, IF NECESSARY.

TEMPORARY DUST CONTROL MEASURES FOR GRADING

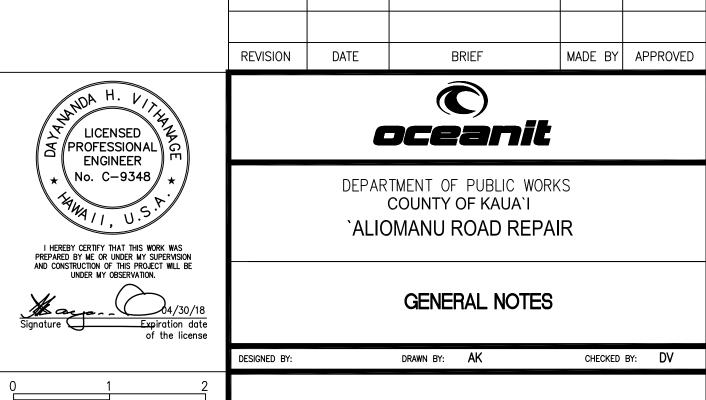
- 1. THE GRADED OR PROJECT SITE THAT IS CLEARED OF VEGETATION SHALL BE KEPT DAMP WITH WATER CONTINUOUSLY FOR SEVEN (7) DAYS A WEEK. AT THE END OF EACH DAY, THE SITE SHALL BE SUFFICIENTLY DAMPENED WITH WATER ON A CONTINUAL BASIS SO THAT THE SITE WILL REMAIN MOISTENED DURING THE NIGHT.
- 2. THE CONTRACTOR SHALL CONDUCT HIS OPERATIONS SO THAT EXCAVATION, EMBANKMENT, AND IMPORTED MATERIAL SHALL BE DAMPENED WITH WATER ON A CONTINUAL BASIS TO PREVENT DUST PROBLEMS.
- 3. IN APPLYING FOR A GRADING PERMIT, THE CONTRACTOR SHALL SUBMIT PLANS, SCHEDULES AND/OR WRITTEN MEASURES WHICH PROVIDES FOR DUST CONTROL. THE DUST CONTROL MEASURES SHALL CONTAIN POSITIVE STATEMENTS WHICH REQUIRE ACTIONS OR WORK THAT PREVENT DUST PROBLEMS. NO PERMITS WILL BE ISSUED UNLESS THE COUNTY IS ASSURED THAT DUST AND EROSION PROBLEMS WILL BE MINIMIZED.

TEMPORARY EROSION CONTROL NOTES

- 1. TEMPORARY VEGETATIVE COVER SHALL BE PLANTED WITHIN A PERIOD OF 30 CALENDAR DAYS AFTER THE SITE HAS BEEN GRADED OR BARED OF VEGETATION OR IF THE SITE WILL BE SUSPENDED FOR MORE THAN 30 CALENDAR DAYS
- 2. TEMPORARY VEGETATIVE COVER SHALL CONSIST OF 40 LBS. COMMON RYE GRASS SEED PER ACRE, 400 LBS. PER ACRE 10-10-10 OR EQUIVALENT FERTILIZER WORKED INTO THE SEED BED BEFORE PLANTING. TEMPORARY SPRINKLER SYSTEM IS TO BE INSTALLED CONCURRENTLY WITH ALL PLANTINGS. PLANTING AND MAINTENANCE OF GRASS SHALL CONFORM TO THE "HAWAI'I STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 2005" AND ITS AMENDMENTS.

PERMANENT EROSION CONTROL MEASURES

- 1. THE CONTRACTOR SHALL GRASS THE ENTIRE PROJECT SITE, EXCEPT PAVED AREAS WITH BERMUDA GRASS SPRIGS. THE GRASS SHALL BE PLANTED, FERTILIZED, AND MAINTAINED IN ACCORDANCE WITH THE "HAWAI'I STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION. 2005" AND ITS AMENDMENTS.
- 2. THE CONTRACTOR SHALL GRASS ALL EXPOSED AREAS THAT HAVE BEEN CONSTRUCTED TO FINAL GRADES WITHIN A PERIOD OF 30 CALENDAR DAYS.
- 3. IN LIEU OF GRASS SPRIGS (NOTE 1), THE CONTRACTOR MAY USE HYDROMULCH WITH SEEDLINGS AND IRRIGATION SPRINKLER SYSTEM.



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LINE IS 2 INCHES AT FULL SCALE (If NOT 2-inches : Scale According)

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B. THE CONTRACTOR SHALL FOLLOW THE GUIDELINES IN THE "INTERIM BEST MANAGEMENT PRACTICES MANUAL FOR CONSTRUCTION SITES FOR COUNTY OF KAUAI" IN DEVELOPING, INSTALLING AND MAINTAINING THE BEST MANAGEMENT PRACTICES (BMPs) FOR THE PROJECT. THE CONTRACTOR MAY SUBMIT ALTERNATE METHODS TO THE ENGINEER FOR ACCEPTANCE.

C. THE CONTRACTOR SHALL KEEP A COPY OF THE APPROVED BMP, NOI, ETC. ON THE PROJECT SITE. THE BMP SHALL BE UPDATED TO REFLECT ANY CHANGES MADE DURING THE COURSE OF CONSTRUCTION FOR THE DURATION OF THE PROJECT.

D. THE ENGINEER MAY ASSESS LIQUIDATED DAMAGES OF UP TO \$27,500 FOR NONCOMPLIANCE OF EACH BMP REQUIREMENT AND EACH REQUIREMENT STATED IN SECTION 209, FOR EVERY DAY OF NON-COMPLIANCE. THERE IS NO MAXIMUM LIMIT ON THE AMOUNT ASSESSED PER DAY.

E. THE ENGINEER MAY DEDUCT THE COST FROM THE PROGRESS PAYMENT FOR ALL CITATIONS RECEIVED BY THE DEPARTMENT FOR NON COMPLIANCE, OR THE CONTRACTOR SHALL REIMBURSE THE STATE, AND/OR COUNTY FOR THE FULL AMOUNT OF THE OUTSTANDING COST INCURRED BY THE STATE, WHICHEVER IS GREATER.

2. <u>WASTE DISPOSAL</u>:

A. WASTE MATERIALS: ALL WASTE MATERIALS SHALL BE COLLECTED AND STORED IN A SECURELY LIDDED METAL DUMPSTER THAT DOES NOT BREAK/LEAK. THE DUMPSTER SHALL MEET ALL LOCAL AND STATE SOLID WASTE MANAGEMENT REGULATIONS. ALL TRASH AND CONSTRUCTION DEBRIS FROM THE SITE SHALL BE DEPOSITED IN THE DUMPSTER. THE DUMPSTER SHALL BE EMPTIED A MINIMUM OF TWICE PER WEEK OR AS OFTEN AS IS DEEMED NECESSARY. NO CONSTRUCTION WASTE MATERIALS SHALL BE BURIED ONSITE. THE CONTRACTOR'S SUPERVISORY PERSONNEL SHALL BE INSTRUCTED REGARDING THE CORRECT PROCEDURE FOR WASTE DISPOSAL. NOTICES STATING THESE PRACTICES SHALL BE POSTED IN THE OFFICE TRAILER AND THE CONTRACTOR SHALL BE RESPONSIBLE FOR SEE THAT THESE PROCEDURES ARE FOLLOWED.

3. SANITARY WASTE: ALL SANITARY WASTE SHALL BE COLLECTED FROM THE PORTABLE UNITS A MINIMUM OF ONCE PER WEEK, OR AS REQUIRED.

3. EROSION AND SEDIMENT CONTROL INSPECTION AND MAINTENANCE PRACTICES:

A. ALL CONTROL MEASURES SHALL BE INSPECTED AT LEAST ONCE EACH WEEK AND WITHIN 24 HOURS FOLLOWING ANY RAINFALL OF 0.5 INCHES OR GREATER.

B. ALL MEASURES SHALL BE MAINTAINED IN GOOD WORKING ORDER. IF REPAIR IS NECESSARY. IT SHALL BE INITIATED WITHIN 24 HOURS AFTER THE INSPECTION.

C. BUILT UP SEDIMENT SHALL BE REMOVED FROM SILT BARRIER, WHEN IT HAS REACHED ONE—THIRD THE HEIGHT OF THE BARRIER.

D. SILT BARRIER SHALL BE INSPECTED FOR DEPTH OF SEDIMENT, TEARS, TO VERIFY THAT THE FABRIC IS SECURED TO THE SANDBAGS.

E. TEMPORARY AND PERMANENT SEEDING AND PLANTING SHALL BE INSPECTED FOR BARE SPOTS, WASH OUTS AND HEALTHY GROWTH.

F. THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER A MAINTENANCE INSPECTION REPORT PROMPTLY AFTER EACH WEEKLY INSPECTION.

G. THE CONTRACTOR SHALL SELECT A MINIMUM OF THREE PERSONNEL WHO SHALL BE RESPONSIBLE FOR INSPECTIONS, MAINTENANCE AND REPAIR ACTIVITIES AND FILLING OUT THE INSPECTION AND MAINTENANCE REPORT.

H. PERSONNEL SELECTED FOR THE INSPECTION AND MAINTENANCE RESPONSIBILITIES SHALL RECEIVE TRAINING FROM THE CONTRACTOR. THEY SHALL BE TRAINED IN ALL THE INSPECTION AND MAINTENANCE PRACTICES NECESSARY FOR KEEPING THE EROSION AND SEDIMENT CONTROLS USED ONSITE IN GOOD WORKING CONDITIONS.

I. ALL SLOPES AND EXPOSED AREAS SHALL BE GRASSED AS FINAL GRADES HAVE BEEN ESTABLISHED, GRADING TO FINAL GRADE SHALL BE CONTINUOUS, AND ANY AREA IN WHICH WORK HAS BEEN INTERRUPTED OR DELAYED OR EXPOSED FOR MORE THAN 15 DAYS SHALL BE GRASSED IN ORDER TO PREVENT DUST, EROSION AND SILT RUNOFF. AREAS WITH IMPORTED SOILS SHALL BE GRASSED NOT MORE THAN 5 WORKING DAYS AFTER THE FINAL GRADES HAVE BEEN ESTABLISHED.

J. TEMPORARY EROSION CONTROLS SHALL NOT BE REMOVED BEFORE PERMANENT EROSION CONTROLS ARE IN PLACE AND ESTABLISHED.

4. GOOD HOUSEKEEPING BEST MANAGEMENT PRACTICES MATERIALS POLLUTION PREVENTION PLAN:

A. APPLICABLE MATERIALS OR SUBSTANCES LISTED BELOW ARE EXPECTED TO BE PRESENT ONSITE DURING CONSTRUCTION. OTHER MATERIALS AND SUBSTANCES NOT LISTED BELOW SHALL BE ADDED TO THE INVENTORY OF THE CONSTRUCTION CONTRACTOR'S SITE—SPECIFIC BMP PLAN.

CONCRETE
DETERGENTS
PAINTS (ENAMEL AND LATEX)
METAL STUDS

FERTILIZERS
PETROLEUM BASED PRODUCTS
CLEANING SOLVENTS
WOOD
MASONRY BLOCK

B. MATERIAL MANAGEMENT PRACTICES SHALL BE USED TO REDUCE THE RISK OF SPILLS OR OTHER ACCIDENTAL EXPOSURE OF MATERIALS AND SUBSTANCES TO STORM WATER RUNOFF. AN EFFORT SHALL BE MADE TO STORE ONLY ENOUGH PRODUCTS AS IS REQUIRED TO DO THE JOB.

WATER POLLUTION AND EROSION CONTROL NOTES (CONT'D)

C. ALL MATERIALS STORED ONSITE SHALL BE STORED IN A NEAT, ORDERLY MANNER IN THEIR APPROPRIATE CONTAINERS AND IF POSSIBLE UNDER A ROOF OR OTHER ENCLOSURE.

D. PRODUCTS SHALL BE KEPT IN THEIR ORIGINAL CONTAINERS WITH THE ORIGINAL MANUFACTURER'S LABEL.

E. SUBSTANCES SHALL NOT BE MIXED WITH ONE ANOTHER UNLESS RECOMMENDED BY THE MANUFACTURER.

F. A PRODUCT SHALL BE USED UP COMPLETELY BEFORE DISPOSING OF THE CONTAINER.

G. MANUFACTURER'S RECOMMENDATIONS FOR PROPER USE AND DISPOSAL SHALL BE FOLLOWED.

H. THE CONTRACTOR SHALL CONDUCT A DAILY INSPECTION TO ENSURE PROPER USE AND DISPOSAL OF MATERIALS ONSITE.

5. HAZARDOUS MATERIAL POLLUTION PREVENTION PLAN:

A. PRODUCTS SHALL BE KEPT IN ORIGINAL CONTAINERS UNLESS THEY ARE NOT REUSABLE.

B. ORIGINAL LABELS AND MATERIAL SAFETY DATA SHEETS (MSDS) SHALL BE RETAINED AND MADE AVAILABLE TO THE ENGINEER UPON REQUEST.

C. SURPLUS PRODUCTS SHALL BE DISPOSED OF ACCORDING TO MANUFACTURER'S INSTRUCTIONS OR LOCAL AND STATE RECOMMENDED ACTIONS.

6. ONSITE AND OFFSITE PRODUCTS SPECIFIC PLANS:

A. PETROLEUM BASED PRODUCTS: ALL ONSITE VEHICLES SHALL BE MONITORED FOR LEAKS AND RECEIVE REGULAR PREVENTIVE MAINTENANCE TO REDUCE THE CHANCE OF LEAKAGE. PETROLEUM PRODUCTS SHALL BE STORED IN TIGHTLY SEALED CONTAINERS WHICH ARE CLEARLY LABELED. ANY ASPHALT SUBSTANCES USED ONSITE SHALL BE APPLIED ACCORDING TO THE MANUFACTURER'S RECOMMENDATION.

7. NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) REQUIREMENTS:

A. IF REQUIRED BY THE DEPARTMENT OF HEALTH, THE CONTRACTOR SHALL APPLY FOR, OBTAIN AND COMPLY WITH THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) REQUIREMENTS FOR KAUA'I DISTRICT PERMIT PROJECTS THAT DISTURB ONE (1) ACRE OR MORE OF LAND. THE CONTRACTOR SHALL NOT START CONSTRUCTION UNTIL NOTICE OF GENERAL PERMIT COVERAGE (NGPC) IS RECEIVED FROM THE DEPARTMENT OF HEALTH, STATE OF HAWAI'I AND HAS SATISFIED ANY OTHER APPLICABLE OF THE NPDES PROGRAM. THIS INFORMATION IS AVAILABLE AT THE KAUA'I DISTRICT OFFICE AT 3040 UMI STREET. DUE TO POTENTIAL COST IMPACTS, THE CONTRACTOR NEEDS TO BE AWARE OF THESE REQUIREMENTS.

B. THE CONTRACTOR SHALL COMPLETE AND SUBMIT A CONTRACTOR'S CERTIFICATION OF NPDES COMPLIANCE, INCLUDING COMPLETION OF THE BEST MANAGEMENT PRACTICE (BMP) CHECKLIST AND SUBMITTAL OF A WRITTEN BMP PLAN AND DRAWINGS, PRIOR TO ISSUE OF THE PERMIT TO PERFORM WORK UPON COUNTY ROADWAYS.

WATER NOTES

1. UNLESS OTHERWISE SPECIFIED, ALL MATERIALS AND CONSTRUCTION OF WATER FACILITIES AND APPURTENANCES SHALL BE IN ACCORDANCE WITH THE "WATER SYSTEM STANDARDS, 2002" AS ADOPTED BY THE DEPARTMENT OF WATER, COUNTY OF KAUAI, INCLUDING ALL SUBSEQUENT AMENDMENTS AND ADDITIONS.

2. THE CONTRACTOR SHALL ARRANGE A PRE—CONSTRUCTION CONFERENCE AT LEAST TEN (10) CALENDAR DAYS BEFORE CONSTRUCTION AND SHALL NOTIFY THE DEPARTMENT OF WATER AT LEAST TRHEE (3) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION.

3. THE CONTRACTOR SHALL SUBMIT THE NAMES AND TELEPHONE NUMBERS OF ITS AUTHORIZED JOB SUPERINTENDENT AND AT LEAST THREE (3) ADDITIONAL PERSONS TO CONTACT IN CASE OF AN EMERGENCY DURING NON-WORKING HOURS.

4. THE CONTRACTOR SHALL NOTIFY THE DEPARTMENT OF WATER AT LEAST 24 HOURS PRIOR TO ANY TRENCHING, PIPE LAYING, BACKFILLING, TESTING OR DISINFECTION ACTIVITIES TO INSURE THAT INSPECTION SERVICES WILL BE AVAILABLE.

5. ALL MATERIALS (PIPE, LUBRICANTS, PAINTS, SEALANTS, FORM OIL, CONCRETE ADMIXTURES, ETC.) IN DIRECT CONTACT WITH THE POTABLE WATER SHALL HAVE NATIONAL SANITATION FOUNDATION (NSF) CERTIFICATIONS. THE CONTRACTOR SHALL SUBMIT THESE CERTIFICATIONS TO THE DEPARTMENT OF WATER FOR REVIEW AND APPROVAL PRIOR TO ITS APPLICATION.

6. THE LOCATION OF EXISTING WATER MAINS AND APPURTENANCES SHOWN ON THE PLANS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS IN THE FIELD. EXCAVATION AROUND ANY EXISTING WATER MAIN SHALL BE DONE BY HAND.

7. THE CONTRACTOR SHALL PROVIDE UNOBSTRUCTED ACCESS TO EXISTING HYDRANTS, VALVES AND WATER METERS AT ALL TIMES.

8. THE CONTRACTOR SHALL SECURE ALL EXCAVATIONS IN ACCORDANCE WITH OSHA REGULATIONS.

9. THERE SHALL BE NO PHYSICAL CONNECTION BETWEEN A PUBLIC OR PRIVATE POTABLE WATER SYSTEM AND A NON-POTABLE WATER SYSTEM, SEWER, OR APPURTENANCE THERETO WHICH COULD PERMIT THE PASSAGE OF ANY SEWAGE OR POLLUTED WATER INTO THE POTABLE WATER SUPPLY.

10. TRENCH EXCAVATION, BACKFILLING IN LIFTS, AND REPAVING SHALL CONFORM TO THE "HAWAI'I STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 2005" AS AMENDED.

WATER NOTES (CONT'D)

11. WARNING TAPE SHALL BE IN ACCORDANCE WITH DIVISION 200, SECTION 212.08 OF THE "WATER SYSTEM STANDARDS." THE WARNING TAPE SHALL BE FOUR MIL THICK, NON-METALLIC, ACID AND ALKALI RESISTANT POLYETHYLENE AND 6— INCHES WIDE WITH MINIMUM STRENGTH OF 1750 PSI LENGTHWISE AND 1500 PSI CROSSWISE. TAPE COLOR SHALL BE "SAFETY PRECAUTION BLUE" AND SHALL BEAR A CONTINUOUS PRINTED INSCRIPTION "CAUTION WATER LINE BURIED BELOW." INSCRIPTION SHALL BE 2—INCHES HIGH, BLACK TEXT.

12. ALL HYDRANTS SHALL RECEIVE A MINIMUM SSPC SP3 SURFACE PREPARATION AND COATED IN ACCORDANCE WITH DIVISION 200, SECTION 206.01 OF THE "WATER SYSTEM STANDARDS."

13. UNLESS OTHERWISE DIRECTED, PRIOR TO THE CONNECTION OF ANY PIPELINES AND/OR LATERALS TO THE EXISTING MAIN, THE PIPELINES/LATERALS INSTALLED SHALL BE CLEANED, PRESSURE TESTED, CHLORINATED, FLUSHED, AND SAMPLED IN ACCORDANCE WITH DIVISION 300, SECTIONS 302.27 TO 302.29 OF THE "WATER SYSTEM STANDARDS.

WATER SAMPLES SHALL BE TESTED FOR TOTAL COLIFORMS BY A LABORATORY CERTIFIED BY THE STATE OF HAWAII TO PERFORM COLIFORM ANALYSIS. PRESENCE OF COLIFORM BACTERIA IS UNACCEPTABLE.

IN ADDITION TO THE TEST FOR COLI FORMS, A SEPARATE TEST FOR HETEROTROPHIC PLATE COUNT (HPC) SHALL BE CONDUCTED. THE HPC COUNT SHALL BE LESS THAN 300 CFU/ML.

PRIOR TO CHLORINATION, A WATER CHLORINATION AND SANITATION CONTRACTOR WITH A C-37D LICENSE SHALL SUBMIT A CHLORINATION PLAN WITH WATER SOURCE, INJECTION POINTS, SAMPLING POINTS AND PROCEDURE CLEARLY DEFINED FOR APPROVAL BY THE DOW.

THE TESTED PIPELINES AND/OR LATERALS MUST BE CONNECTED TO THE EXISTING DOW SYSTEM WITHIN 14 CALENDAR DAYS OF PULLING THE FIRST DISINFECTION SAMPLE TESTED BY A CERTIFIED LABORATORY. THE DEPARTMENT OF WATER WILL REQUIRE THE CONTRACTOR TO REDO THE CLEANING, PRESSURE TESTING, AND/OR DISINFECTION OF THE PIPELINES AND/OR LATERALS AT THE CONTRACTOR'S EXPENSE IF THE CONNECTION IS NOT COMPLETED WITHIN THESE 14 CALENDAR DAYS.

14. POLYURETHANE FOAM "PIGG" SHALL BE "PUSHED" THROUGH THE LENGTH OF THE INSTALLED PIPELINE USING PRESSURIZED WATER.

15. ALL CONNECTIONS SHALL BE SCHEDULED IN COORDINATION WITH THE DEPARTMENT OF WATER.

A. AN ADVANCE DEPOSIT IS REQUIRED FOR OPERATING VALVES, FLUSHING LINES AND NOTIFYING CONSUMERS AFFECTED BY A WATER SHUTDOWN DURING CONNECTIONS. THE

CONTRACTOR WILL BE CHARGED THE ACTUAL COST.

B. THE CONTRACTOR SHALL PLACE THE DEPOSIT PRIOR TO SCHEDULING THE CONNECTION DATE.

CONNECTIONS SHALL BE SCHEDULED ON TUESDAYS THROUGH THURSDAYS. NO CONNECTIONS SHALL BE SCHEDULED ON MONDAYS, FRIDAYS, WEEKENDS, AND HOLIDAYS.

D. ALL MATERIALS SHALL BE ON HAND AND APPROVED BY THE ENGINEER PRIOR TO SCHEDULING THE CONNECTION DATE.

E. PUMPS USED TO DE-WATER THE CONNECTION AREA SHALL BE OPERATED IN THE PRESENCE OF THE ENGINEER PRIOR TO SCHEDULING THE CONNECTION DATE.

F. ALL CONNECTIONS SHALL BE PERFORMED IN THE PRESENCE OF THE ENGINEER.

16. IN ORDER TO PREVENT DAMAGE TO THE POLYETHYLENE ENCASEMENT FROM EXCESSIVE HANDLING, THE POLYWRAP SHALL BE INSTALLED AROUND THE BARREL OF THE DUCTILE IRON PIPE AT ITS FINAL LOCATION ALONG THE TRENCHLINE. THE POLYETHYLENE ENCASED PIPE SHALL BE LIFTED USING A FABRIC TYPE SLING OR A SUITABLY PADDED CABLE OR CHAIN TO PREVENT DAMAGE TO THE POLYETHYLENE.

17. THE CONTRACTOR SHALL TAKE ALL NECESSARY COMPACTION TESTS WHILE THE WATERLINE TRENCH IS BEING BACKFILLED AND WHILE THE SUBBASE/BASECOURSE IS BEING PLACED. IF THE TEST RESULTS INDICATE THAT ADDITIONAL COMPACTION IS REQUIRED, THE CORRECTIVE WORK SHALL BE COMPLETED BEFORE ANY ADDITIONAL TRENCH EXCAVATION OR PLACING OF SUBBASE/BASECOURSE IS ALLOWED.

THE CONTRACTOR SHALL RETAIN THE SERVICES OF A REGISTERED GEOTECHNICAL ENGINEER FOR QUALITY CONTROL. THE COMPACTION TEST RESULTS SHALL BE CERTIFIED BY THE GEOTECHNICAL ENGINEER AND SUBMITTED TO THE DEPARTMENT OF WATER, STATE HIGHWAYS DIVISION (FOR WORK DONE WITHIN STATE ROW) AND THE DEPARTMENT OF PUBLIC WORKS (FOR WORK DONE WITHIN COUNTY ROW). THE GEOTECHNICAL ENGINEER SHALL CERTIFY THAT THE COMPACTION RESULTS MEET THE REQUIREMENTS OF THE CURRENT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.

18. THE CONTRACTOR SHALL CONNECT ALL EXISTING CONSUMER PIPING TO THE NEW SERVICE LATERALS. THE DEPARTMENT OF WATER WILL TRANSFER THE EXISTING WATER METERS ONLY.

19. ALL FITTINGS SHALL BE MECHANICAL JOINT (MJ) AT EACH END UNLESS OTHERWISE NOTED. "MEGALUG" RETAINER GLANDS SHALL BE USED WITH ALL MECHANICAL JOINT FITTINGS AND VALVES USED IN CONNECTING NEW WATER MAINS TO EXISTING WATER MAINS UNLESS OTHERWISE NOTED.

20. ALL WATER VALVES THAT WILL BE ABANDONED IN PLACE SHALL BE PLACED IN THE "CLOSED" POSITION. REMOVE TOP SECTION OF VALVE BOX AND CONCRETE SETTLEMENT SLAB. FILL REMAINDER OF VALVE BOX WITH CONCRETE. PLACE BACKFILL AND REPAIR PAVEMENT SECTION TO APPLICABLE STATE OR COUNTY STANDARDS. BACKFILL TO FINISH GRADE IN ROAD SHOULDER AREA.

WATER NOTES (CONT'D)

21. THE CONTRACTOR SHALL OBTAIN ALL APPLICABLE DEPARTMENT OF HEALTH PERMITS PRIOR TO THE START OF CONSTRUCTION. PERMITS INCLUDE, BUT ARE NOT LIMITED TO, NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) PERMITS FOR STORM WATER, HYDROSTATIC TEST, DEWATERING, AND FOR CONSTRUCTION ACTIVITIES, INCLUDING CLEARING, GRADING, AND EXCAVATION, THAT RESULT IN THE DISTURBANCE OF EQUAL TO OR GREATER THAN ONE (1) ACRE OF TOTAL LAND AREA.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER DISPOSAL OF STORM WATER DISCHARGES AND EFFLUENT ASSOCIATED WITH CONSTRUCTION ACTIVITIES INCLUDING HYDROTESTING AND DISINFECTION OPERATIONS, TO SAFEGUARD PUBLIC HEALTH AND SAFETY IN ACCORDANCE WITH APPLICABLE DEPARTMENT OF HEALTH REQUIREMENTS. ALL PERMITS AND LICENSES FOR STORM WATER AND CONSTRUCTION WATER DISPOSAL, INCLUDING ALL APPLICATION, CHARGES, FEES, AND TAXES, ARE THE RESPONSIBILITY OF THE CONTRACTOR.

22. THE CONTRACTOR IS RESPONSIBLE FOR DEWATERING TRENCH AS NECESSARY WHERE GROUNDWATER IS ENCOUNTERED. ALL ASSOCIATED COSTS FOR DEWATERING SHALL BE BORNE BY THE CONTRACTOR.

23. THE USE OF KNOWN SEWER PUMP TRUCKS IS PROHIBITED FOR DOW PROJECTS FOR ANY USE, INCLUDING BUT NOT LIMITED TO DEWATERING AND TESTING OF NEW FACILITIES.

24. THE CONTRACTOR SHALL VERIFY OUTSIDE DIAMETER OF ALL EXISTING ASBESTOS—CEMENT (AC) WATERLINES TO BE CONNECTED. CONTRACTOR SHALL VERIFY USE OF PROPER GASKETS PRIOR TO CONNECTION. AC PIPE AND GASKET INFORMATION SHALL BE SUBMITTED TO ENGINEER FOR APPROVAL.

25. ALL REMOVAL, DISPOSAL AND CONNECTION WORK THAT INVOLVES ASBESTOS PIPE/MATERIAL SHALL BE DONE IN THE PRESENCE OF OR BY A LICENSED ASBESTOS CONTRACTOR.

THE LICENSED ASBESTOS CONTRACTOR SHALL SUBMIT THEIR PLAN FOR ALL ASSOCIATED REMOVAL, DISPOSAL AND CONNECTION WORK FOR THE PROJECT TO DOW FOR REVIEW AND APPROVAL PRIOR TO CONDUCTING THE WORK.

26. ALL CONNECTIONS TO EXISTING AC PIPE SHALL BE AT THE NEAREST AC PIPE JOINT. AC PIPE SHALL BE REMOVED BY ENTIRE LENGTH(S) TO FACILITATE THE CONNECTION. CUTTING OF AC PIPE IS PROHIBITED.

27. THE CONTRACTOR SHALL FOLLOW ALL APPLICABLE OSHA, HIOSH AND FEDERAL REGULATIONS IN HANDLING AND DISPOSAL OF ASBESTOS—CEMENT PIPE. DISPOSAL OF THE PIPE SHALL BE AT AN APPROVED ASBESTOS MATERIAL DISPOSAL SITE.

28. ALL WATERWORKS BRASS FITTINGS SHALL BE IN COMPLIANCE WITH THE AMENDED SECTION 1417 OF SAFE DRINKING WATER ACT (SDWA) WHICH TAKES EFFECT ON JANUARY 4, 2014. THE AMENDMENT INCLUDES A CHANGE TO THE DEFINITION OF "LEAD-FREE" BY REDUCING LEAD CONTENT FROM 8% TO A WEIGHTED AVERAGE OF NOT MORE THAN 0.25% IN THE WETTED SURFACE MATERIAL. ALL WATERWORKS BRASS FITTINGS INSTALLED FOR POTABLE WATER SERVICE ON JANUARY 4, 2014 AND BEYOND SHALL CONFORM TO THE AMENDED DEFINITION OF "LEAD-FREE."

AS INDICATED IN SECTION 211 OF WATER SYSTEM STANDARDS — BRASS PRODUCTS, ALL BRASS FITTINGS SHALL CONFORM TO NSF STANDARD 61 AND SECTION 1417 OF THE SAFE DRINKING WATER ACT (SDWA), IN ADDITION, ALL BRASS FITTINGS SHALL CONFORM TO NSF STANDARD 372.

29. CONTRACTOR SHALL INSTALL WATER FACILITIES ONLY AFTER REACHING FINAL SUBGRADE OR HIGHER. THE DEPARTMENT OF WATER WILL NOT ALLOW INSTALLATION OF ANY WATER FACILITIES UNTIL THE FINAL SUBGRADE LAYER AT MINIMUM HAS BEEN ACHIEVED.

SPECIAL NOTES TO DEVELOPER

CERTIFICATION OF COMPLETION FOR THESE WATER SYSTEM FACILITIES WILL NOT BE ISSUED UNTIL:

1. ALL WATER IMPROVEMENTS ARE COMPLETE AND DEDICATED TO THE DEPARTMENT OF WATER.

2. AS-BUILT TRACINGS ARE SUBMITTED TO THE DEPARTMENT OF WATER.

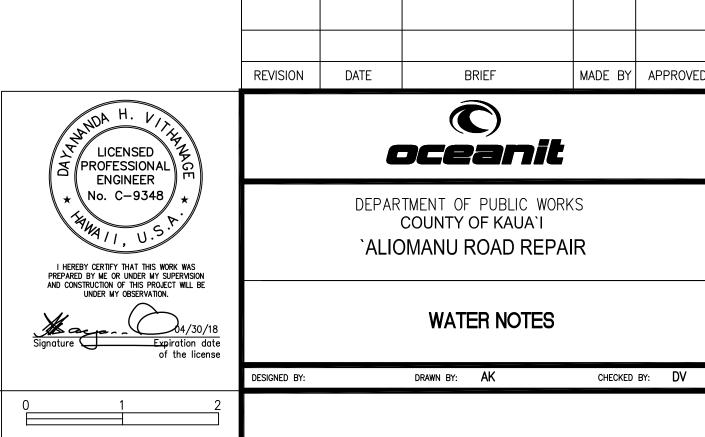
3. FINAL COST BREAKDOWN FOR THE WATER IMPROVEMENTS ARE SUBMITTED AND APPROVED BY THE DEPARTMENT OF WATER. THE OWNER SHALL CERTIFY COSTS.

4. ROADWAY AND PIPELINE EASEMENTS ARE CONVEYED TO THE DEPARTMENT OF WATER, IF APPLICABLE.

5. PAYMENT OF ALL APPLICABLE FEES FOR THE DEVELOPMENT ARE RECEIVED BY THE DEPARTMENT OF WATER. THESE FEES INCLUDE BUT ARE NOT LIMITED TO:

A. FACILITIES RESERVE CHARGE

6. OTHER REQUIRED CONDITIONS ARE COMPLETED, IF APPLICABLE



APPROVED:

MANAGER AND CHIEF ENGINEER, DATE DEPT. OF WATER, COUNTY OF KAUAI

DWG. NO. T—3

SHEET NO. 3 OF 18

LINE IS 2 INCHES AT FULL SCALE
(If NOT 2-inches : Scale According)

₹ AUGUST 2019

KAUA'I ISLAND UTILITY COOPERATIVE (KIUC) CONSTRUCTION NOTES

UNDERGROUND CONSTRUCTION NOTES AND REQUIREMENTS

- 1. THESE NOTES ARE NOT INTENDED TO BE USED IN PLACE OF THE SERVICE INSTALLATION MANUAL, PLEASE REFER TO SERVICE INSTALLATION MANUAL FOR ALL SERVICE ISSUES.
- 2. CONTRACTOR SHALL CONTACT KAUAI ISLAND UTILITY COOPERATIVE (KIUC) CONSTRUCTION COORDINATOR/LNSPECTOR PRIOR TO START OF WORK ON KE FACILITIES AND FOR SCHEDULING SITE INSPECTIONS. (WESTSIDE: 246-2323; EASTSIDE: 246-4343)
- 3. CONTRACTOR SHALL CONTACT KIUC'S DISTRIBUTION PLANNING COORDINATOR @ 246-2373 FOR DESIGN APPROVALS, STANDARD DETAIL DRAWINGS, AND ANY ITEMS NOT ADDRESSED IN THESE NOTES OR DRAWINGS.
- 4. ALL CONTRACTORS ENTERING KIUC FACILITIES MUST BE APPROVED BY KIUC AND MUST HAVE PROPER LICENSING AND INSURANCE COVERAGE. CONTACT KIUC LEGAL COORDINATOR @ 246-4369 FOR DETAILS.
- 5. ALL TRENCHES AND PULLBOXES MUST BE INSPECTED BY KIUC PRIOR TO BACKFILLING AND CONCRETE—ENCASING OPERATIONS. FOR DETAILED TRENCHING AND BACKFILLING REQUIREMENTS REFER TO KIUC'S SERVICE INSTALLATION MANUAL.
- 6. THE CONTRACTOR SHALL PROVIDE A POLY-LINE 200 LB. TEST LINE OR EQUIVALENT AS A PULLING WIRE IN ALL 1 INCH, 2 INCH, 3 INCH AND 4 INCH CONDUITS. IN 5 INCH AND 6 INCH CONDUITS, THE CONTRACTOR SHALL INSTALL NEPTCO WP1BOO MULETAPE AS A PULLING LINE.
- 7. ALL CONDUITS, PULLBOXES, HANDHOLES &' MANHOLES SHALL BE CLEANED AND FREE FROM OBJECTIONABLE MATERIALS. CONDUIT ENDS SHALL BE ADEQUATELY COVERED UNTIL THE CONDUCTOR IS INSTALLED BY THE ELECTRIC COMPANY. (COVERS SHALL BE CARLON PLUG WITH PULL TAB SERIES P25B EQUIVALENT OR BETTER)
- 8. FOR ALL CONDUIT OTHER THAN SERVICES, REFER TO CONDUIT SCHEDULE ON DRAWINGS.
- 9. FOR ALL SERVICES WHERE THE CONDUCTOR IS 1/0 OR LESS, THE DISTANCE FROM KIUC'S HANDHOLE AND CUSTOMER'S METER IS LESS THAN 125 FEET, AND NOT CROSSING ANY DRIVEWAYS OR ROADS THE CONDUIT SHALL BE 2 INCH SCHEDULE 40 PVC. FOR SERVICES GREATER THAN 125 FEET, CONTACT KIUC PLANNER FOR FIELD VERIFICATION AND UNDERGROUND SERVICE REQUIREMENTS. ANY DEVIATIONS WILL REQUIRE KIUC WRITTEN APPROVAL.
- 10. PRIMARY AND SECONDARY CONDUITS FOR NEW LINE EXTENSIONS SHALL BE SCHEDULE 40 PVC. (CARLON P&C DUCT TYPE DB EQUIVALENT OR BETTER.) UNDER DRIVEWAYS AND ROADWAYS, THE CONDUITS SHALL BE ENCASED IN A MINIMUM OF 3 INCH CONCRETE JACKET EXTENDING 12 INCHES OUTSIDE THE EDGE OF THE PAVEMENT.
- 11. SCHEDULE 80 PVC CONDUIT MAY BE SUBSTITUTED FOR THE CONCRETE ENCASED SCHEDULE 40 PVC FOR SERVICE CONDUIT ONLY CROSSING UNDER UNPAVED PRIVATE DRIVEWAYS AND ROADWAYS FROM KIUC POLE/HANDHOLE TO CUSTOMER'S METER. IF CONCRETE DRIVEWAY WILL BE BUILT OVER SERVICE CONDUIT IMMEDIATELY AFTER CONDUIT IS INSTALLED, THEN SCHEDULE 40 PVC MAY BE USED PROVIDED THAT IT MEETS WITH RULE NO. 21.
- 12. ALL PRIMARY AND SECONDARY CONDUITS WHICH ARE CROSSING STATE OR COUNTY ROADWAYS SHALL BE SCHEDULE 40 PVC ENCASED IN A MINIMUM 3 INCH CONCRETE JACKET, WHICH SHALL EXTEND A MINIMUM OF 12 INCHES OUTSIDE OF THE EDGE OF PAVEMENT.
- 13. ELECTRICAL SUPPLY DUCTS, WHEN INSTALLED NEAR COMMUNICATION CABLES, SHALL BE SEPARATED FROM COMMUNICATION DUCT SYSTEMS AND BURIED COMMUNICATION CABLES OR CONDUCTORS BY NOT LESS THAN 3 INCHES OF CONCRETE OR 12 INCHES OF EARTH WHEN PARALLELING OR CROSSING.
- 14. CHAIRS SHALL BE INSTALLED AND SPACED AT A MAXIMUM OF 5 FEET SEPARATION WHEN CONCRETE ENCASING CONDUITS.
- 15. ALL CONDUITS SHALL ENTER BOXES AT A 90 DEGREE ANGLE, PERPENDICULAR AND FLUSH TO THE WALL WITH BELL ENDS TO PREVENT CABLE DAMAGE.
- 16. 90 DEGREE CONDUIT BENDS SHALL BE FACTORY—MADE WITH A MINIMUM RADIUS OF 3 FEET IN TRENCH RUNS.
- 17. CONDUIT BENDS EXCEEDING 90 DEGREES WILL NOT BE ACCEPTED
- 18. A 36 INCH MINIMUM HORIZONTAL CLEARANCE SHALL BE MAINTAINED WHEN RUNNING KIUC CONDUITS PARALLEL TO WATER &' SEWER LINES. IF CLEARANCE IS LESS THAN 36 INCHES, KIUC CONDUIT SHALL BE CONCRETE ENCASED.
- 19. NO FOREIGN PULL BOXES, HANDHOLES, MANHOLES, CONCRETE SLABS/BOXES, STRUCTURES, ETC. ARE TO BE INSTALLED OVER KIUC FACILITIES WITH THE EXCEPTION OF HAWAIIAN TELCOM, CA TV OR WATERLINE CONDUIT CROSSINGS. SUCH CROSSING MUST BE APPROVED BY KIUC'S SERVICE ASSURANCE DEPARTMENT AND KIUC CONDUIT TO BE CONCRETE ENCASED. CONCRETE ENCASEMENT MUST BE MINIMUM OF 3 INCH ENCASEMENT AND EXTEND A MINIMUM OF 1 FOOT BEYOND CROSSING CONDUIT OR PIPE.
- 20. YELLOW MARKER TAPE TO BE PLACED 1 FOOT ABOVE ELECTRICAL CONDUITS IN THE TRENCH DURING BACKFILLING. (E-Z CODE WBT 6 INCH WIDE 4 MIL POLYETHYLENE PROTECT-A-LINE WARNING TAPE NA-0708 "ELECTRIC LINE" IN YELLOW, EQUIVALENT OR BETTER?
- 21. UNLESS OTHERWISE NOTED, THE TOP OF ALL CONDUITS SHALL BE AT A DEPTH OF 24 INCHES.

KAUA'I ISLAND UTILITY COOPERATIVE (KIUC) CONSTRUCTION NOTES

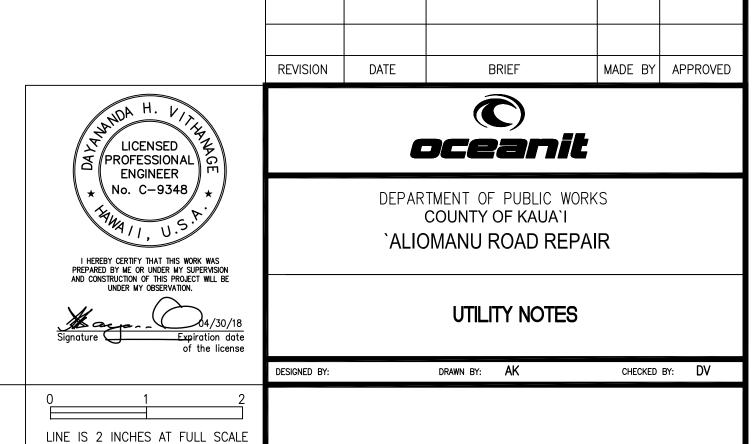
- 22. ALL HANDHOLES, PULLBOXES, AND MANHOLES SHALL BE WALKER INDUSTRIES TYPE OR APPROVED EQUAL. CONTACT KIUC PRIOR TO ORDERING UNDERGROUND BOXES FOR VENDOR APPROVAL. CUSTOMER TO SUBMIT MANUFACTURER'S SHOP DRAWINGS IF SUBSTITUTING FROM WALKER INDUSTRIES TYPE.
- 23. TYPICALLY, THE TOP OF ALL ELECTRICAL UTILITY BOXES SHALL BE 1 INCH ABOVE FINISH GRADE, SINGLE PHASE TRANSFORMER PADS SHALL BE 2 INCHES ABOVE FINISH GRADE, AND THREE PHASE TRANSFORMER PADS SHALL BE 4 INCHES ABOVE FINISH GRADE UNLESS OTHERWISE NOTED {SPECIAL CONDITIONS MAY APPLY TO SIDEWALKS, ROADWAYS, ETC., SEE SPECIFIC LOCATION NOTATION}
- 24. AT NO TIME SHALL CEMENT MORTAR, WOOD, OR ANY OTHER MATERIAL BE USED BETWEEN PRE-CAST SECTIONS OF KIUC PULLBOXES, HANDHOLES, OR MANHOLES. THE PERMANENT INSTALLATION OF WOODEN WEDGES TO LEVEL OR RAISE THE PRE-CAST SECTIONS SHALL NOT BE PERMITTED.
- 25. A MINIMUM OF 6 INCHES OF #3 CRUSHED ROCK BACKFILL SHALL BE PLACED LOOSELY BENEATH THE BOTTOM SECTION OF HANDHOLES AND PULLBOXES. CRUSHED ROCK OR OTHER FOREIGN MATERIALS ARE NOT TO BE PLACED INSIDE HANDHOLES AND PULLBOXES.

HAWAIIAN TELCOM GENERAL CONSTRUCTION/DESIGN NOTES

- 1. THE CONTRACTOR SHALL PROCURE AND PAY FOR ALL LICENSES AND PERMITS AND SHALL GIVE ALL NOTICES NECESSARY AND INCIDENT TO THE DUE AND LAWFUL PROSECUTION OF THE WORK
- 2. THE CONTRACTOR SHALL CALL THE HAWAII ONE CALL CENTER AT 811 AT LEAST TWO WEEKS PRIOR TO THE START OF CONSTRUCTION.
- 3. THE LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL EXERCISE EXTREME CAUTION AND SHALL MAINTAIN PROPER CLEARANCES WHENEVER CONSTRUCTION CROSSES OR IS IN CLOSE PROXIMITY OF HAWAIIAN TELCOM FACILITIES. THE CONTRACTOR SHALL VERIFY THEIR LOCATIONS AND SHALL BE LIABLE FOR ANY DAMAGES TO HAWAIIAN TELCOM FACILITIES. ANY DAMAGES SHALL BE REPORTED IMMEDIATELY TO HAWAIIAN TELCOM'S REPAIR SECTION AT #611 (24 HOURS) OR TO THE CONSTRUCTION MANAGER AT 652–2804 (NORMAL WORKING HOURS, MONDAY THROUGH FRIDAY, EXCEPT HOLIDAYS). AS A RESULT OF HIS OPERATIONS, ADJUSTMENTS TO THE NEW DUCTLINE ALIGNMENT, IF REQUIRED, SHALL BE MADE TO PROVIDE REQUIRED CLEARANCES.
- 4. THE CONTRACTOR SHALL TAKE NECESSARY PRECAUTION NOT TO DAMAGE EXISTING CABLES OR DUCTS. A HAWAIIAN TELCOM INSPECTOR OR DESIGNATED REPRESENTATIVE IS REQUIRED TO BE AT ANY JOB SITE WHENEVER THERE WILL BE A BREAKAGE INTO OR ENTRY INTO ANY STRUCTURE THAT CONTAIN HAWAIIAN TELCOM FACILITIES. TEMPORARY CABLE AND DUCT SUPPORTS SHALL BE PROVIDED WHEREVER NECESSARY.
- 5. THE CONTRACTOR SHALL NOTIFY HAWAIIAN TELCOM'S INSPECTOR OR DESIGNATED REPRESENTATIVE A MINIMUM OF 72 HOURS PRIOR TO EXCAVATION, BRACING OR BACKFILLING OF HAWAIIAN TELCOM' STRUCTURES OR FACILITIES.
- 6. ALL APPLICABLE CONSTRUCTION WORK SHALL BE DONE IN ACCORDANCE WITH THE "HAWAIIAN TELCOM STANDARD SPECIFICATIONS FOR PLACING UNDERGROUND TELEPHONE SYSTEMS" DATED MARCH 1999. ALL SUBSEQUENT AMENDMENTS AND ADDITIONS, AND ALL OTHER PERTINENT STANDARDS FOR TELEPHONE CONSTRUCTION. CONTRACTOR SHALL FAMILIARIZE HIS PERSONNEL BY OBTAINING APPLICABLE SPECIFICATIONS.
- 7. WHEN EXCAVATION IS ADJACENT TO OR BENEATH HAWAIIAN TELCOM'S EXISTING STRUCTURES OR FACILITIES. THE CONTRACTOR SHALL:
 - A. SHEET AND/OR BRACE THE EXCAVATION TO PREVENT SLIDES, CAVE—INS, OR SETTLEMENTS TO ENSURE NO MOVEMENT TO HAWAIIAN TELCOM'S STRUCTURES OR FACILITIES.
 - B. PROTECT EXISTING STRUCTURES AND/OR FACILITIES WITH BEAMS, STRUTS, OR UNDERPINNING WHILE EXCAVATING BENEATH THEM TO ENSURE NO MOVEMENT TO HAWAIIAN TELCOM'S STRUCTURES OR FACILITIES.
- 8. THE CONTRACTOR SHALL BRACE ALL POLES OR LIGHT STANDARDS NEAR THE DUCTLINE, MANHOLE, OR HANDHOLE DURING HIS OPERATIONS.
- 9. THE CONTRACTOR SHALL SAW—CUT AC. PAVEMENT AND CONCRETE GUTTER WHENEVER NEW MANHOLES, HANDHOLES, OR DUCTLINES ARE TO BE PLACED AND SHALL RESTORE TO EXISTING CONDITION OR BETTER.
- 10. THE CONTRACTOR SHALL COMPLY WITH THE POLICY ADOPTED BY THE DEPARTMENT OF PUBLIC WORKS, KAUAI COUNTY, CONCERNING THE REPLACEMENT OF CONCRETE SIDEWALKS AFTER EXCAVATION WORK.
- 11. THE UNDERGROUND PIPES, CABLES, OR DUCTLINES KNOWN TO EXIST BY THE ENGINEER FROM HIS SEARCH OF RECORDS ARE INDICATED ON THE PLANS. THE CONTRACTOR SHALL VERIFY THE LOCATIONS AND DEPTHS OF THE FACILITIES AND EXERCISE PROPER CARE IN EXCAVATING IN THE AREA. WHENEVER CONNECTIONS OF NEW UTILITIES TO EXISTING UTILITIES ARE SHOWN ON THE PLANS, THE CONTRACTOR SHALL EXPOSE THE EXISTING LINES AT THE PROPOSED CONNECTIONS TO VERIFY THEIR LOCATIONS AND DEPTHS PRIOR TO EXCAVATION FOR THE NEW LINES.
- 12. WHENEVER CONNECTIONS TO EXISTING UTILITIES ARE SHOWN ON THE PLANS, THE CONTRACTOR SHALL EXPOSE THE EXISTING LINES PRIOR TO EXCAVATION OF THE MAIN TRENCHES TO VERIFY THEIR LOCATIONS AND DEPTHS.
- 13. THE CONTRACTOR, AT HIS OWN EXPENSE, SHALL KEEP THE PROJECT AND SURROUNDING AREA FREE FROM DUST NUISANCE. THE COST FOR ADDITIONAL MEASURES, WHEN REQUIRED BY KAUAI COUNTY AND THE STATE (HOOT) SHALL BE BORNE BY THE CONTRACTOR.
- 14. THE CONTRACTOR SHALL PUMP ALL MANHOLES DRY DURING FINAL INSPECTION.

HAWAIIAN TELCOM GENERAL CONSTRUCTION/DESIGN NOTES

- 15. THE CONTRACTOR SHALL NOTIFY HAWAIIAN TELCOM INSPECTOR 24 HOURS PRIOR TO THE POURING OF CONCRETE OR BACKFILLING.
- 16. WHEN CONNECTING TO MANHOLE WALLS, ALL EXISTING REINFORCING BARS SHALL BE LEFT INTACT. DUCTS SHALL BE ADJUSTED IN THE FIELD IN ORDER TO CLEAR REINFORCING.
- 17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LAYING OUT ALL REQUIRED LINES AND GRADES AND SHALL PRESERVE ALL BENCH MARKS AND WORKING POINTS NECESSARY TO LAYOUT THE WORK CORRECTLY. THE NEW DUCTLINE SHALL BE ADJUSTED BY THE CONTRACTOR TO SUIT THE EXISTING CONDITIONS AND THE DETAILS AS DESCRIBED IN THE PLANS.
- 18. MINIMUM CONCRETE STRENGTH SHALL BE:
 FOR DUCTLINE 2500 PSI AT 28 DAYS
 FOR MANHOLE 3000 PSI AT 28 DAYS
 OR AS SPECIFIED IN DESIGN NOTES
- 19. BENDS IN THE DUCT ALIGNMENT, DUE TO CHANGES IN GRADE SHALL HAVE A MINIMUM RADIUS OF 25 FEET. ALL 90 DEGREE C-BENDS AT A POLE OR AT THE BUILDING FLOOR SLAB PENETRATION, SHALL HAVE A BEND RADIUS OF TEN TIMES THE DIAMETER OF THE DUCT OR GREATER.
- 20. AFTER DUCTLINE HAS BEEN COMPLETED, A MANDREL WITH A SQUARE FRONT NOT LESS THAN 12" LONG AND HAVING A DIAMETER OF 1/4" LESS THAN THE INSIDE DIAMETER OF THE DUCT, SHALL BE PULLED THROUGH EACH DUCT AFTER WHICH A BRUSH WITH STIFF BRISTLES SHALL BE PULLED THROUGH TO MAKE CERTAIN THAT NO PARTICLES OF EARTH, SAND, OR GRAVEL HAVE BEEN LEFT INSIDE. DUCTS SHALL BE COMPLETELY DRY AND CLEAN
- 21. AI DUCTS AND CONDUITS SHALL HAVE AN 1800# POLYESTER MULE— TAPE (NEPTCO, WP1800P, HAWAIIAN TELCOM MATERIAL CODE NO. 571154) INSTALLED THROUGHOUT ITS ENTIRE LENGTH. ALL DUCTS SHALL BE CAPPED TO PREVENT ENTRY OF FOREIGN MATERIAL DURING CONSTRUCTION AND AT THE COMPLETION OF INSTALLATION.



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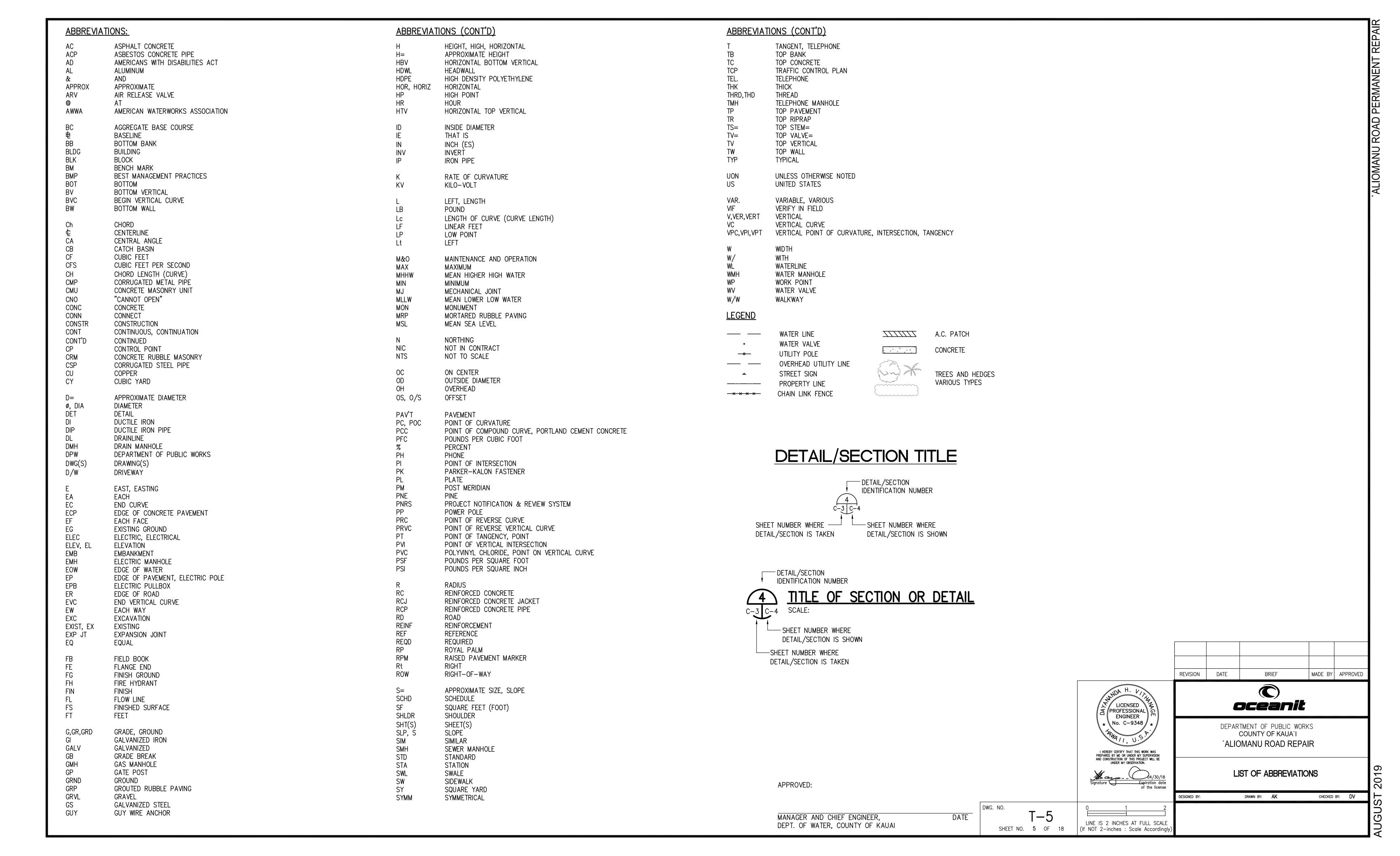
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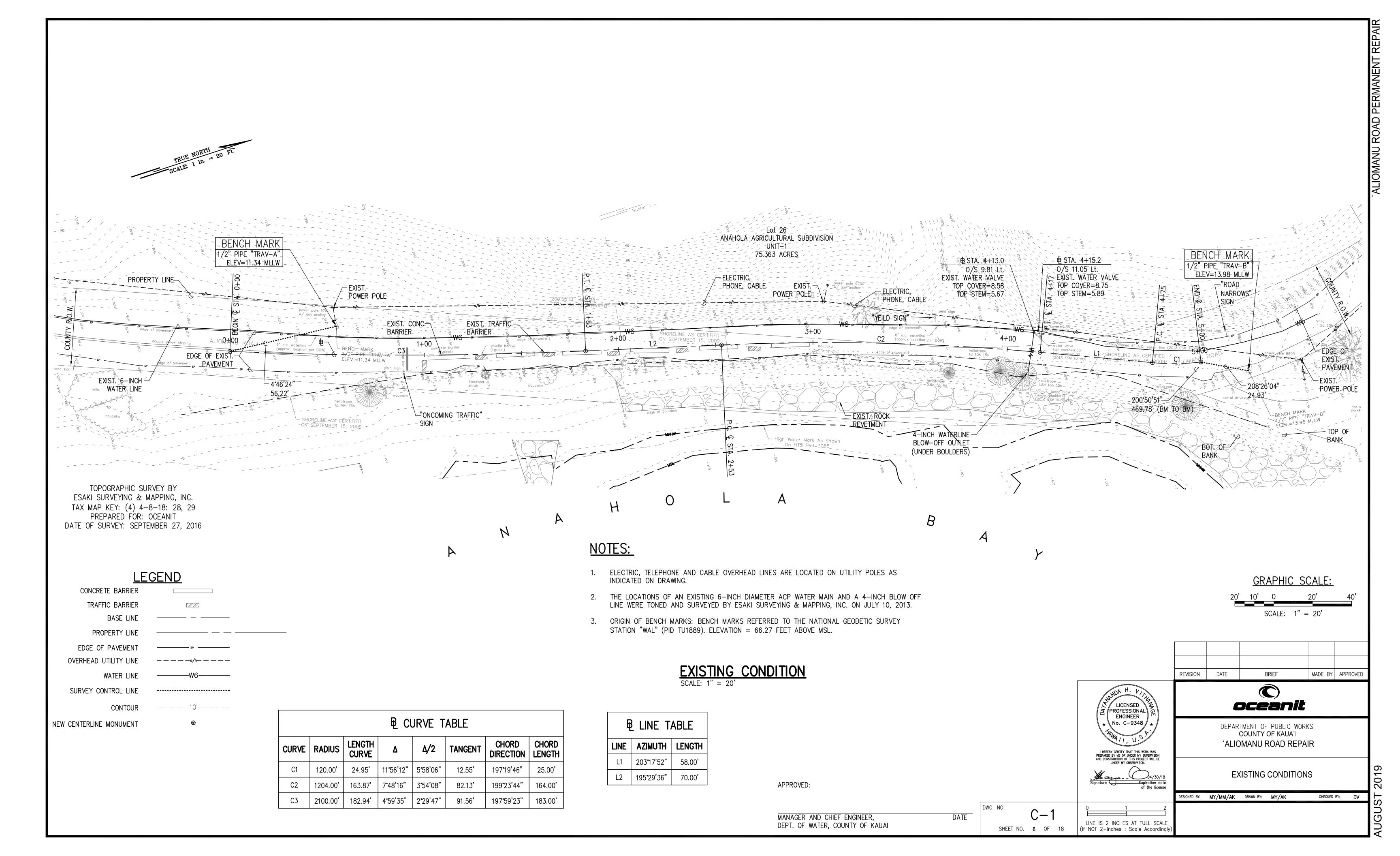
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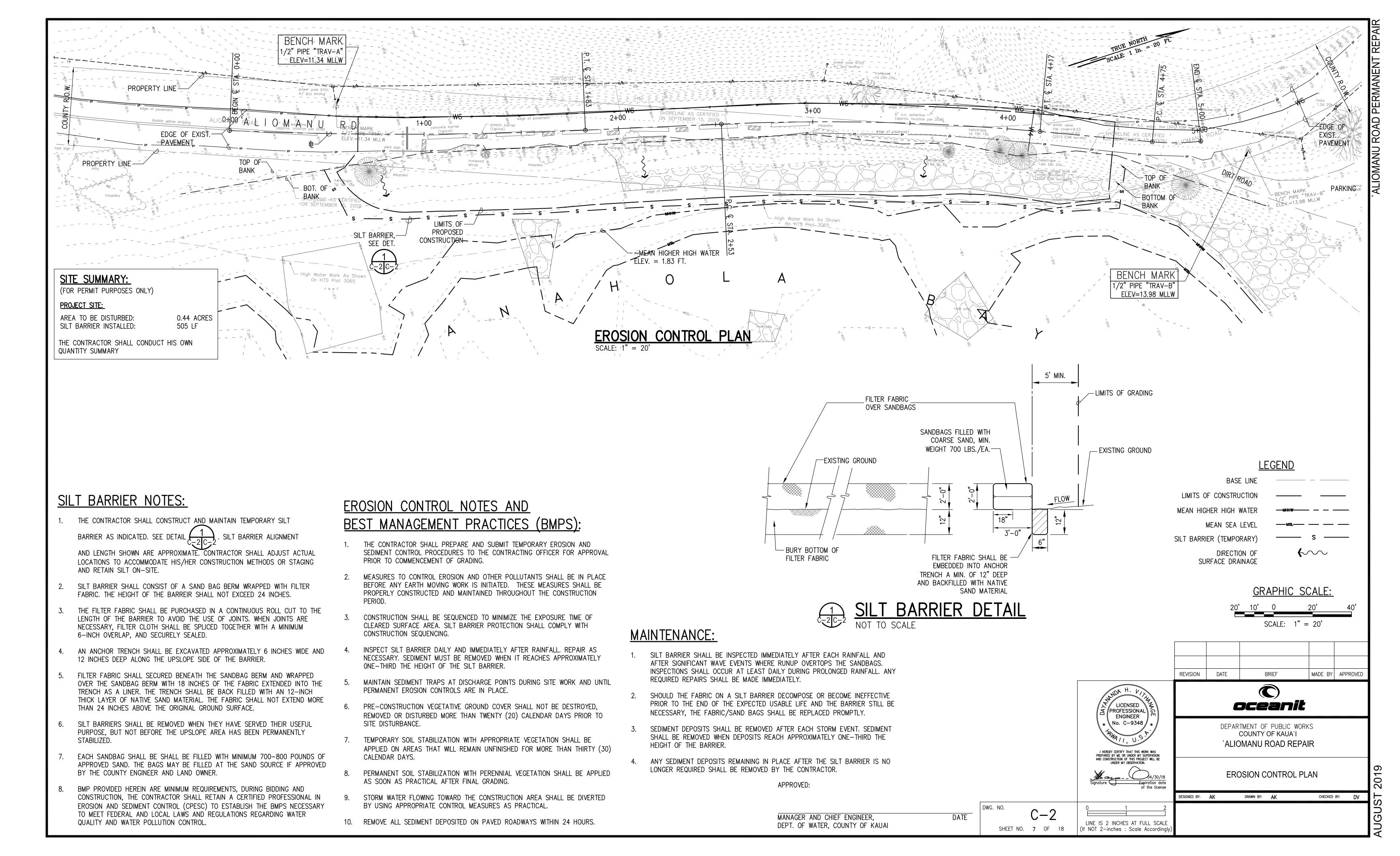
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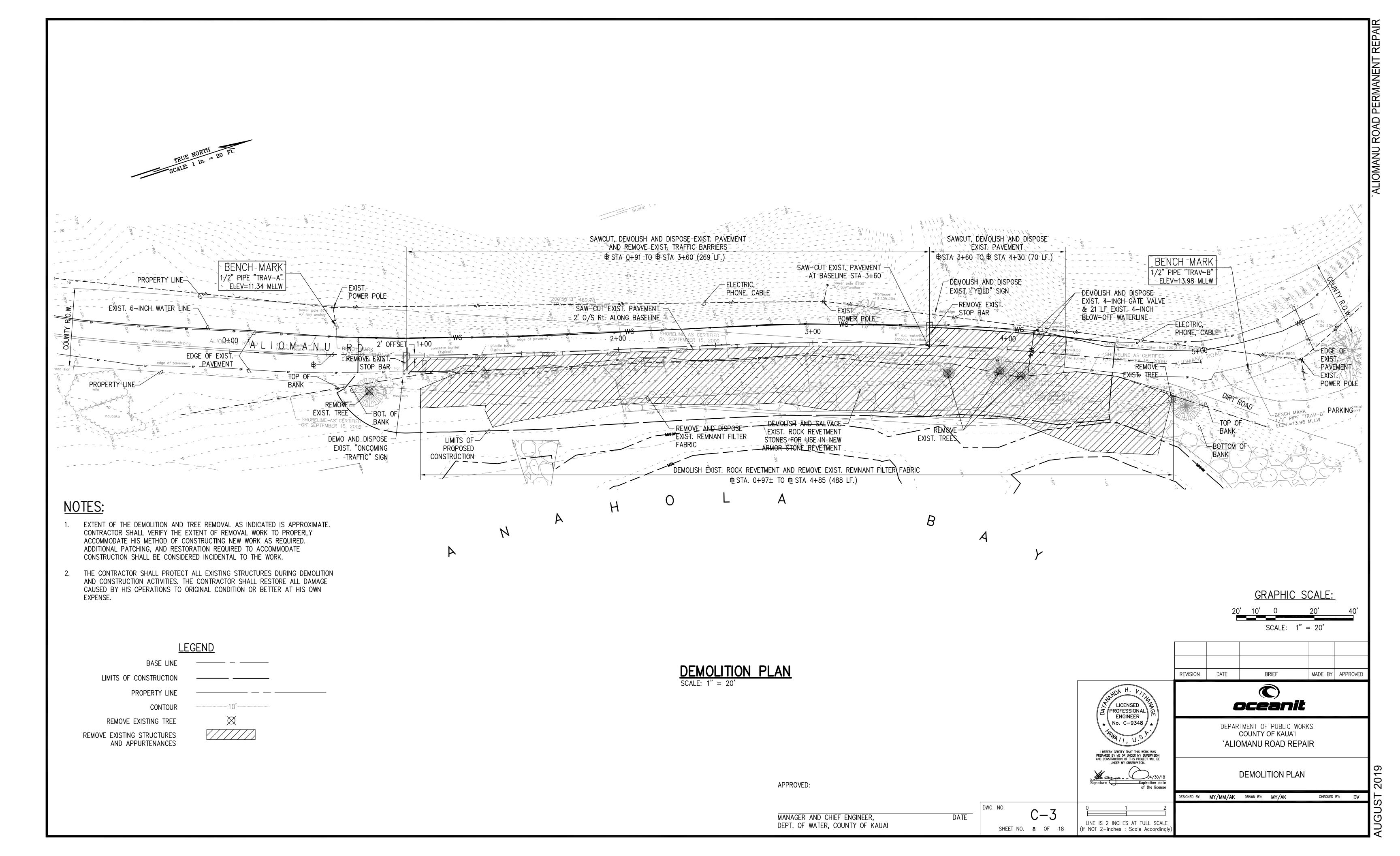
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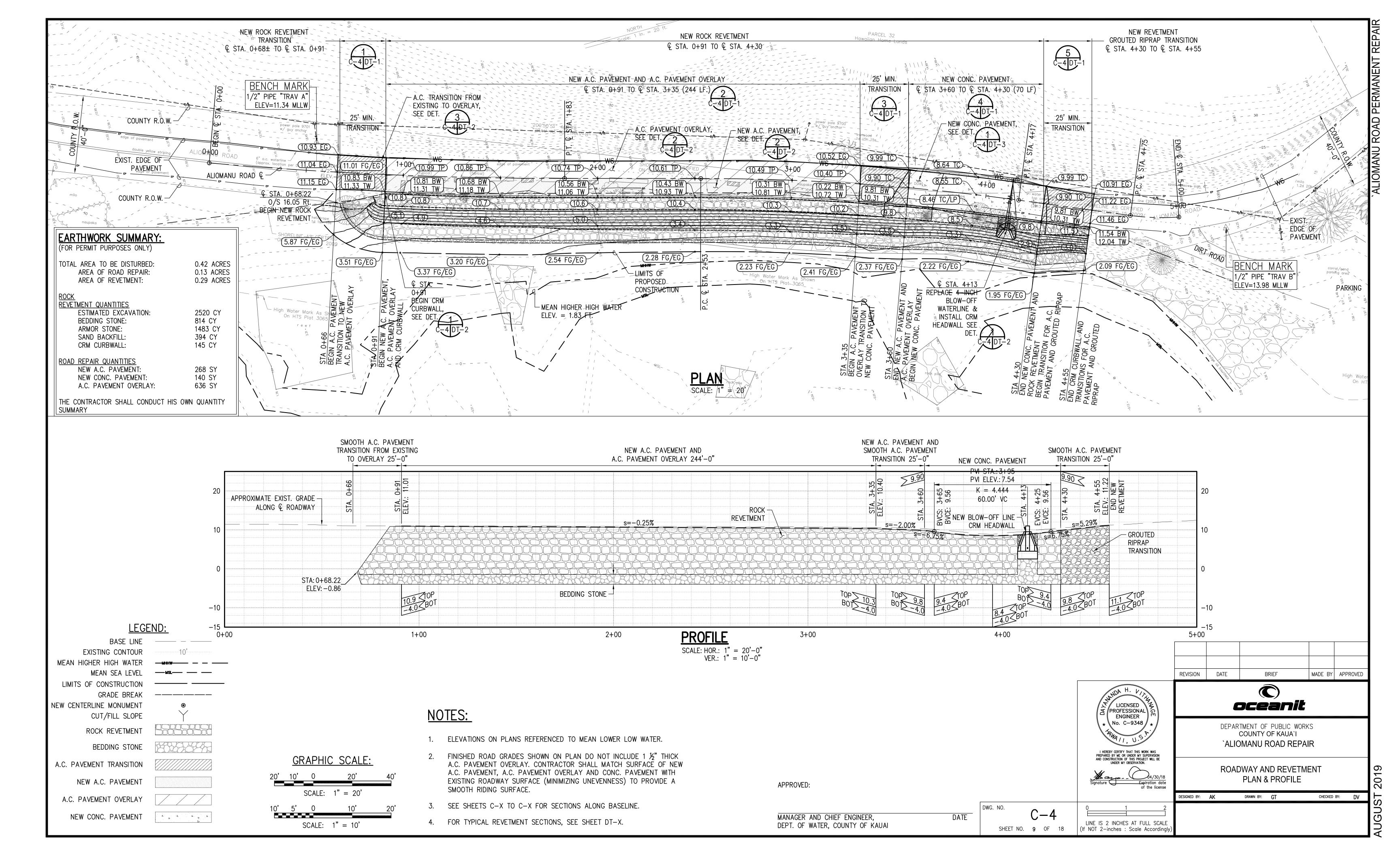
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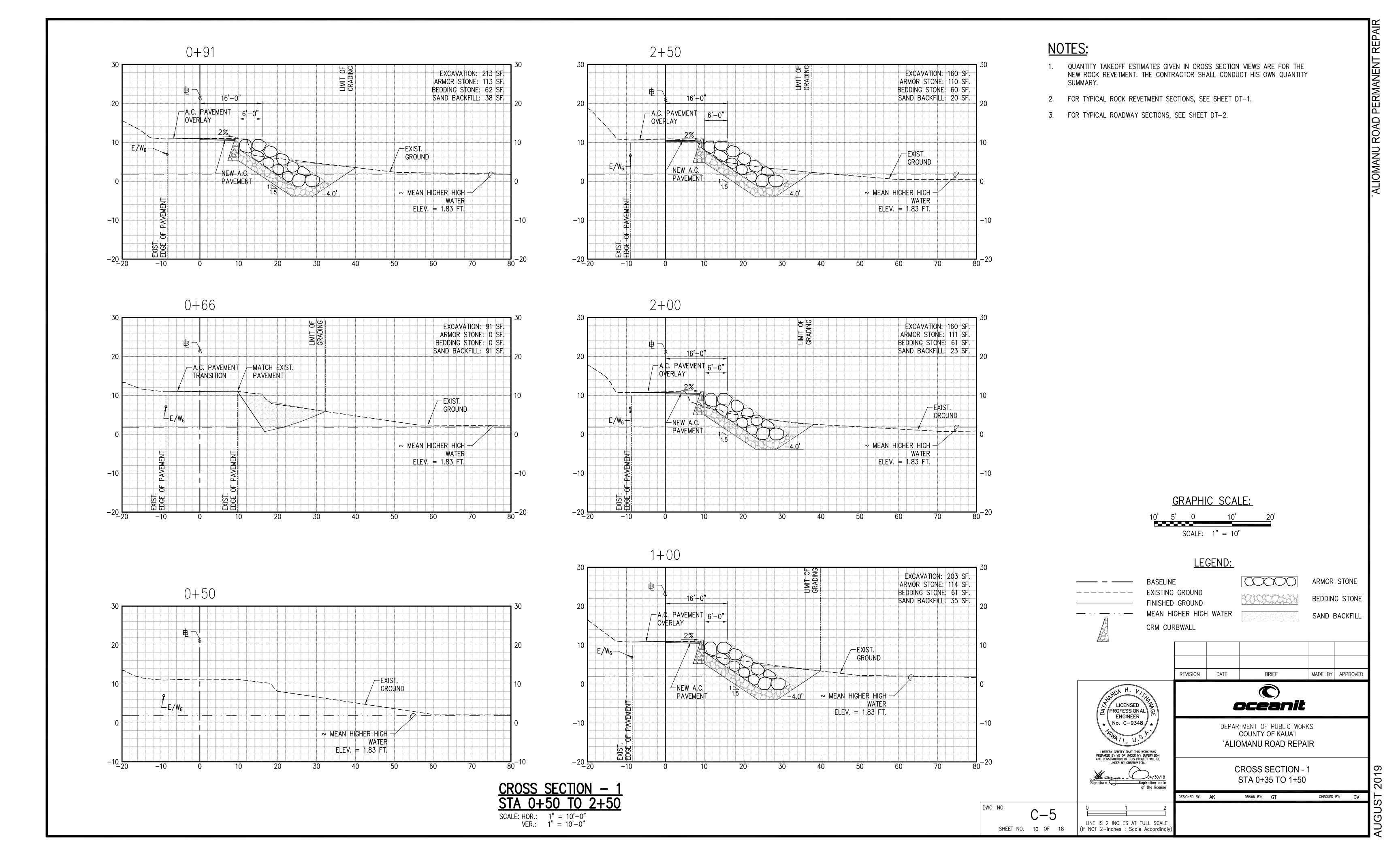


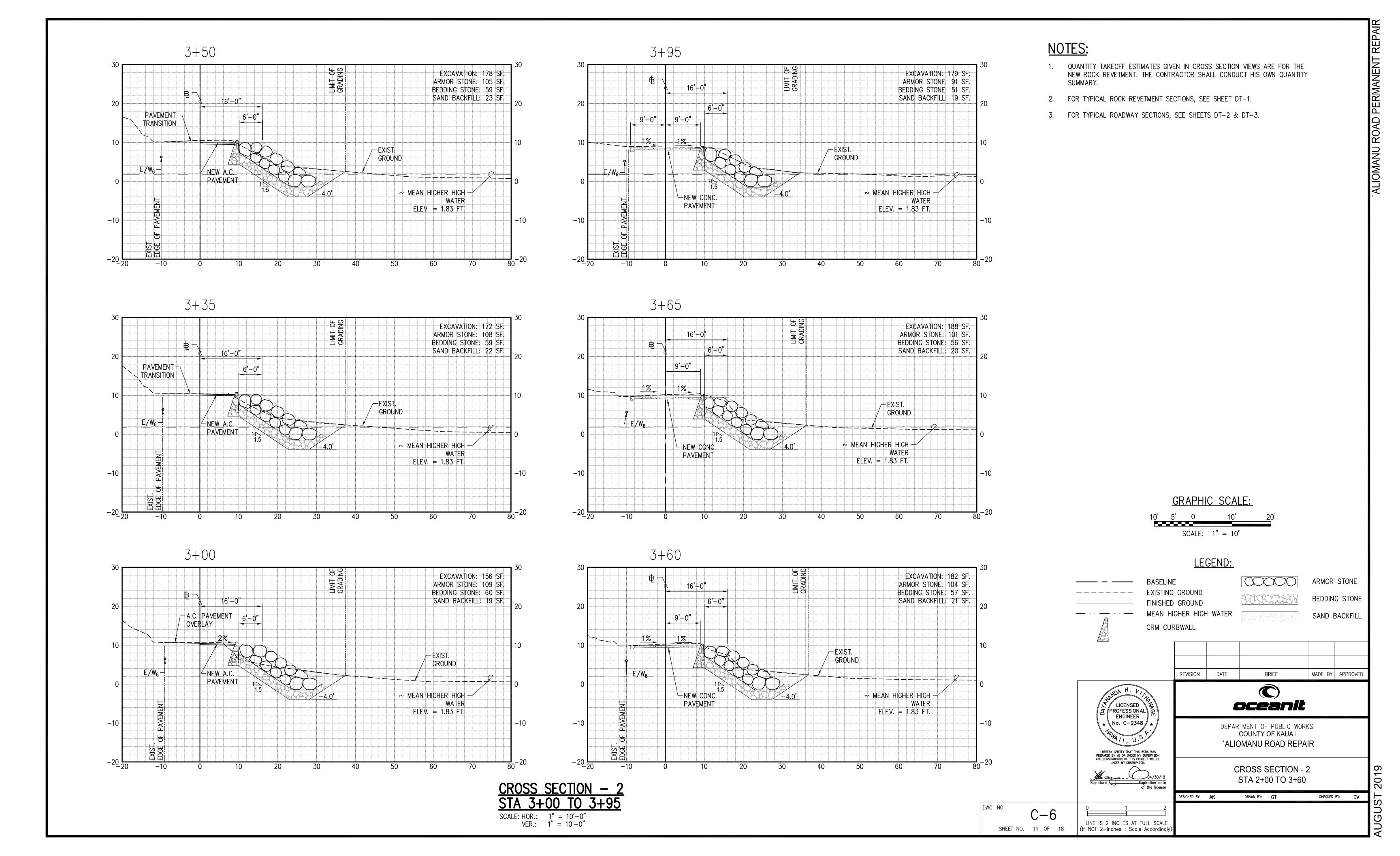


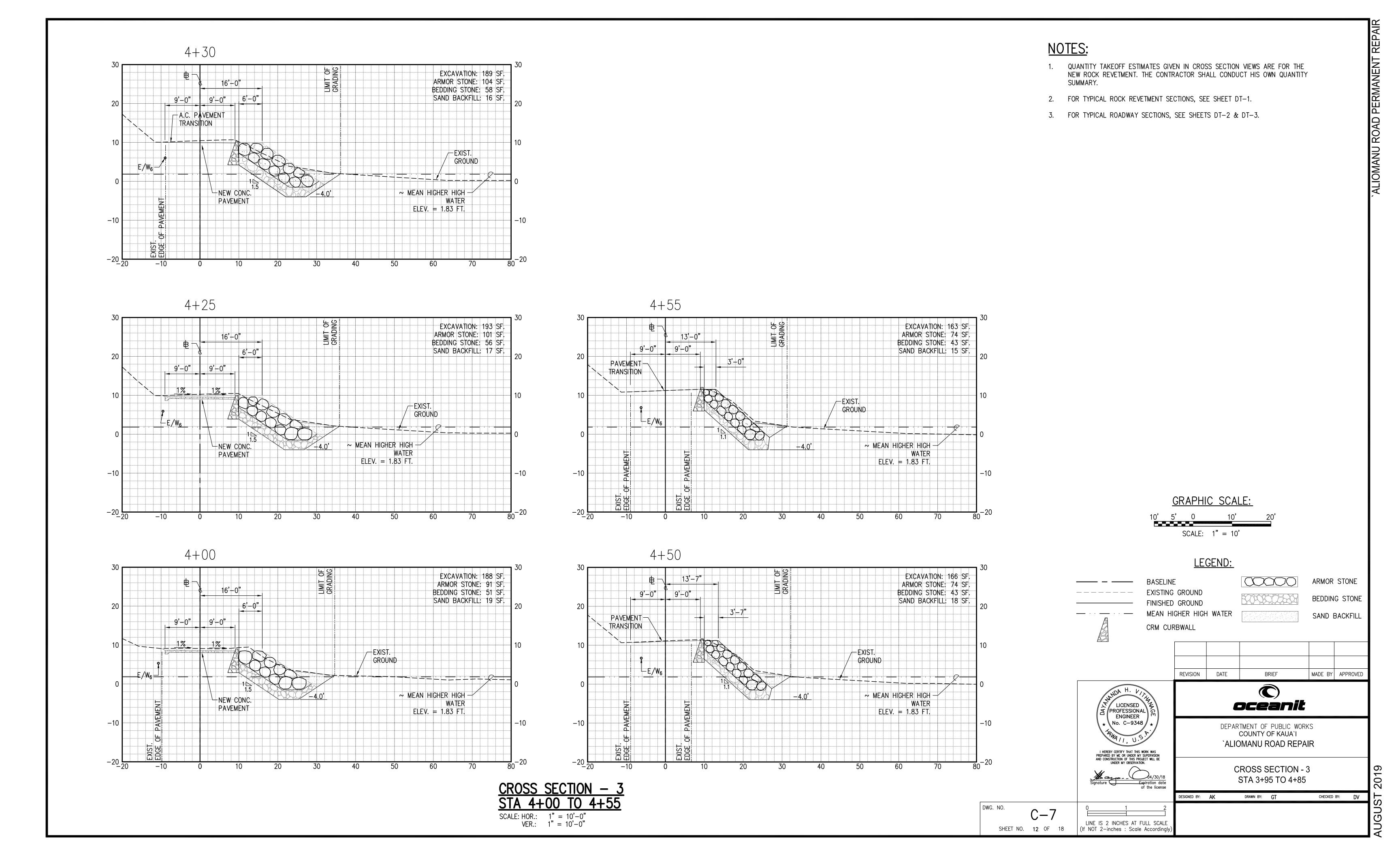


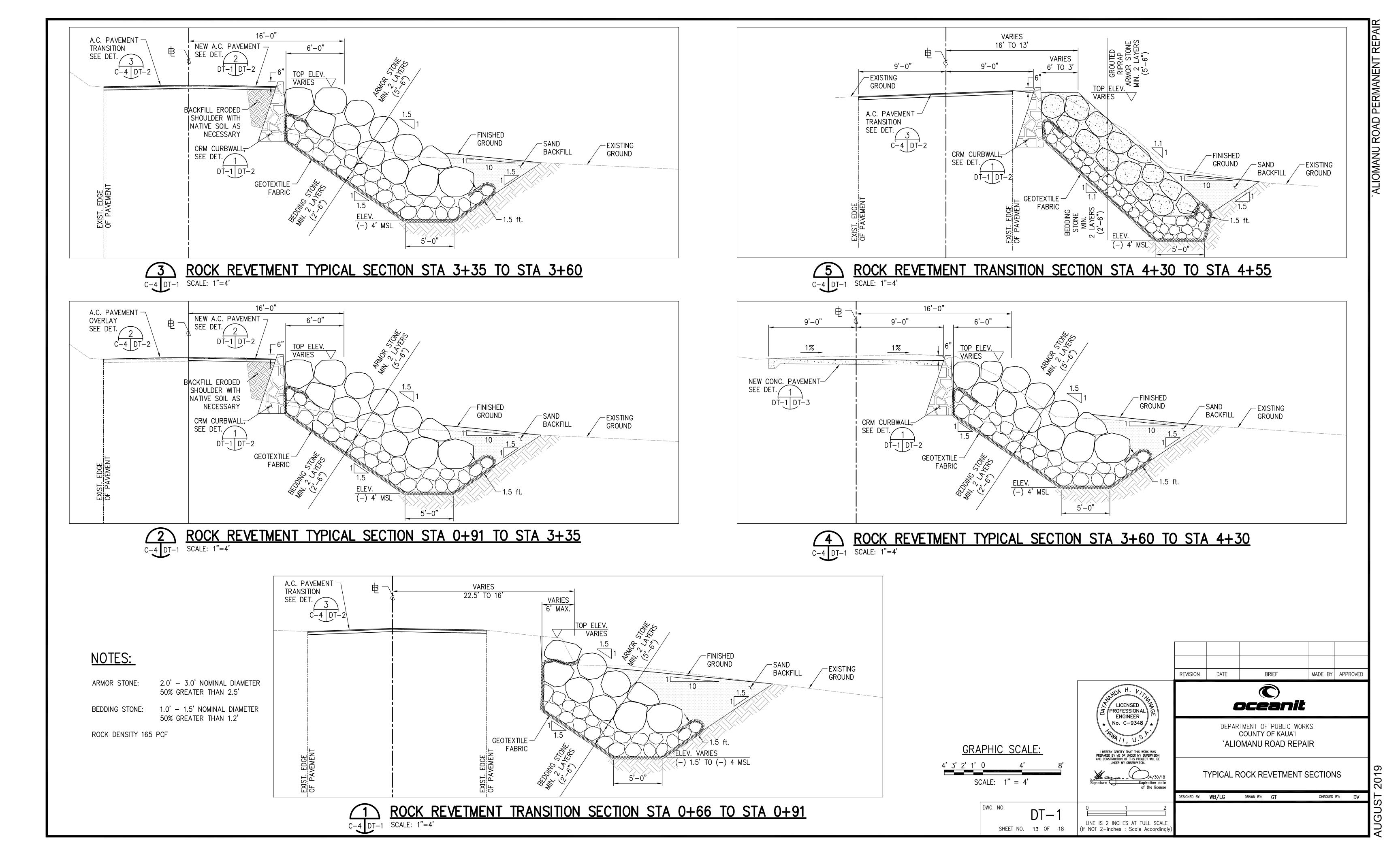


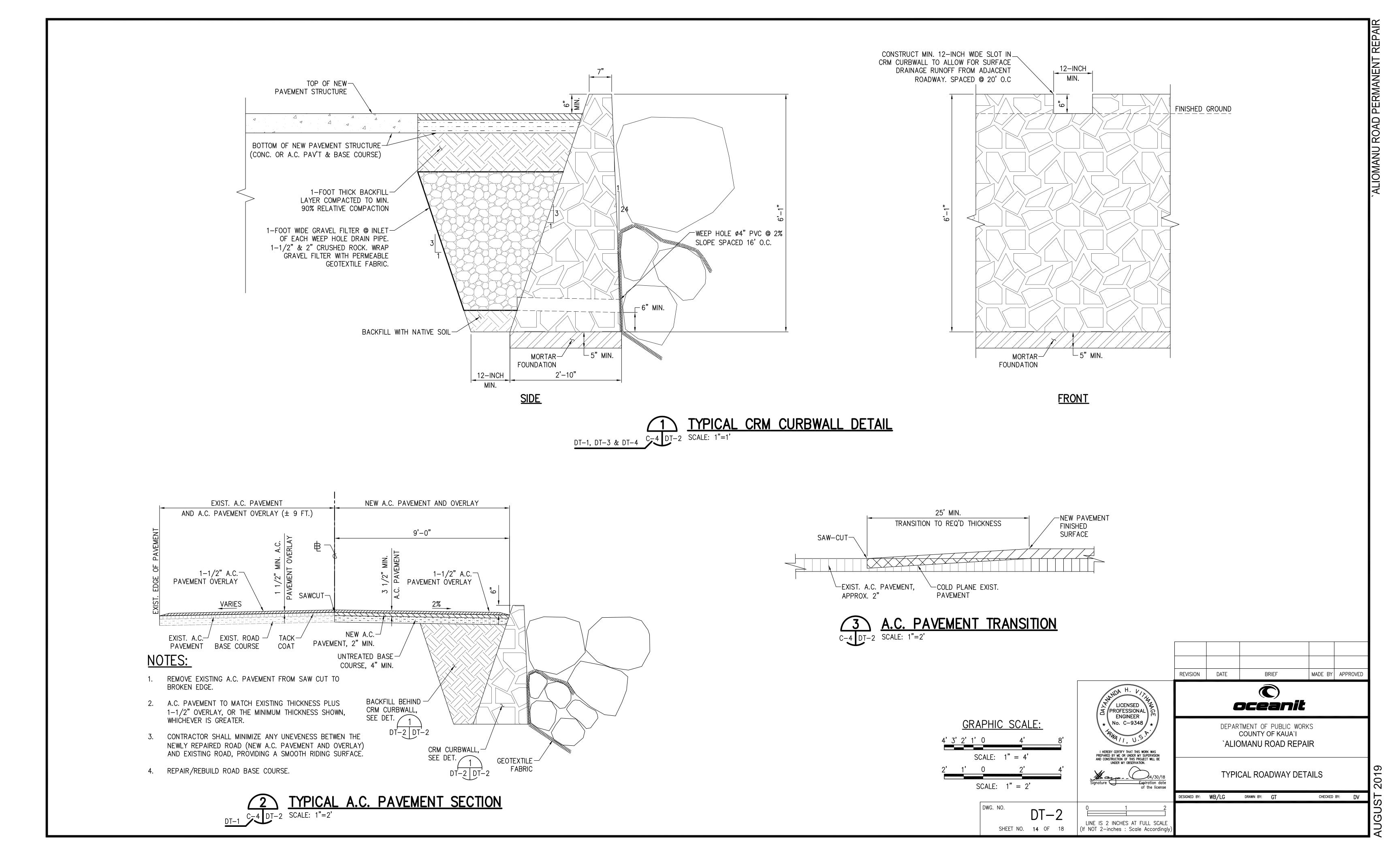


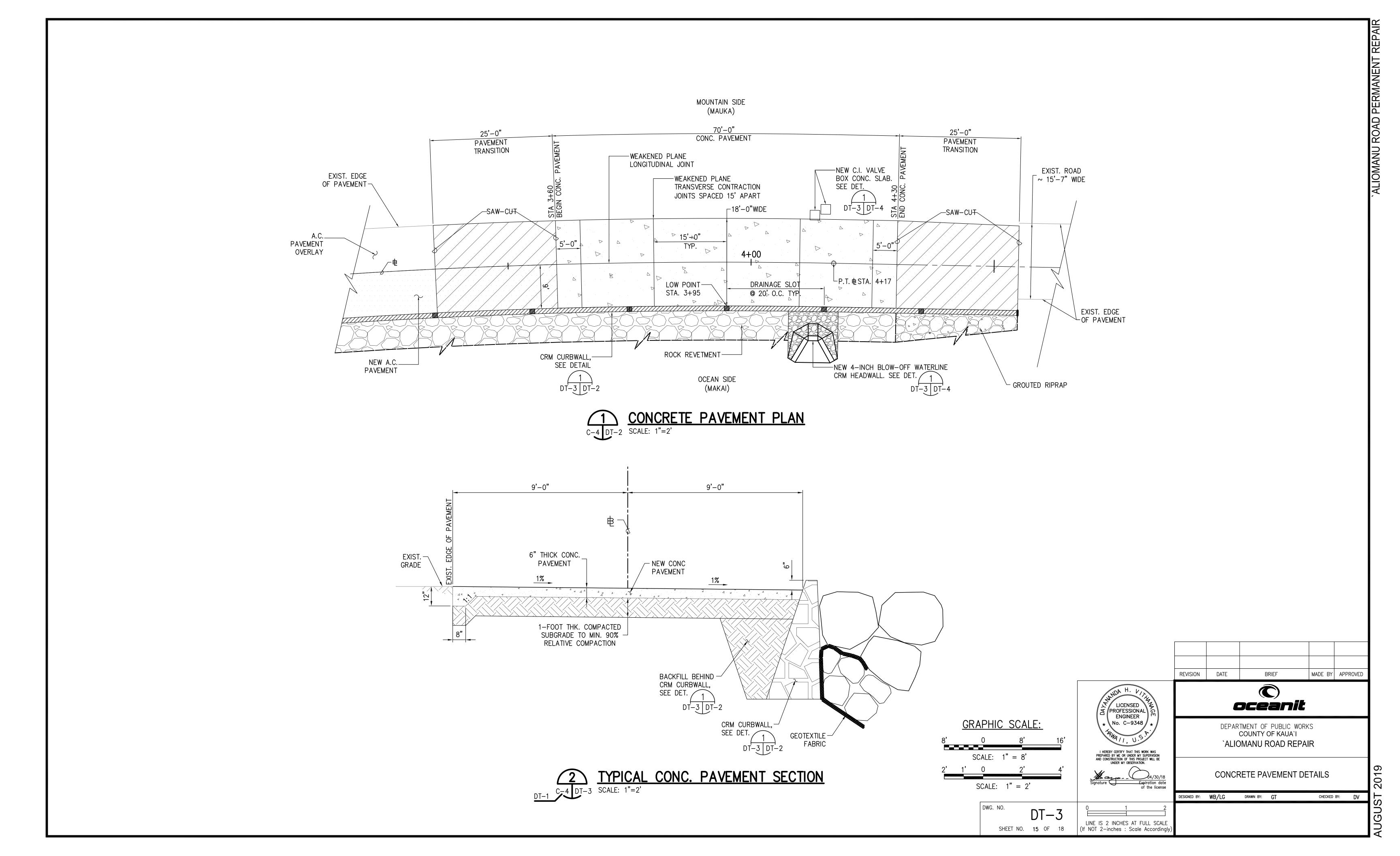


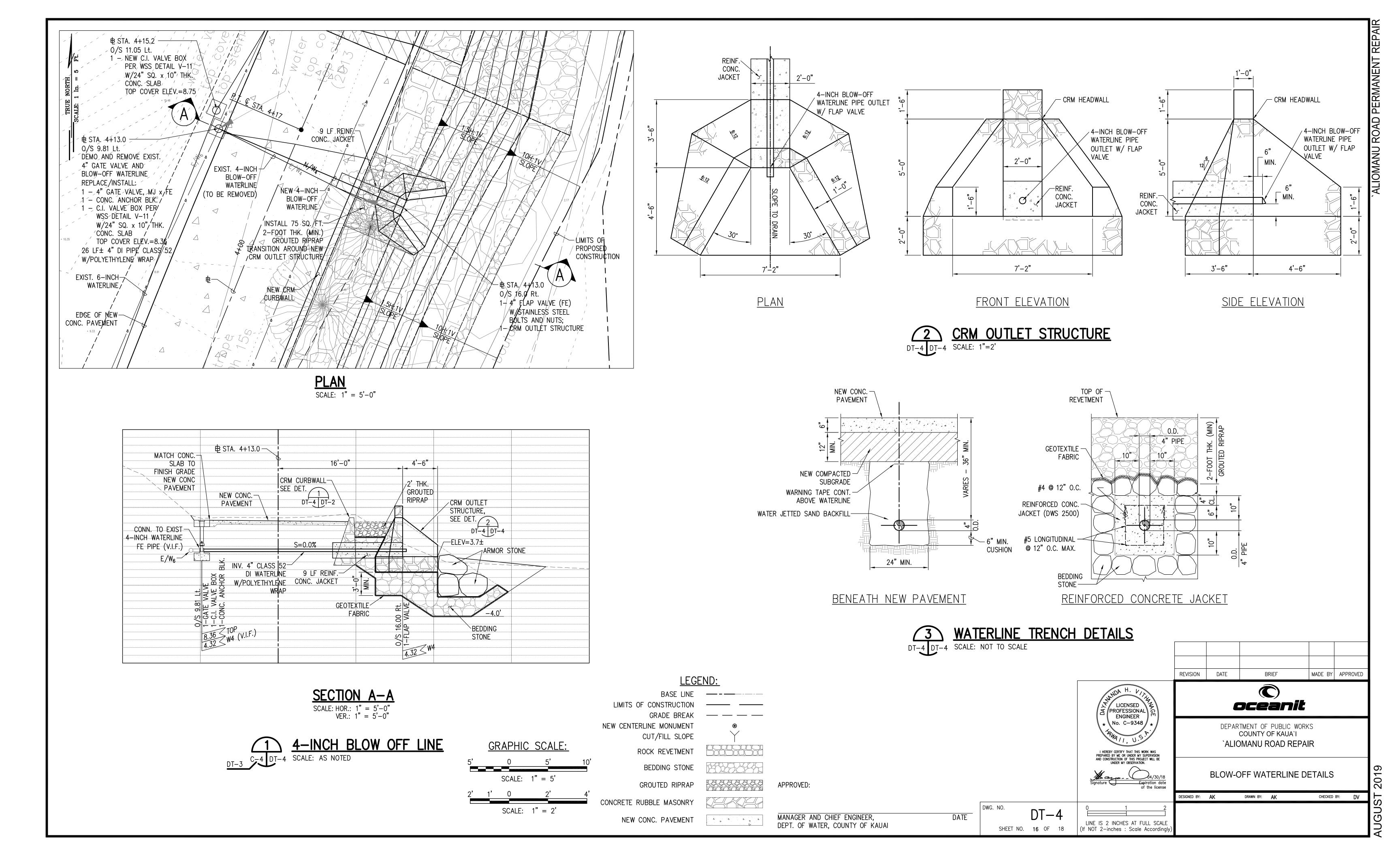


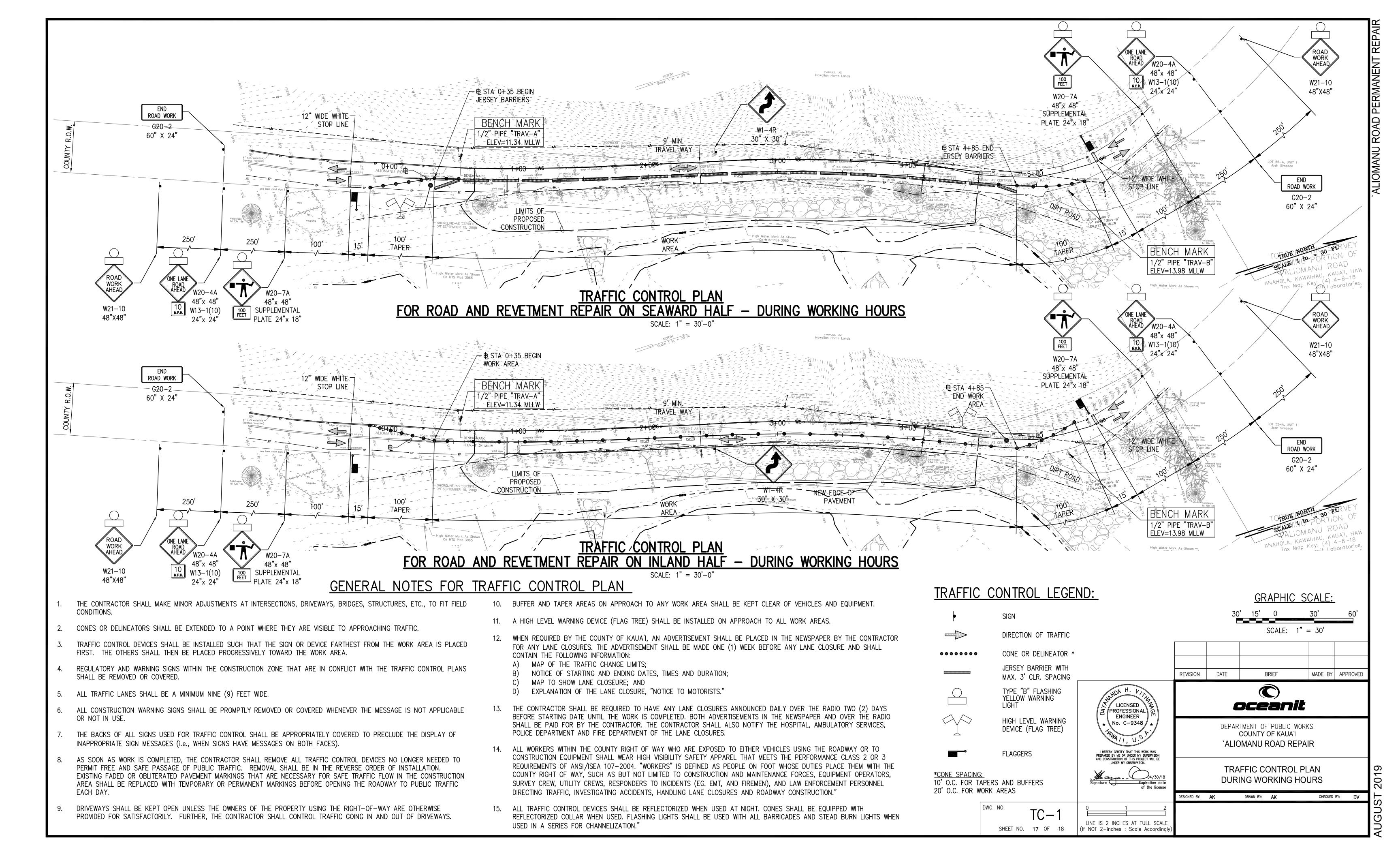


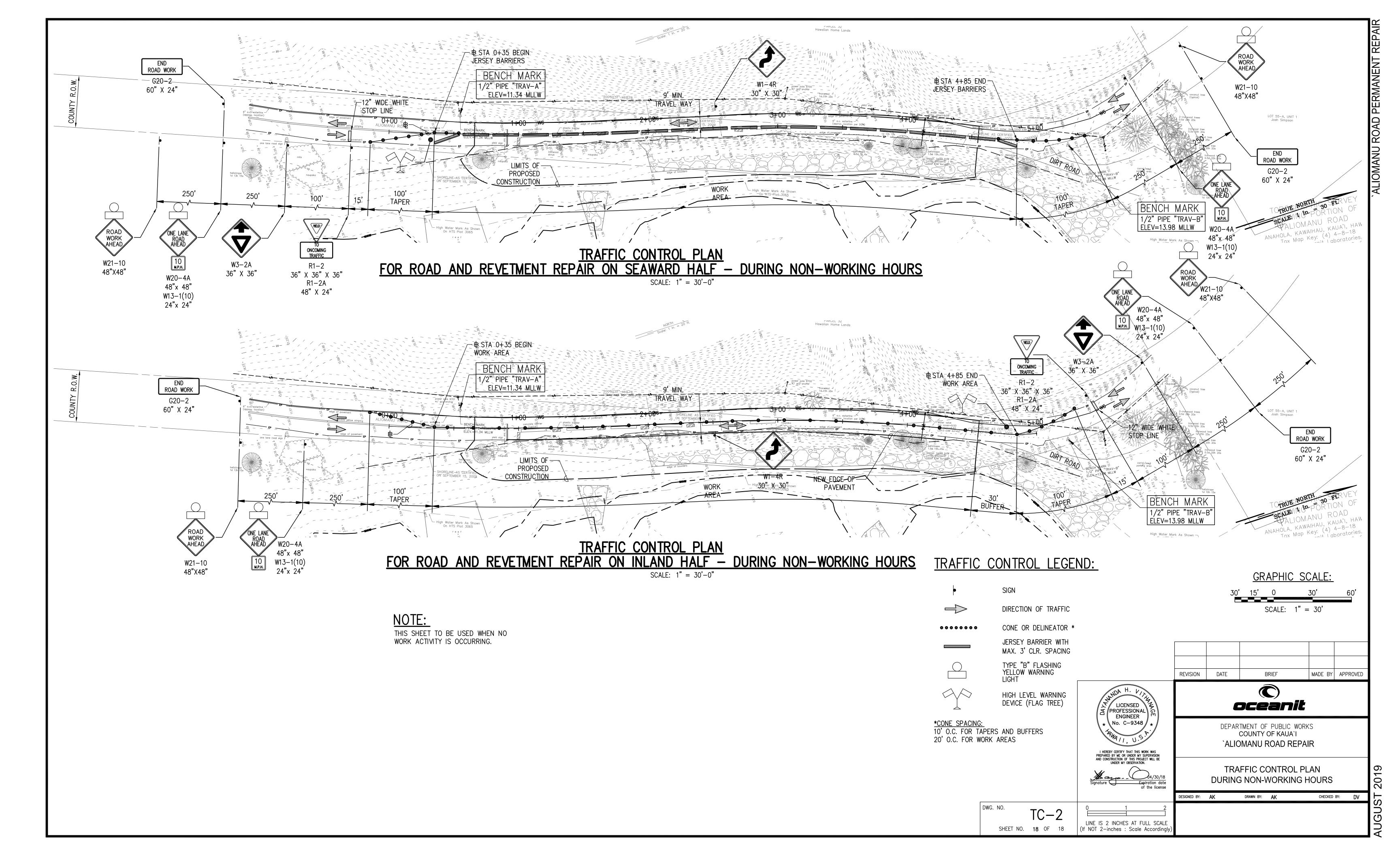


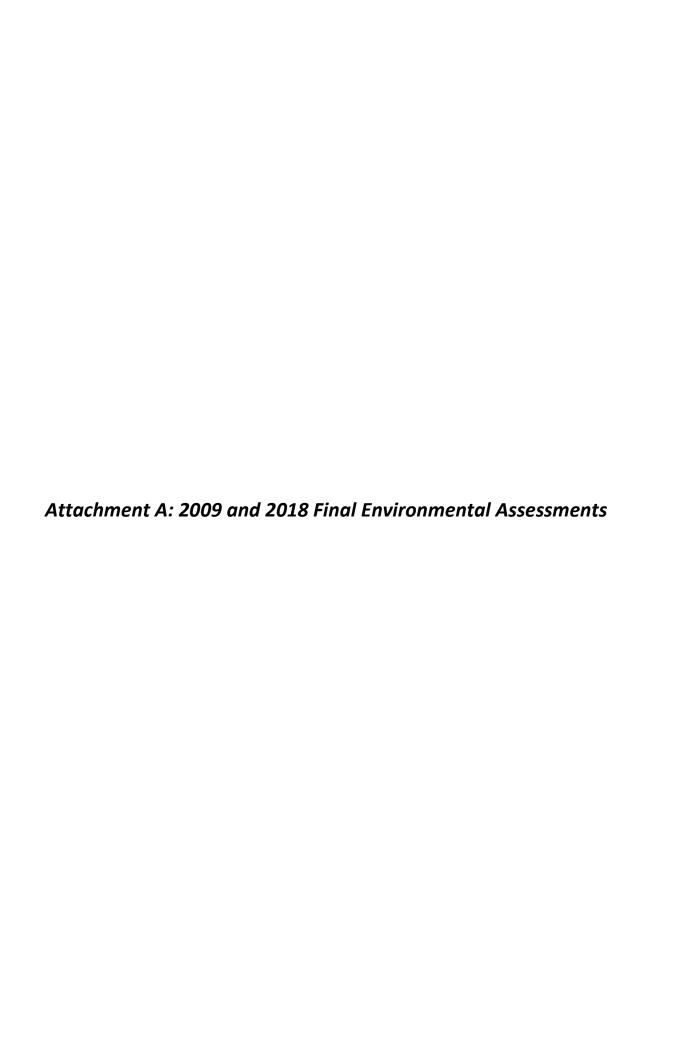


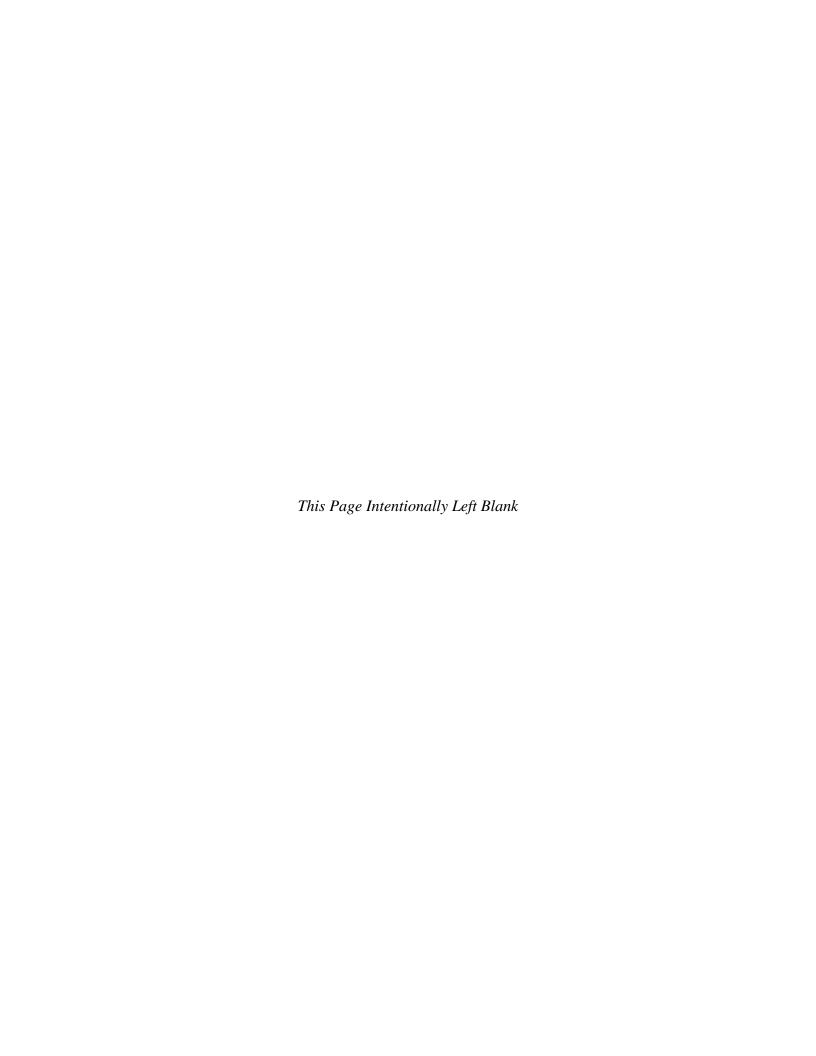












BERNARD P. CARVALHO, JR. MAYOR

> GARY K. HEU **ADMINISTRATIVE ASSISTANT**



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DONALD M. FUJIMOTO COUNTY ENGINEER **TELEPHONE 241-4992**

EDMOND P.K. RENAUD DEPUTY COUNTY ENGINEER **TELEPHONE 241-4992**

AN EQUAL OPPORTUNITY EMPLOYER COUNTY OF KAUA'I

DEPARTMENT OF PUBLIC WORKS 4444 RICE STREET MO'IKEHA BUILDING, SUITE 275 LIHU'E, KAUA'I, HAWAI'I 96766-1340

September 22, 2009

Ms. Katherine Puana Kealoha, Director Office of Environmental Quality Control 235 South Beretania Street, Suite 702 Honolulu, Hawaii 96813

Dear Ms. Kealoha:

SUBJECT: Finding of No Significant Impact (FONSI) and

Final Environmental Assessment (FEA) for

Aliomanu Road Repair

TMK: 4-8-18: 028, 029, Anahola, Kauai

The County of Kauai, Department of Public Works, has reviewed the comments received during the 30-day public comment period, which began on April 8, 2009. We have determined that this project will have no significant environmental effects and had issued a FONSI. Please publish this FONSI and the Final Environmental Assessment in your next OEQC Bulletin.

We enclose a completed OEQC Bulletin Publication Form, two copies of the Final Environmental Assessment. We have also submitted via email the publication form and a pdf file to your office. Please contact Ryan Nishikawa of the Department of Public Works at (808) 241-4845, or Joanne Hiramatsu of Oceanit at (808) 531-3017 if you have any questions regarding this submittal.

Sincerely,

Donald M. Fujimoto County Engineer

Copy: Oceanit

Final Environmental Assessment For 'Aliomanu Road Repair

Prepared for:

Department of Public Works
County of Kaua'i



Prepared by: **oceanit**

Oceanit Center 828 Fort Street Mall, Suite 600 Honolulu, HI 96813

September 2009

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General Information Summary

Applicant: County of Kaua'i, Department of Public Works

Moʻikeha Building

4444 Rice Street, Suite 255 Līhu'e, Kaua'i, Hawai'i 96766

Owner: County of Kaua'i and State of Hawai'i

Consultant/Preparer: Oceanit

Suite 600

828 Fort Street Mall Honolulu, HI 96813

Approving Agency: County of Kaua'i

Planning Department 4444 Rice Street Līhu'e, HI 96766

Project Description: A portion of 'Aliomanu Road has been eroded by wave action just

north of Anahola Stream. The County of Kaua'i 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 four feet below mean sea level (MSL) 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 Kaua'i, Planning Department Department of Hawaiian Home Lands

Office of Hawaiian Affairs

State Historic Preservation Division

Kaua'i 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



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County General Plan: Residential Community

County Zoning: Open

Special Designations: Special Management Area and Shoreline Setback



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1 Introduction

This environmental assessment is being prepared by Department of Public Works (DPW) of the County of Kaua'i, 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 Kaua'i 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 Hawai'i.

The new rock revetment will be built within the State of Hawai'i 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 four 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 Hawai'i is the owner of these parcels, but the road repair section is under the jurisdiction of the County of Kaua'i.

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

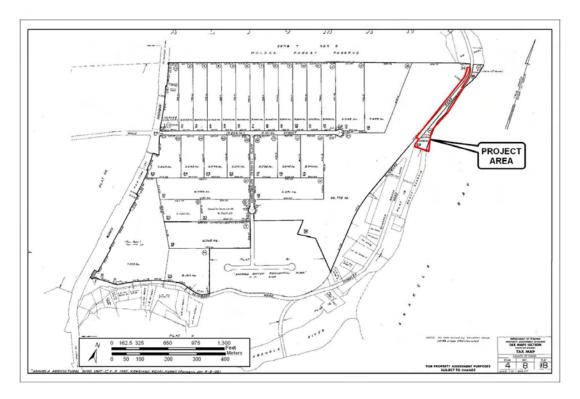


Figure 1-1. TMK of Project Site







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

3





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 Kaua'i near 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 Kaua'i. A rock revetment will be constructed on the seaward side of the roadway to prevent future damage to the road by erosion. The revetment toe will be at approximately four 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 emergency measures included placement of coir sandbags along 200 feet of the shoreline at the damaged section of the roadway. For the permanent solution, these coir sand bags will be removed and replaced with a rock revetment about 500 feet long. The sand bags will be removed prior to construction.

2.2 History of Erosion

Historical aerial photographs and maps show the coastal embankment at Aliomanu Road to the north of Anahola Stream and just south of Kuaehu Point has been eroding at least since 1927 when a shoreline survey was made (see Figure 2-1). According to aerial photos, between 1927 and 1975 the shoreline moved inland on the order of 80-90 feet. The shoreline was relatively stable from 1975 through 1992; however, the shoreline moved in about 30 feet over a short section along the road by 1996. By 1999, the shoreline position had moved seaward to its previous alignment. The most recent aerial photo in 2007 shows the shoreline at the edge of the road again. The beach to the north, which would typically feed the beach at the project site, was also much narrower in 2007. The north side of Kuaehu point continually eroded between 1975 and 2007. Homes on the north side of the point were threatened and seawalls and sandbag revetments were built to protect these homes. The shoreline to the north of the point is not in the project area.

At some time before 2004, Kauai County moved rocks to protect Aliomanu Road from coastal erosion damage. A letter from DLNR dated March 29, 2004 notified the County that it was in violation of Chapter 183C, HRS for an unauthorized boulder structure and a fine of \$2,000 was imposed. The County Department of Public Works responded to the violation on July 30, 2008 and paid the fine. The County proposed a temporary emergency repair for the road damage until a permanent repair could be designed. DLNR/OCCL accepted the County's plan.

The temporary emergency repair consisted of placing coir (coconut fiber) sandbags along 200 feet of the eroded roadway. The proposed permanent repair is a rock revetment that is the subject of this environmental assessment.





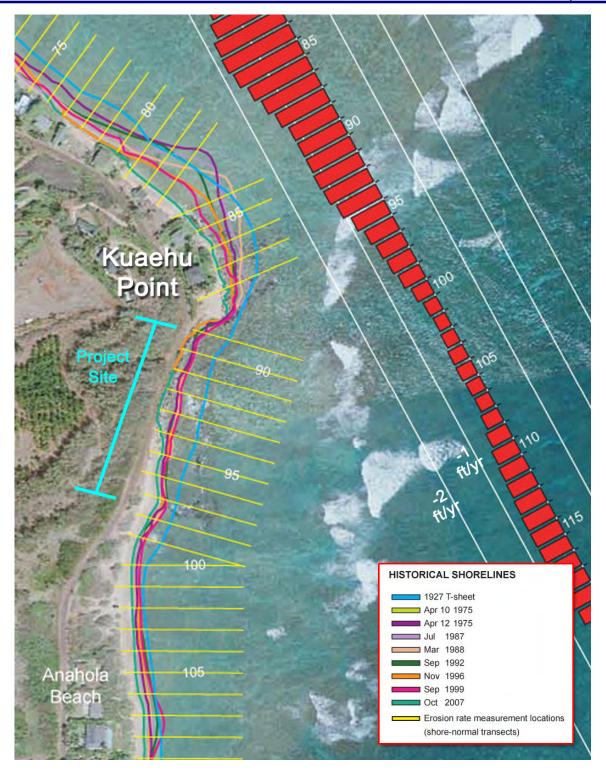


Figure 2-1. Map showing historical erosion

Source: University of Hawaii, Coastal Geology Group





2.3 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 Kaua'i 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.

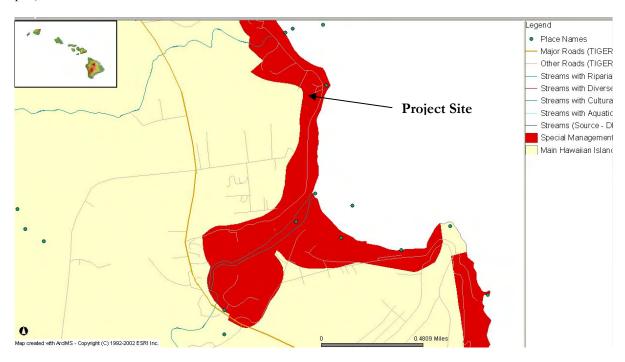


Figure 2-2. Special Management Area Map





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 scope of the repair work is to reconstruct the damaged portion of the road to pre-erosion conditions. Therefore, the proposed project is to rebuild the existing roadway to include a 2-foot wide paved 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). The rock revetment was designed using Corps of Engineers' methods given in the Shore Protection Manual (U.S. Army Corps of Engineers, 1984).

The new revetment will be constructed to a depth of -4 feet MSL. The selected revetment will slope at 1V:1.5H, using less rock and therefore costs less than a shallower sloped revetment. When waves are depth limited (i.e., they break before reaching the shoreline), the highest unbroken wave that hits the revetment is used with empirical factors to estimate armor stone size. Unbroken wave height depends on water depth, which is a combination of still water depth, tide, wave setup, and any future sea level rise during the revetment's 50-year design life. The Mean sea level (MSL) contour is about 45 feet seaward from the edge of the eroded road, so most of the revetment will be above MSL. Nearshore water depth is about 1 foot below MSL. Extreme tide (not including hurricanes) measured on Kauai is 2.19 feet above MSL. Wave setup, calculated from the significant wave height of deepwater waves measured at Data Buoy 5101 northwest from Kauai, is about 1.94 feet above MSL, although storm waves would make setup higher. Sea level rise in Hawaii between 1992 and 2007 was about 2 mm/yr. Over 50 years the rise is estimated at 100 mm or about 4 inches (0.33 feet). The total design water depth seen by an approaching wave is about 5.46 feet. The largest unbroken wave that can pass this depth is approximately 4.26 feet high. Using Hudson's formula, the mean armor stone weight is calculated at 1,800 lbs (0.9 tons). The armor stone size range is from 75% to 125% of the mean weight or 1350 to 2250 lbs (0.68 to 1.13 tons) with 50% greater than 1800 lbs. Bedding stone is one tenth the weight of the armor stone, so 135 to 225 lbs. A geotextile fabric will be placed beneath the bottom layer of smaller rocks to prevent soil from escaping through the revetment. Both the armor and the bedding layers are two stones thick. The revetment concept is shown in Figure 3-1.

The estimated design life of a rock revetment is 50 years with maintenance. Maintenance of the revetment will be needed the first five years because settling could dislodge a few armor stones that would have to be placed back onto the revetment. However, once the settling has occurred periodic inspection is recommended, especially after high wave events.





There are several reasons why a rock revetment was chosen as the preferred alternative. A rock revetment was viewed as the most environmentally friendly alternative, because it will reduce energy from waves as they pass through voids in the revetment. The filter lining in the back of the revetment will minimize soil migration through the revetment to the ocean. Repairing a revetment is less costly than repairing a concrete vertical seawall with a rock toe. The cost to build a revetment is also less than building the other alternatives that were considered.

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 used 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 Aliomanu 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 the stream. Construction of a bridge to connect the two roads was considered. However, the cost to build this bridge is in the multi-million dollar range and the terrain made a bridge construction project difficult because major land alteration 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 alteration 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.

3.2.5 'Aliomanu Road Relocation

Kauai County initially reviewed road relocation options. However, topography and land ownership issues made this option too expensive or legally difficult. There is a steep slope inland from the damaged road that limits grading a new road. The road provides access to only about 20 residences. The surrounding land is owned by the State Department of Hawaiian Home Lands, and alternative road routes would require a roadway easement through homestead properties.

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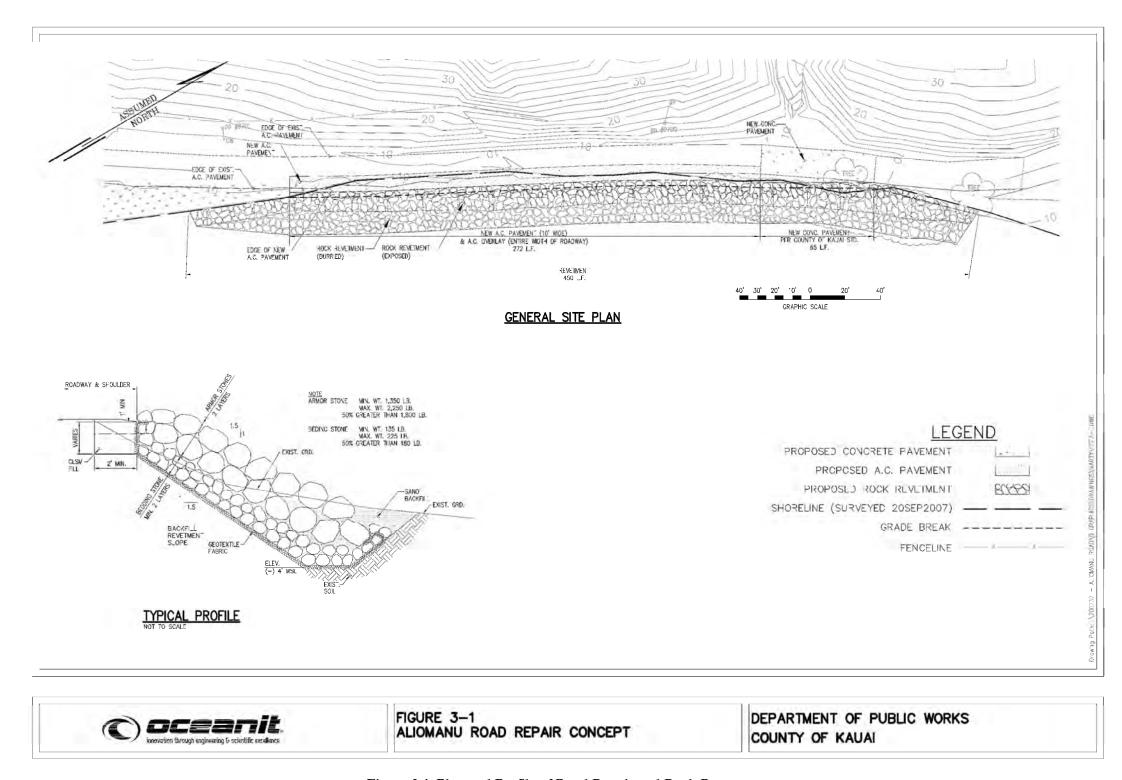


Figure 3-1. Plan and Profile of Road Repair and Rock Revetment

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September 2009



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 Kaua'i 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). Kaua'i is a shield volcano and is classified as the Waimea Canyon volcanic series.

Kaua'i, 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 Kaua'i is made up of 10 soil associations. Soil association in the vicinity of the project site consists of the Līhu'e-Puhi soils (SCS, 1972). The Līhu'e-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 should 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, sea level rise, 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.

Sea level rise has been predicted to be 0.5 to 1.4 meters over the next hundred years (Dr. Chip Fletcher, Presentation, November 22, 2008) (see Figure 4-1). However, sea level trends in Hawaii have had a near zero change between 1992 and 2007. Relative sea level rise for Kauai has been estimated to be 1.75 mm/yr based on the NOAA tide gauge network. The proposed shore protection structure is a rock revetment that has a design life of 50 years and can easily be changed to increase its size. The damaged road is at an elevation of about 10 feet above MSL, well above predicted sea level rise. The major problem at the road is bank erosion, not beach erosion. The embankment was apparently built many years ago as a bed for a railroad. Now a paved road has replaced the railroad. By the time sea level rise really threatens the road, it will be time to rebuild the road and decisions on road size and location can be made.

According to the Flood Insurance Rate Map (FIRM), 'Aliomanu Road from Anahola Stream to Kuaehu Point is within the VE Zone with a flood elevation of 10 feet (see Figure 4-2). The VE designation means that this area is in the coastal flood zone with velocity hazard (wave action) where base flood elevations have been determined.

In recent history, Kaua'i experienced two hurricanes, Iwa (1982) and Iniki (1992). 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.

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 will be designed and constructed in accordance with appropriate Hawaii State standards.





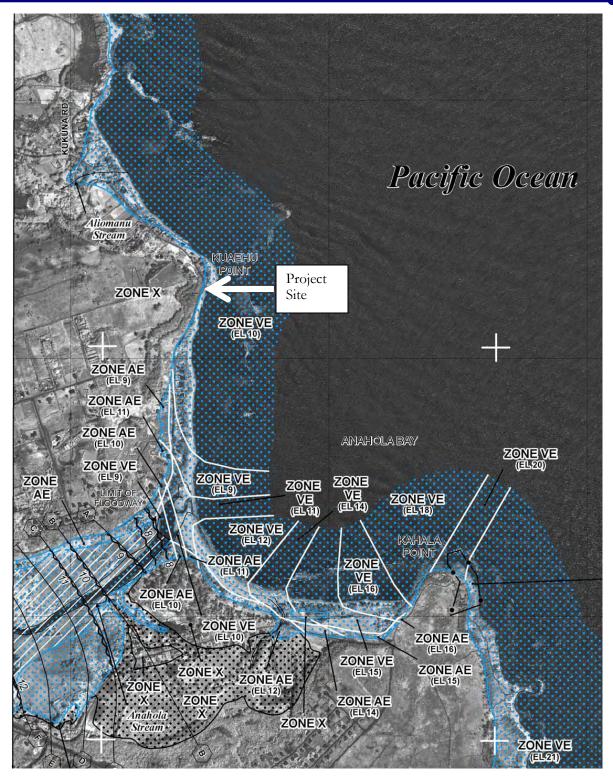


Figure 4-1. FEMA Flood Map





4.3 Coastal Resources

The beach along 'Aliomanu Road becomes thin and variable at the project site. The northern section contains boulders and smaller rock with very little sand. The beach grows wider as it leaves the project area toward Anahola Stream. The nearshore reef area is flat, consists of rock and hardened sediment, and is partially dry at very low tides. The reef flat gradually becomes deeper as it extends about 600 feet out from the shoreline. Deep water waves break at the outer reef edge, and only small waves propagate over the reef flat.

The sediment of interest is beach sand and soil eroded from the road embankment. The layer of sand on the beach at the erosion site is not usually very thick and is mixed with boulders, cobbles, and gravel. Sediment is typically transported to the south toward the apex of Anahola Bay where it collects on the beach near the Anahola Stream mouth or is moved offshore by the stream flow. Both trade winds and wave-driven currents push water over the reef flat causing strong currents to flow south along the shoreline. Aerial photos show a gap through the reef at the north end of the project where more wave energy and tidal flow can enter to erode the shoreline and increase longshore current flow. The outer reef is closer to the shoreline as it gets near the stream mouth creating a funnel where current velocity and consequently sediment transport rate increases. A large sand channel heads directly offshore from the stream mouth.

4.3.1 Impacts and Mitigation

No impacts on these coastal resources are expected from the construction of the rock revetment, thus no mitigation is needed.

4.4 Aquatic Resources and Water Quality

A survey of the marine ecosystem was conducted on May 8, 2008 to determine or not there were any significant aquatic resources fronting the proposed new revetment (see Appendix A). 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.

Occasional coral heads, mainly rose coral (*Pocillopora meandrina*) 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.

Geometric mean turbidity generally varied between 1.0 and 1.8 NTU at the project site. Turbidity near the Anahola Stream mouth was higher probably due to the influence of the stream. The Anahola Stream, located south of the roadway repair site, is listed as 303(d) Impaired Water by the State of Hawaii's Department for nutrients and turbidity.

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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.

4.4.1 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 unburied part of the revetment will be dry at low tide. At high tide some places on the toe will be wet enough so that algae might grow; however, very little algae growth is seen on existing rocks unless they are far enough seaward to be mostly submerged. We do not expect the new revetment to create much new habitat except perhaps for crabs, which live in the existing rocks. 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 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.

4.4.2 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. During construction, if monk seal is seen resting on the beach, the Kaua'i representative for the Department of Land and Natural Resources and the National Oceanic and Atmospheric Association will be contacted and all construction activities will cease operations.

Best management practices (BMP) will be implemented during construction to ensure that the nearshore waters and marine organisms are not impacted. A site specific BMP plan will be prepared as part of the Department of Health, Section 401, Water Quality Certification Permit.

4.5 Botanical Resources

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 found on the upper beach zones.

4.5.1 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.

4.5.2 Mitigation

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



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4.6 Terrestrial 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) is 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.

4.6.1 Impacts

In the event that a 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 Kaua'i 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.

Since there is no habitat available for the endangered or threatened bird species observed at the site, no adverse impacts are anticipated. The Hawaiian Hoary Bat is commonly seen in this area and tends to forage at dawn and dusk during non-construction hours. Therefore, construction operations are not expected to impact the endangered mammal.

4.6.2 Mitigation

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.

4.7 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 Hawai'i Inc. in September 2008 and confirmed that there are no archaeological sites in the immediate area of the project. However, because the area south of the project site contains 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 Hawai'i in February 2009. Attempts were made to contact a total of 20 people and there were 13 respondents, four of whom 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, engineers and planners found that 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.

4.7.1 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.

4.7.2 Mitigation

An archaeological monitor will be on site during excavation activities in the event subsurface archaeological resources are uncovered during construction. Should subsurface archaeological resources or burials be uncovered during construction, all work will cease and the Planning Department and the State Historic Preservation Division 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.

4.8 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.

4.8.1 Impacts

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

4.8.2 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.

4.9 Air Quality and Noise

The State Department of Health, Clean Air Branch, monitors ambient air in the State of Hawai'i 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 Kaua'i. 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 size 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 Kaua'i, 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/m³ (micrograms per cubic meter of air) whereas the State standard is 70 ug/m³. For Carbon Monoxide, the 1-hour Federal standard is 40,000 ug/m³ and the State standard is 10,000 ug/m³.

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 Hawai'i 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. Hawai'i Administrative Rules Title 11, Chapter 46, Community Noise Control contains the specific sound levels in dBA and is shown in Table 1.

 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

Table 4-1, Maximum Permissible Sound Levels in dBA

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.

4.9.1 Impacts

In the immediate vicinity of the construction activities, short term impacts on air quality are anticipated from the movement and excavation of sand and soil 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 moved 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.



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

4.9.2 Mitigation

The construction site will be watered down periodically to prevent particulate matter from becoming airborne during construction. 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 Kaua'i was 58,463 people according to the 2000 census data. This represents only 5 percent of the total population of the State of Hawai'i. 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 Kaua'i 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 Kaua'i 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 Kaua'i 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 Kaua'i 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 Kaua'i. Thus no mitigation is planned.

5.2 Economic and Fiscal Factors

Civilian labor force for the island of Kaua'i in 2006 is estimated at 32,550 people. The labor force is comprised of persons 16 years of age and over. Kaua'i has the smallest labor force compared to the other three counties. Oahu has the highest with a labor force of 439,850 people. On Kaua'i 31,800 people in the labor force are employed. The unemployment rate is 2.3 percent. The average annual income is \$31,390 on Kaua'i 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 Kaua'i 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 Kaua'i 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 not increase the amount of runoff.

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 revetment protecting 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 0.3 miles 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. Traffic control and road closures will be necessary during contruction. 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 Kaua'i 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 Kaua'i 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.



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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 Hawai'i State Plan and Functional Plans

The Hawai'i State Plan was developed to serve as a guide for future development of the State of Hawai'i 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 Hawai'i 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.

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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 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.

Both a cultural impact study and an archaeological study were made for the project site. No burials or other cultural sites or materials were identified in the area where the new revetment will be constructed. Therefore, none will be destroyed by the construction. Geotechnical borings were made at both the north and south ends of the repair site. At the north end the soils include silty clay fill to a depth of about 3 feet below ground surface with residual stiff clays and silts below the fill to a depth of 16 feet. The boring at the south end showed clayey silt fill to a depth of 2.5 feet and medium dense beach sand to a depth of 8 feet below the ground surface. Soft basalt was found below the sand. The clay and silt material are not considered a valuable natural resource. The layer of sand at the south end of the project has some value as a beach resource. However, the beach to the south and around the Anahola Stream mouth is quite healthy and contains a large quantity of sand that is already part of the beach system. The proposed revetment will cover some beach sand especially at the south end where the beach is being eroded. Sand is already being washed away as evidenced by a small erosion scarp. The revetment does not extend seaward far enough to cover any coral, limu, or fish habitat. It will not cover the rock area where monk seals like to rest. And the revetment will reduce the amount of non-beach soil being washed into the ocean.

(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 Kaua'i 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 Determination

Based on the review of the draft Environmental Assessment and analysis of the significance criteria, the County of Kaua'i Department of Public Works is filing this Finding of No Significant Impact (FONSI). 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.

There were comments received on this document as part of the circulation of the draft version (see Appendix E, Comments & Responses). Those changes are reflected throughout this final version.





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	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, Hawaiʻi

Department of Public Works
County of Kauai



Oceanit Center 828 Fort Street Mall, Suite 600 Honolulu, HI 968I3

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 photopoints, 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 in 3-4 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





STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES

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CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCE ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

April 1, 2009

Mr. David Shideler Cultural Surveys Hawai'i P. O. Box 1114 Kailua, Hawai'i 96734 LOG NO: 2009.1374 DOC NO: 0904WT20

Archaeology

Dear Mr. Shideler:

SUBJECT: 6E-42 Historic Preservation Review--

FINAL Archaeological Assessment (AA)--For the 'Aliomanu Road Repair Project,

Anahola Ahupua'a, Kawaihau District, Kaua'i Island, Hawai'i

TMK: (4) 4-8-018: 029, 999

Thank you for the opportunity to review this FINAL AA (FINAL archaeological Assessment (AA) for the 'Aliomanu road repair Project, Anahola Ahupua'a, Kawaihau District, Kaua'i Island, Hawai'i TMK: (4) 4-8-018: 029, 999 [Groza, Shideler and Hammatt, PhD March 2009]).

This approximately 350 linear of feet of roadway has taken extensive damaged by high surf. Exposed profiles along the ocean side reveal that Jaucas sands are found in this area, though no cultural properties were exposed in these profiles. However, the potential for impacting historic properties, including human burials, is high. Therefore we agree with Cultural survey's Hawai'i recommendation that archaeological monitoring occur during all repair activities.

This report is accepted and it meets the minimum requirements for compliance with 6E-42 and Hawaii Administrative Rules (HAR) §13-13-276 Rules Governing Standards for Archaeological Inventory Studies and Reports.

We are in receipt of a final hardcopy as well as a text-searchable PDF, and will be included in our SHPD Library here at the Kapolei SHPD office.

Please call Wendy Tolleson at (808) 692-8024 if there are any questions or concerns regarding this letter.

Aloha,

Nancy A. McMahon (Deputy SHPO) State Historic Preservation Officer

Nancy a. M. Mahon

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

Prepared by
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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 <i>makai</i> of the road, but will not intrude into the area <i>mauka</i> 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 35 meter long portion of 'Aliomanu Road, coastal Anahola Ahupu the construction of a shoulder and wall <i>makai</i> (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.	

i

TMK: [4] 4-8-018:029, 999

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

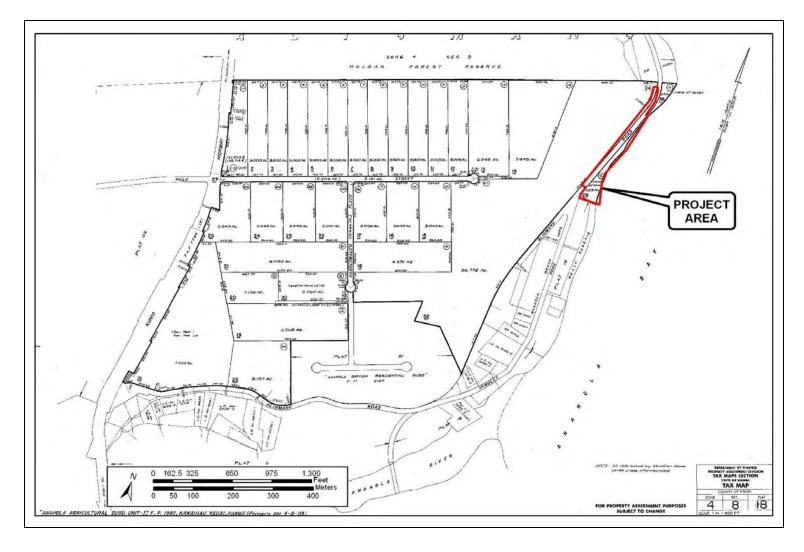


Figure 2. Tax map (4-8-018) with overlay of area of proposed work

Archaeological Assessment for 'Aliomanu Road, Anahola, Kaua'i

4

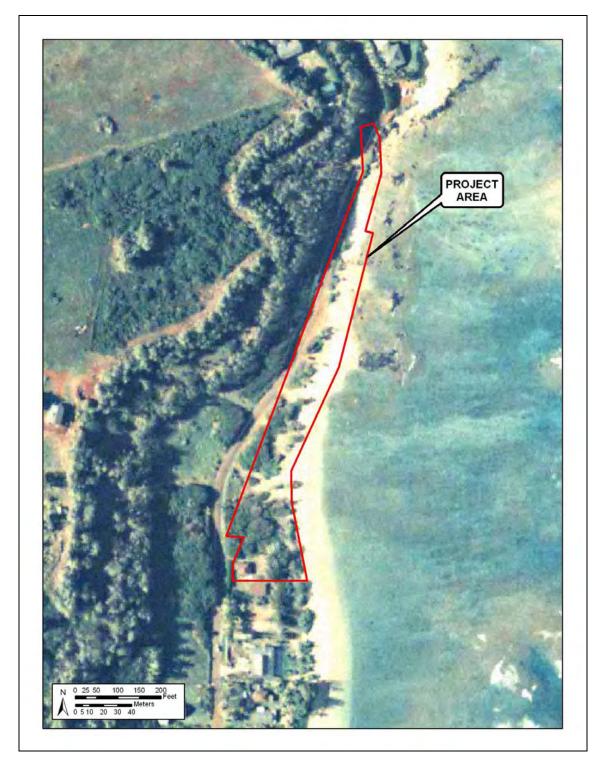


Figure 3. Aerial photograph, with overlay of area of proposed work

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 Koʻolau 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.

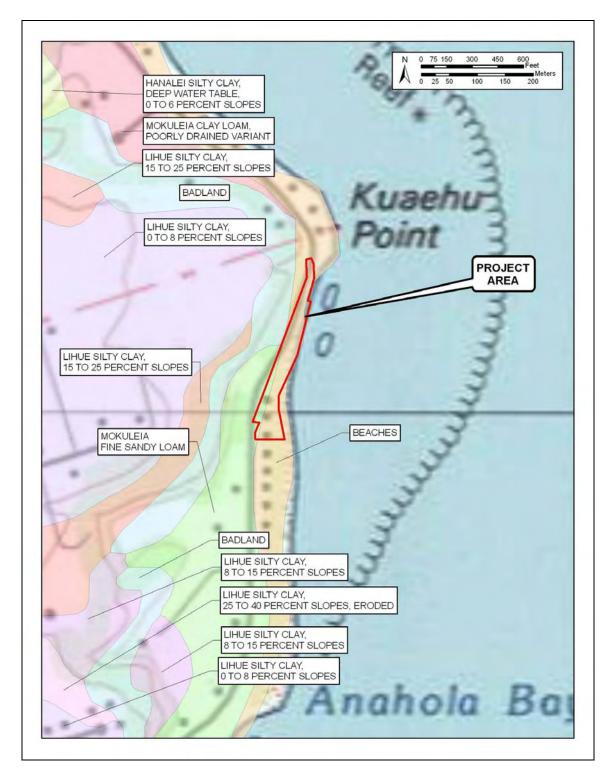


Figure 4. Overlay of the Soil Survey of the State of Hawai'i (Foote et al. 1972), indicating the soil type within the project area

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 *moʻo* or lizard who changed forms; in the ocean he was a merman, and on land, a man. Another *moʻo*, 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 *moʻo* 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' (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 *loʻi 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 *loʻi* (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 *loʻi*

Archaeological Assessment for 'Aliomanu Road, Anahola, Kaua'i

Table 1. Land Commission Award Claims Granted in Anahola

LCA#	Claimant	ʻIli	Land Use	Awarded
00440!	Pua'ahinehune			No
0069*K	Kaehu, J. W.			No
03030	Kawaimakanui	Palawai, Pauko	House lot	Yes
03411B	Paupau	Kalaiula, Hope	Loʻi or moʻo,	Yes
04406!	Pa'a		house lot	No
04526	Opae	Keawaakaehu	Loʻi, Wauke,	Yes
04530	Ohao	Puoio,Kapahupoko, Kawaikapu		Yes
04535	Upai			No
04538	Ehuelua			No
04547	Anahola	Puamano,	Loʻi, Wauke,	Yes
04554	Walanaeku	Koolaukai,	Loʻi, Wauke,	Yes
04556	Wailau	k AAI311Vani	HOUGA IOT	No
04559	Wahie	Kaihulu, Palikoa	Loʻi, Wauke,	Yes
04581	Huluhulu	Kanapaa,	Loʻi, Wauke,	Yes
04590	Kekuaiki	Hahalina,	Loʻi, Wauke,	Yes
04591	Hulu	Kuakemana,	House lot Loʻi, Wauke,	Yes
04593	Haili	Haili	Loʻi, Wauke,	Yes
04594	Hiapo		House lot	No

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LCA#	Claimant	ʻIli	Land Use	Awarded
04611	Pokake	Kapapa, Hanaiki	Loʻi, Wauke,	Yes
04621	Pehuiki	Hoolakaupu,	Loʻi, Wauke,	Yes
04624	Paa	Kukuluaukai,	Loʻi, Wauke,	Yes
04627	Paia	Kapukalio,	House lot Loʻi, Wauke,	Yes
04632	Роороо	Kanoko	House lot	No
04640	Pua'a	Keakimoma,	Loʻi, Wauke,	Yes
04643	Piawe	Pukoenieni, Anahola	Loʻi, Wauke,	Yes
04619	Pohaku	2 11.00.110 1.00	House Inf	No
04651	Po'opo'o	Anahola	Loʻi, Wauke,	Yes
04652	Puaeae		HANGE IN	No
04655	Puaokekau, wahine	Kakaea	Loʻi, Wauke,	Yes
04656	Puoa	Kanaua, Kapoko	Loʻi,	Yes
04657	Puaunahi	Hikii, Paeia	Loʻi, Wauke,	Yes
04690	Nalawaia	Kealohi	Loʻi, Wauke,	Yes
04693	Luahele	Palawai, Koananai	Loʻi, Wauke,	Yes
04694	Lono 1 & 2	Puoio, Kumunana	Loʻi, Wauke,	Yes
04694B	Lonoiki	Ananakini, Kaluoopu	Loʻi, Wauke,	Yes
04699	Lupaieie		IN CPI	No
04711	Mailou	Hakaea, Makaikai	Loʻi, Wauke,	Yes

LCA#	Claimant	ʻIli	Land Use	Awarded
04712	Makaino	Hioka, Kioka	Loʻi, Wauke,	Yes
04718	Maumau	Anahola	Loʻi, Wauke,	Yes
04719	Makaolo	Hoopala	Loʻi, Wauke,	Yes
)4721	Makakane		HAREATAI	No
04722	Mahilauawa	Palawai	Loʻi, ʻĀpana,	Yes
04724	Mona	Kamoku, Kamuliwai	Loʻi, Wauke,	Yes
04727	Mailou	Pikau, Kekau	Loʻi,	Yes
04728	Makaino	Mamani	Loʻi, Wauke,	Yes
04730	Manamana	Kalaiwahiwai,	Loʻi, Wauke,	Yes
04731	Makuakane	Kanapaa, Pouka	Loʻi,	Yes
04760-1	Naelele	Palawai, Pukalio	Loʻi, Noni,	Yes
04754	Naololi	Pukoanini, Kaupake	Loʻi, Noni,	Yes
04777	Nanukuwaiki	Kauapa,	Lo'i, Wauke,	Yes
04780	Naiwi	Mamania,	Loʻi, Wauke,	Yes
04782	Nakea	Pauko	Loʻi, Noni,	Yes
04797!	Mailou		HOUSE IOF	Wrong
04879	Inoaole			Number No
04879B	Inoaole			No
04909	Kaeleu	Kamalupe,	Loʻi, Wauke,	Yes
		Kaloula Olelokan	House lot	

LCA#	Claimant	ʻIli	Land Use	Awarded
04913	Kanuhu	Olokuiha,	Loʻi,	Yes
		Kamokuani	House lot	
04916	Kumukou	Kanakini,	Loʻi, Wauke,	Yes
		Diwaha	House lot	
04935	Koleaka	Kalahiki, Hikii	Loʻi,	Yes
			House lot	
04971	Kalehua	Kanamoa,	Lo'i, Wauke,	Yes
		Kanuakea	House lot	
04980	Kuohu	Puuoio,	Loʻi, Wauke,	Yes
		Olelokana	House lot	
04981	Kalima'ele'ele	N/L	Loʻi, Noni,	Yes
	wahina		House lot	
04984	Kole / Kale	Papooulu,	Loʻi, Kula,	Yes
		Kealuaahokia	House lot	
04987	Keanuhawai'i	Pauku, Kaupapa	Loʻi, Noni,	Yes
			House lot	
05022	Kunane	Kamalupa, Puoni	Loʻi, Wauke,	Yes
			House lot	
05023	Kolia, D	Pukoenieni,	Loʻi, Wauke,	Yes
		Kanakahikio	House lot	
05248	Kaehu, J. W.			No
05078	Kawaaiai	Kahalepua,	Loʻi, Wauke,	Yes
33070	TXa w aarar	-		103
05083	Kiei	Pohakumano Kanakawale, Hikii	House lot Loʻi, Wauke,	Yes
05005	Kici	Kanakawaic, Ilikii		103
05084	Kaniku	Palikoa,	House lot Loʻi, Ulu,	Yes
		Puanala	House lot	
05089	Kuhaimoana	N/L	Lo'i, Wauke,	Yes
		"	Noni	
05099	Kauhaialae	Puuomano,	Loʻi, Wauke,	Yes
		Olelokana	House lot	
05102	Kuihu	Puuoniunu,	Loʻi, Wauke,	Yes
		Panahikiloaka	House lot	
05104	Kawaohia	Olokauha,	Loʻi, Wauke,	Yes
		Cahill	House lot	
05105	Kawailoa	Pika, Malama	Loʻi,	Yes
			House lot	

LCA#	Claimant	ʻIli	Land Use	Awarded
05106	Kawailoa			Wrong
_				Number
05112	Kupukupu			No
05141	Kaukai	Kuloa,	Loʻi, Wauke,	Yes
		Koanunu	House lot	
05142	Kaliuwa'a			Wrong
				Number
05143	Ka'ahiki			No
05170	Kalawaia	Ananakini,	Loʻi, Wauke,	
		Накада	House lot	
05190	Kekuaiki		Loʻi, Wauke,	No
_			House lot	
05199	Kuoha	Puamano,	Loʻi, Noni,	Yes
		Kaluaoonu	House lot	
05205	Kaholomoana	Halalua	Loʻi, Wauke,	Yes
_			House lot	
05391	Hilo	Kaakaulua,	Loʻi,ʻ}pana,	Yes
		Panakolea	House let	
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 Kaʻalaua 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 interisland 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).

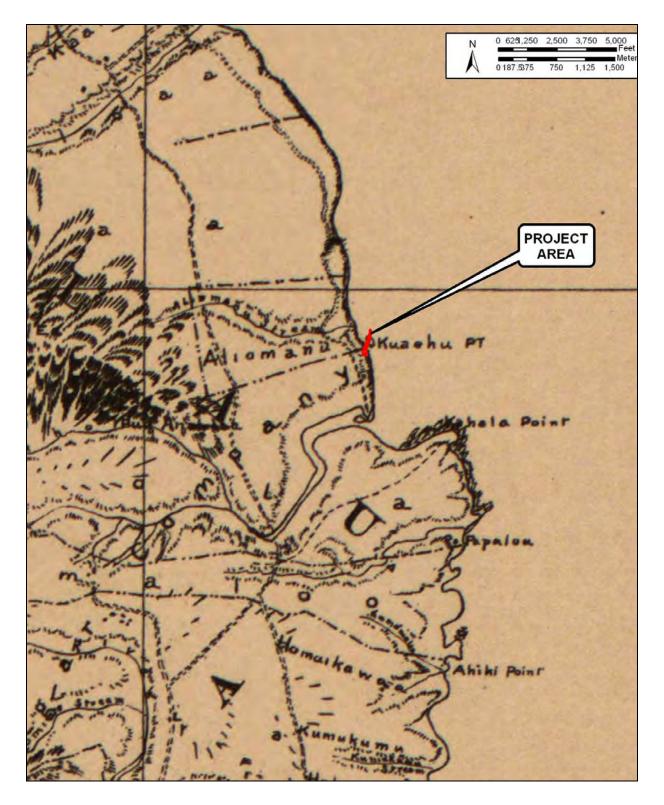


Figure 5. Portion of 1878 Alexander survey map with overlay of project area

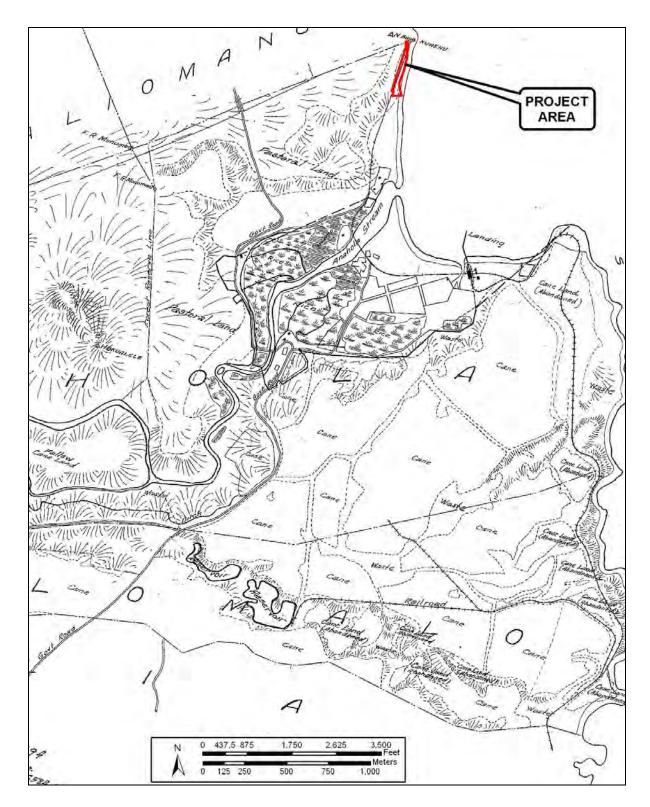


Figure 6. Portion of 1914 Wall survey map with overlay of project area

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.

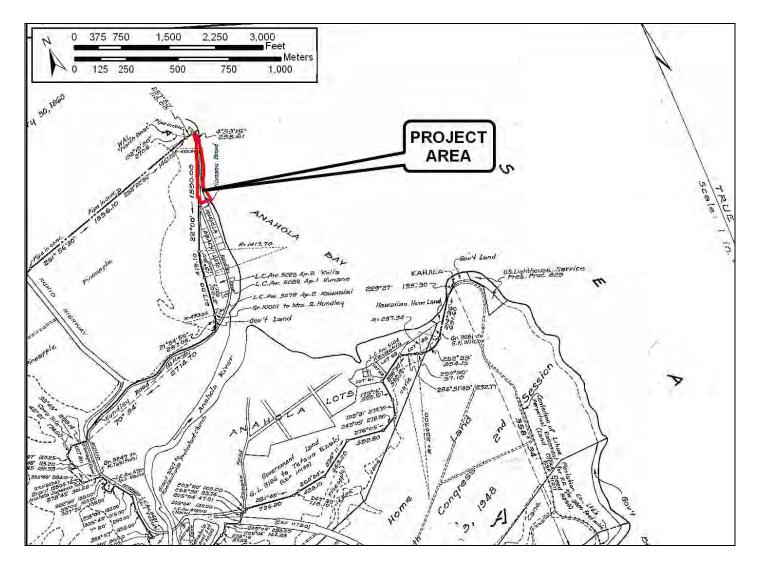


Figure 7. Portion of 1955 Dunn survey map with overlay of project area

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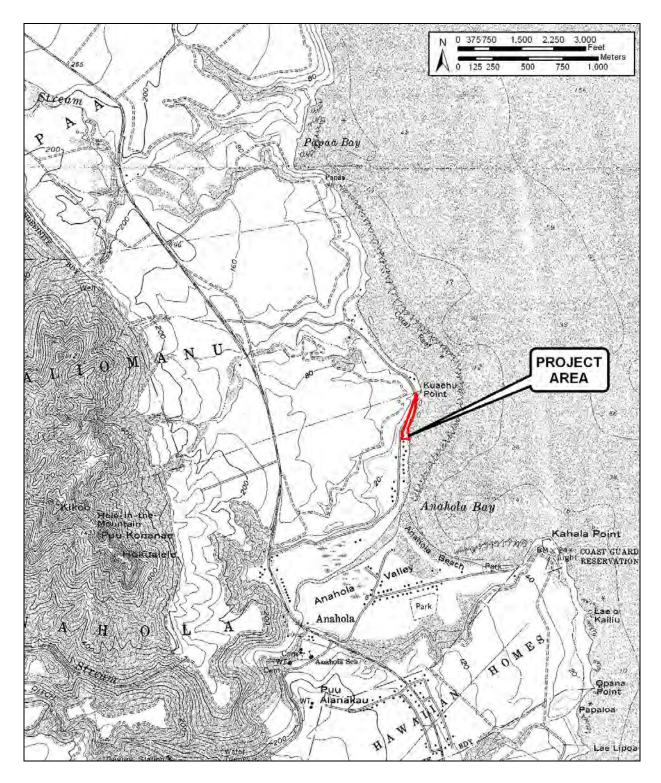


Figure 8. 1963 USGS topographic map with overlay of project area

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 <i>heiau</i> 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 <i>lo'i</i> field, during backhoe trenching. AMS dated to a 2 Sigma calibrated range of AD 1520-1950

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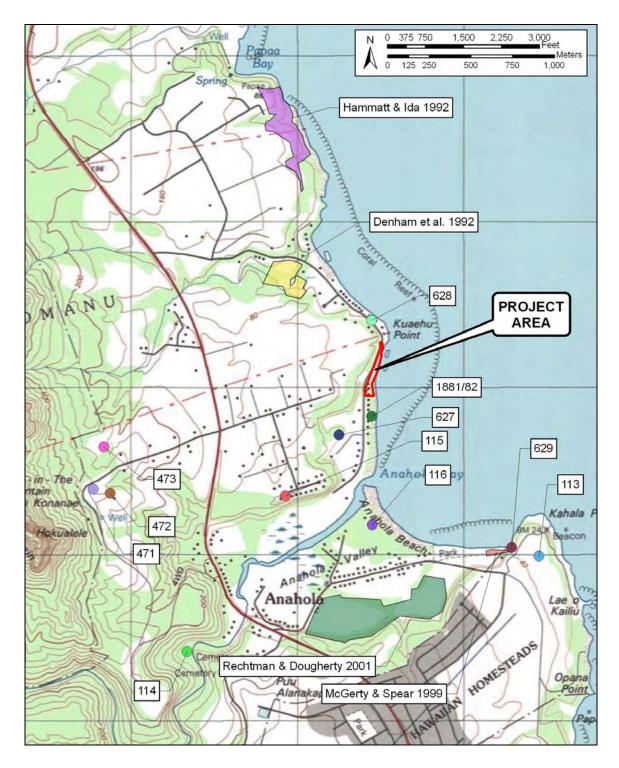


Figure 9. Portion of US Geological Survey Topographic Map, Anahola Quad (1998), showing previously identified sites and archaeological projects conducted within the vicinity of the project area

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 precontact 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.

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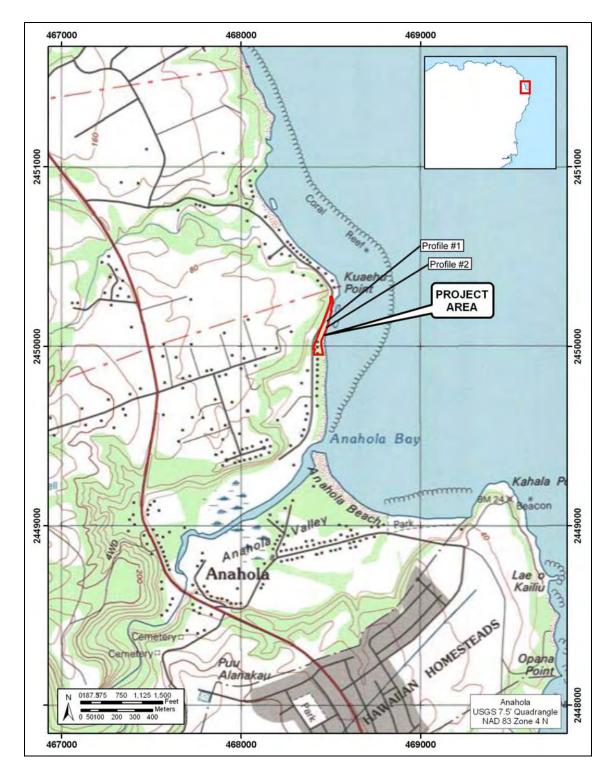


Figure 10. Portion of USGS Topo Map, Anahola Quad (1998), showing project area and locations of profiles



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

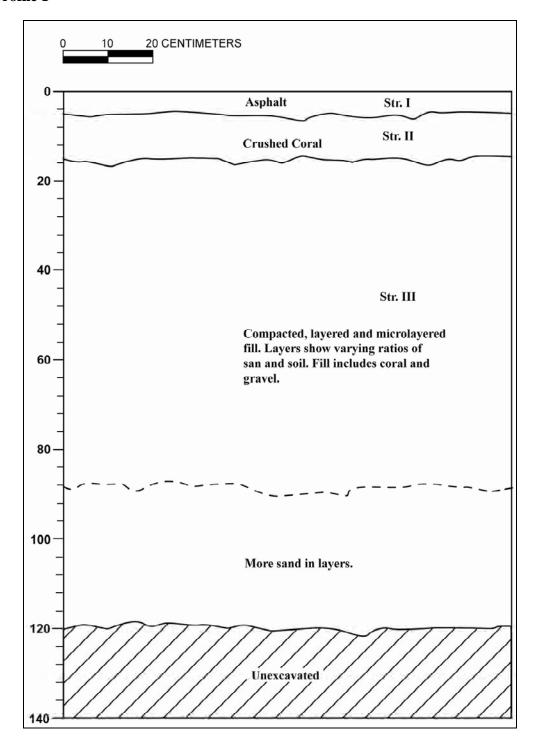


Figure 13. Stratigraphy of Profile 1

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

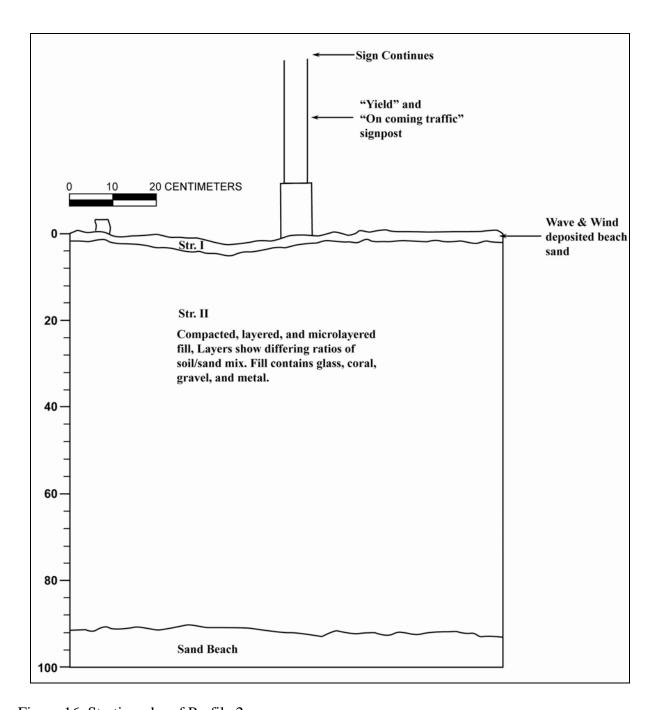


Figure 16. Stratigraphy of Profile 2

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

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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

Prepared for Oceanit

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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 <i>makai</i> of the road, but will not intrude into the area <i>mauka</i> 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 <i>makai</i> (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 <i>ahupua</i> '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) <i>Guidelines for Assessing Cultural Impacts</i>]. 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

CIA for 'Aliomanu Road, Anahola, Kaua'i

TMK: [4] 4-8-018:029, 999

	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 shows:
Background Research	1. Located in the Kawaihau district, traditionally known as Koʻolau, 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 <i>limu kohu</i> (<i>Asparagopsis taxiformis</i>).
	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 <i>ahupua</i> 'a suggests occupation of this area may date from AD 1483 to 1680.
	4. The project area is associated with specific <i>moʻolelo</i> (stories, legends) about: the origin of Anahola, named after a <i>moʻo</i> (lizard, water spirit) who changed forms; Hōkū-ʻalele which is the largest peak in Anahola; Lahemanu (daughter of an Anahola chief); <i>limu kohu</i> 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 <i>kūpuna</i> and/or <i>kamaʻāina</i> 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.
- 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.

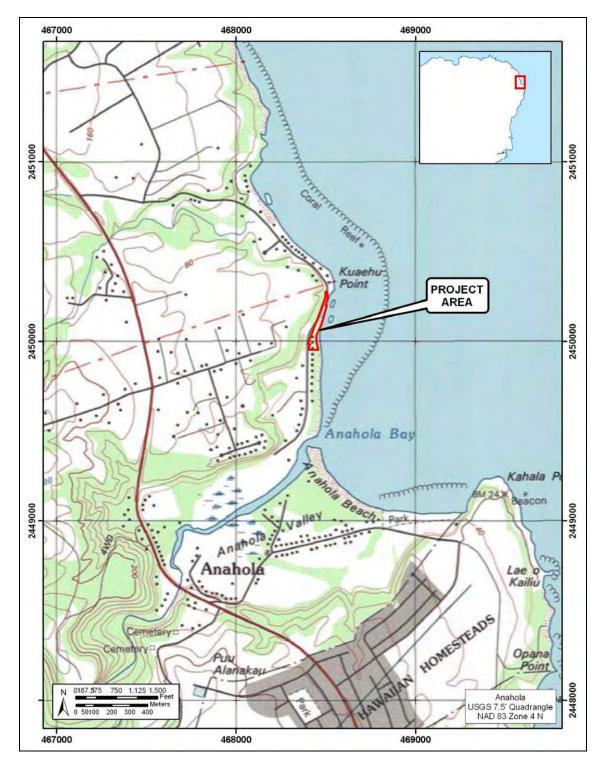


Figure 1. Portion of US Geological Survey Topographic Map, Anahola Quad (1998), showing location of area of proposed work

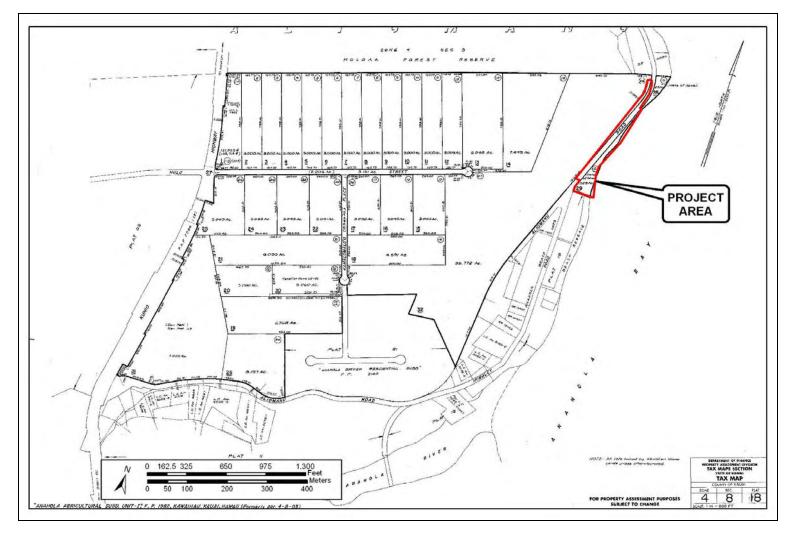


Figure 2. Tax map (4-8-018) with overlay of area of proposed work



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 Koʻolau 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.

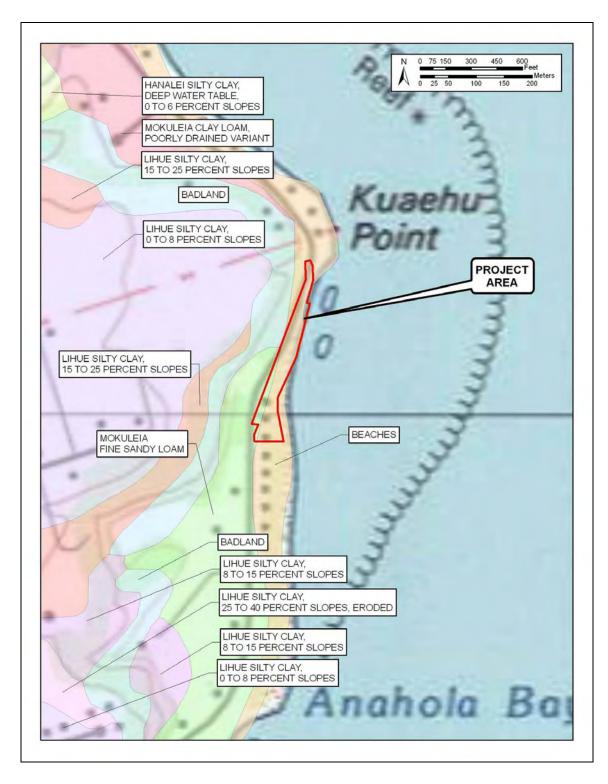


Figure 4. Overlay of the Soil Survey of the State of Hawai'i (Foote et al. 1972), indicating the soil type within the study area

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 *moʻo* or lizard who changed forms; in the ocean he was a merman, and on land, a man. Another *moʻo*, 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 *moʻo* 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' (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 Hōkūʻalele 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 Kaʻalaua 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	ʻIli	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	Loʻi, ʻāpana (lot), wauke	Yes
	Keakaawaehu (mulberry)	(mulberry)		
04530	Ohao	Puoio,Kapahupoko,	Lo'i, wauke,	Yes
		Kawaikapu	house lot	
04535	Upai	,		No
04538	Ehuelua			No
04547	Anahola	Puamano,	Loʻi, wauke,	Yes
		Papaihiapohaka	house lot	
04554	Walanaeku	Koolaukai,	Lo'i, wauke,	Yes
		Koolaukani, Koolauhani	house lot	
04556	Wailau			No
04559	Wahie	Kaihulu, Palikoa	Loʻi, wauke,	Yes
04581	Huluhulu	Kanapaa,	Loʻi, wauke,	Yes
		Kapuonunui,	house lot	
04590	Kekuaiki	Hahalina,	Loʻi, wauke,	Yes
		Kahalina	house lot	
04591	Hulu	Kuakemana,	Loʻi, wauke,	Yes
		Paanoho	house lot	
04593	Haili	Haili	Loʻi, wauke,	Yes
			house lot	
04594	Hiapo			No

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

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

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

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

LCA#	Claimant	'Ili	Land Use	Awarded
05170	Kalawaia	Ananakini,	Loʻi, wauke,	
		Hakaea	house lot,	
05190	Kekuaiki		Loʻi, wauke,	No
			house lot,	
05199	Kuoha	Puamano,	Loʻi, noni,	Yes
		Kaluaoopu	house lot,	
05205	Kaholomoana	Halalua	Loʻi, wauke,	Yes
			house lot,	
05391	Hilo	Kaakaulua,	Loʻi,ʻāpana,	Yes
		Papakolea	house lot,	
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 interisland 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 Keaoʻopu. A third reference point, Papaʻaloa, marked Anahola's southern boundary. Papaʻaloa 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.

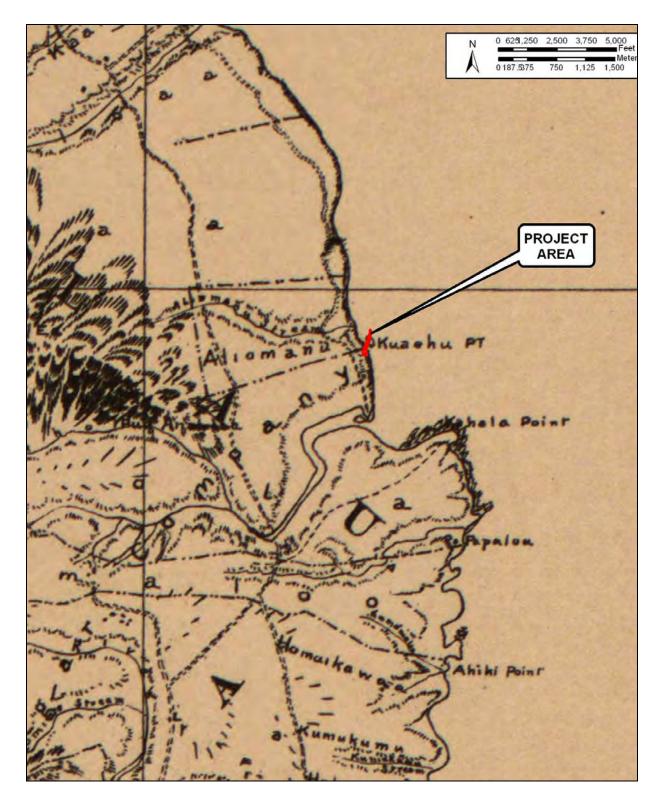


Figure 5. Portion of 1878 Alexander survey map with overlay of project area

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.

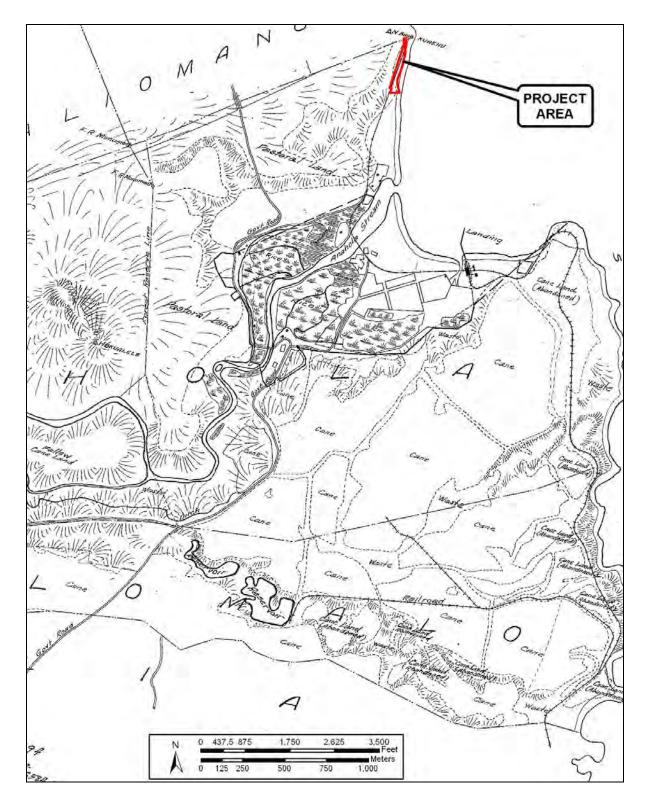


Figure 6. Portion of 1914 Wall survey map with overlay of project area

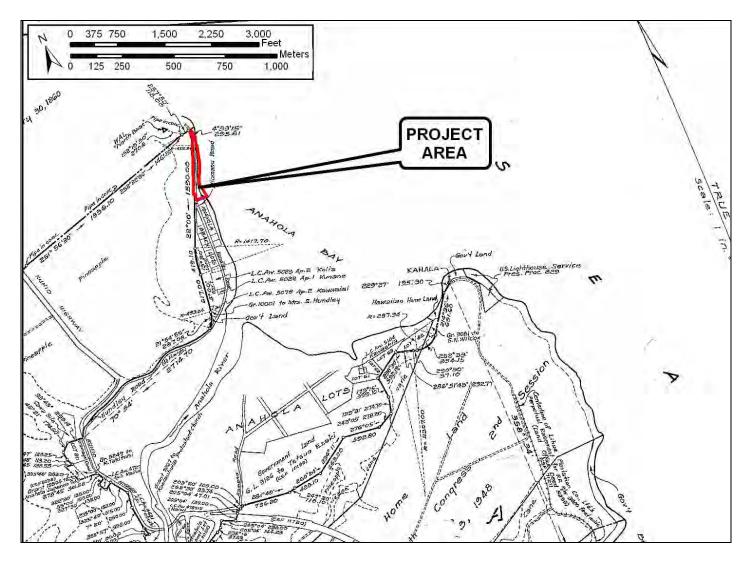


Figure 7. Portion of 1955 Dunn survey map with overlay of project area

CIA for 'Aliomanu Road, Anahola, Kaua'i

22

TMK: [4] 4-8-018:029, 999

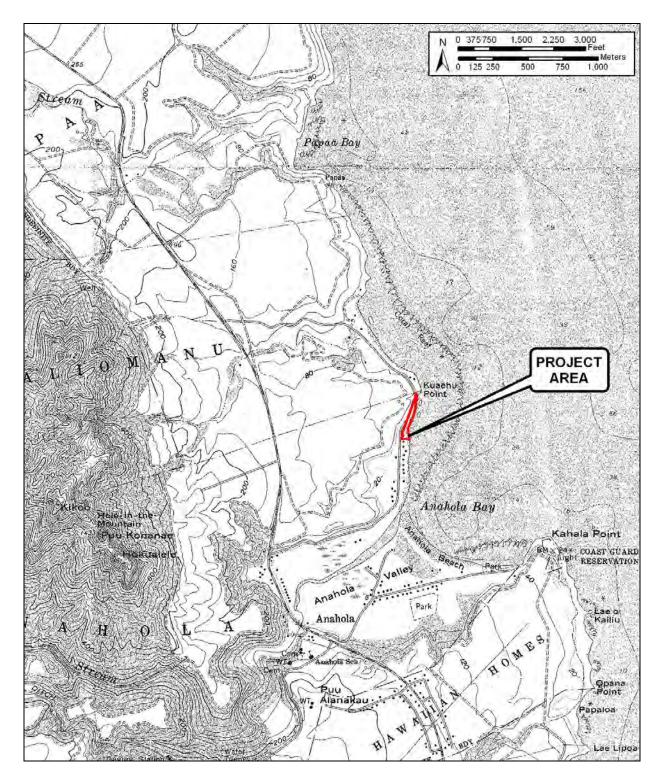


Figure 8. 1963 USGS topographic map with overlay of project area

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	Archaeological	Confirmed that the two <i>heiau</i> in the
	4-4-9-10:1,2,3,5. 4-8-various	Reconnaissance	Anahola vicinity are destroyed (Bennett's sites 113 & 115)
Denham et al.	'Aliomanu	Archaeological	Subsurface testing found one fire pit site radiocarbon dated to AD 1483 to
1992	Ahupua'a 4-9-04:1	Inventory Survey	1680
Hammatt and Ida	'Aliomanu	,	CHID 1906: in a dynamical of found
1992	Ahupua'a	Archaeological Inventory	SIHP -1896; inadvertently found burial and cultural layer
	4-9-05, por. 4	Survey	j
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	Archaeological Inventory	SIHP # 50-30-04-627 with seven features associated with pre-Contact
	and G1 (TMK 4- 8-12:6 & 4-8-18- 26)	Survey	habitation and radiocarbon dated to AD 1455-1675
McGerty and	Anahola Beach	Archaeological	No findings
Spear 1999	Park, TMK 4-8- 14:6	Inventory Survey	140 mangs
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 <i>lo'i</i> field, during backhoe trenching. AMS dated to a 2 Sigma calibrated range of AD 1520-1950

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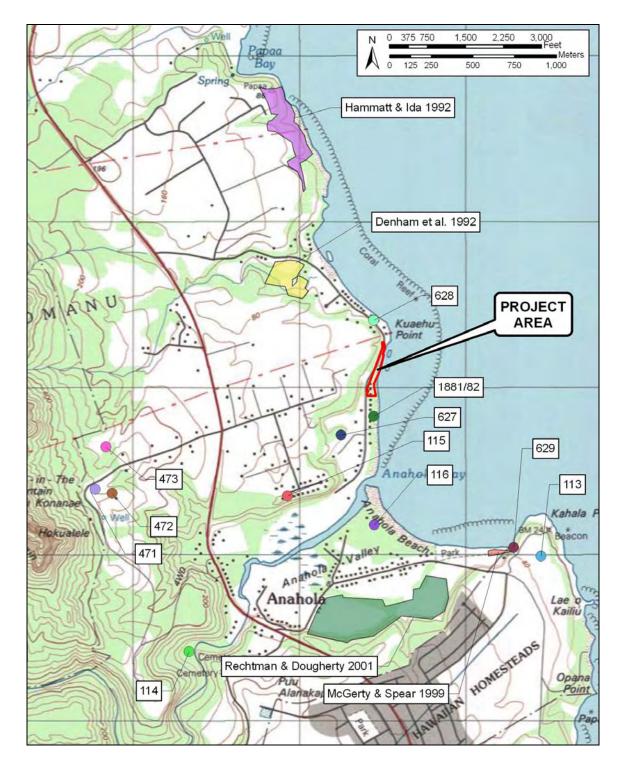


Figure 9. Portion of US Geological Survey Topographic Map, Anahola Quad (1998), showing previously identified sites and archaeological projects conducted within the vicinity of the project area

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 *kamaʻāina* who might be willing to share their cultural knowledge of the Anahola Area and the surrounding *ahupuaʻa* 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 (Kamaʻāina "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	CSH emailed letter and maps on Nov. 5, 2008. Ms. Drake replied on Nov. 6, stating:
	Director	"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.
Kaʻuhane, 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, Kamaʻāina	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 <i>mana</i> o regarding Anahola.
Makepa, Mr. Sam	Fisherman, Kamaʻāina	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, Kaumaliʻi	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 Kauaʻi, 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 assessment 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 preerosion conditions and will include construction of a revertment 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 keola@oha.org.

'O wau iho nō me ka 'oia'i'o,

Clyde W. Nāmu'o

C: OHA Kaua'i CRC Office

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





STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION 601 KAMOKILA BOULEVARD, ROOM 555 KAPOLEI, HAWAII 96707 LAURA H. THIELEN
CHARPERSON
BOARD OF LAND AND NATURAL RESOURCES
OMMISSION ON WATER RESOURCE MANAGEMEN

RUSSELL Y. TSUJI

KEN C. KAWAHARA

Log No: 2008.4734 Doc No: 0810PC06 Culture

November 5, 2008

MEMORANDUM

TO:

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

FROM:

Phyllis Coochie Cayan V. Carchie 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 Department of Hawaiian Homelands – Kauai Office of Hawaiian Affairs – Ms. Kaliko Santos, Kauai Office The Kupuna Program at Alu Like Inc. – Kauai Office The Hawaiian Studies Program at Kauai Community College The Kauai Museum

pomroys001@hawaii.rr.com 808-587-6367 808-274-3141

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.

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, 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 $k\bar{u}puna$ 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 Oʻahu, 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 ($k\bar{u}puna$, 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 $k\bar{u}puna$ 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

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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 ' $p\bar{o}$) 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 Koʻolau, 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 $4 k \bar{u} puna$ and/or $k a ma' \bar{a} i na$ 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'."

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- 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

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- 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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Appendix D Geotechnical Report



DATE:

January 8, 2008

TO:

Oceanit

FROM:

Clayton S. Mimura/Glenn Barut

ATTN:

Mr. Warren Bucher

W.O. No.: 5971-00

5074 00

SUBJECT:

Aliomanu Road Stabilization

NO. OF PAGES:

Preliminary Findings and

(Including cover sheet)

Recommendations

REMARKS:

The following contains our preliminary findings and geotechnical engineering recommendations for the design of the proposed retaining wall.

Subsurface Conditions

We drilled two borings, designated as Boring Nos. 1 and 2, at the site. Boring Nos. 1 and 2 were drilled at the north and south ends of the site, respectively. A hard layer of basalt rock or coral formation was not encountered in the borings.

Boring No. 1 (drilled at the north end of the site) generally encountered silty clay fill that extended to a depth of about 3 feet below the existing ground surface. Residual soils, which consisted of stiff clays and silts, were encountered below the fills and extended to a depth of about 16 feet below the existing ground surface. The residual soils were underlain by saprolitic soils that extended to the maximum depth explored. The saprolitic soils consisted of stiff silts.

Boring No. 2 (drilled at the south end of the site) generally encountered clayey silt fill that extended to a depth of about 2.5 feet below the existing ground surface. Below the fill, we encountered beach deposits that consisted of medium dense sand. The beach deposits extended to a depth of about 8 feet below the existing ground surface. Extremely weathered and soft basalt formation was encountered below the beach deposits and extended to the maximum depth explored.

We encountered groundwater at depths of about 5.8 and 6.1 feet below the existing ground surface at the time of our field exploration. It should be noted that groundwater levels are expected to fluctuate with variation in tides, rainfall, surface water runoff, groundwater withdrawal, and other factors.

Retaining wall

We understand that a reinforced concrete retaining wall will be constructed along the east side of the road. This will allow for construction of a new lane and shoulder. The

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following general guidelines may be used for design of the retaining wall planned for the project.

Wall Foundations

Since the roadway is being undermined by erosion due to wave action, we believe that the design of the proposed retaining wall will need to take into consideration foundation scour. There are some measures that may be taken to reduce foundation scour potential or loss of foundation support. If the scour depth is anticipated to be shallow, then use of a turndown footing or cutoff wall extending at least 3 feet below the bottom of footing along the front side of the retaining wall may be used.

Where the scour potential is anticipated to be relatively deep, then the retaining wall may be supported on deep foundations, such as micropile foundations. The micropiles would be designed to extend several feet below the anticipated scour depth.

We recommend that a study on foundation scour should be conducted to determine the anticipated scour depths. The information obtained from the study would be used to determine the appropriate measure(s) that should be taken to reduce foundation scour potential.

Lateral Earth Pressures

The retaining wall should be designed to resist the lateral earth pressures due to adjacent soil and surcharge effects. The following lateral earth pressures, expressed in equivalent fluid pressures of pounds per square foot per foot of depth (pcf), may be used in the design of the retaining wall at the project site.

LATERAL EARTH PRESSURES LEVEL GROUND CONDITION			
Groundwater Conditions	Active (pcf)	At-Rest (pcf)	
Above Groundwater	40	60	
Below Groundwater	82	91	

The values provided above assume that select granular fills and/or free draining granular material (for below groundwater) will be used to backfill behind the wall. It is assumed that the backfill behind retaining wall will be compacted to between 90 and 95 percent relative compaction. Over-compaction of the retaining wall backfill should be avoided. In general, an active condition may be used for walls that are free to deflect by as much as 0.5 percent of the structure height. If the tops of the retaining wall are not free to deflect beyond this degree, or are restrained, the retaining wall should be designed for the at-rest condition.

Surcharge pressures due to areal surcharges, traffic loads, line loads, and point loads within a horizontal distance equal to the depth of the retaining wall should be considered in the design. For uniform surcharge pressures imposed on the loaded side of the structure, a rectangular distribution with uniform pressure equal to 33 percent of the vertical surcharge pressure acting on the entire height of the wall, which is free to deflect (cantilever), may be used in design. For retaining walls that are restrained, a rectangular distribution equal to 50 percent of the vertical surcharge pressure acting over the entire height of the wall may be used for design. Additional analyses during design may be needed to evaluate the surcharge effects of point loads and line loads.

Wall Drainage

The retaining wall should be well drained to reduce the potential for build-up of hydrostatic pressures behind the wall. A typical drainage system for the retaining wall should consist of about 1 cubic foot of permeable material, such as open-graded gravel (ASTM C 33, No. 67 gradation), wrapped with non-woven filter fabric (Mirafi 180N or equivalent) at each of the weephole locations. The weepholes should be spaced no more than 6 feet apart. Unless covered by concrete or asphaltic concrete, the upper 12 inches of backfill should consist of relatively impervious materials, such as the on-site soils, to reduce the potential for significant water infiltration behind the retaining wall.

Closure

If you have questions or need additional information, please contact our office.

Appendix E Comment Letters and Responses



STATE OF HAWAI'I OFFICE OF HAWAIIAN AFFAIRS

711 KAPI'OLANI BOULEVARD, SUITE 500 HONOLULU, HAWAI'I 96813

HRD09/3793B

May 1, 2009

Ryan Nishikawa County of Kaua'i Department of Public Works 4444 Rice Street Līhu'e, HI 96766

RE: Draft Environmental Assessment for the 'Aliomanu Road Repair project, Anahola, Kaua'i, TMK: 4-8-18: 028, 029.

Aloha e Ryan Nishikawa,

The Office of Hawaiian Affairs (OHA) is in receipt of your March 20, 2009, letter requesting comments on the above-mentioned project. The County of Kaua'i proposes to install a rock revetment to repair a section of 'Aliomanu Road to its original condition. The road has been damaged as a result of shoreline erosion. OHA has reviewed the project and offers the following comments.

The Draft Environmental Assessment does not appear to contain an analysis of the impact the possible run-off from construction activities for the project will have on water quality and the natural resources of the area. We ask what kind of mitigation measures and best management practices will be implemented to minimize run-off during construction to ensure the protection of the environment near the project site.

In addition, we request clarification whether an archaeological monitor will be on site during all excavation operations or only when subsurface cultural resources are uncovered. We note that the project involves major sand disturbance. Sand is a very common medium in which Native Hawaiians buried their loved ones. Therefore, we recommend an archaeological monitor be on site during all excavations activities. We will rely on the applicant's assurances that should iwi kūpuna or Native Hawaiian cultural or traditional deposits be found during the construction

Ryan Nishikawa May 1, 2009 Page 2

of the project, work will cease, and the appropriate agencies will be contacted pursuant to applicable law.

Thank you for the opportunity to comment. If you have further questions, please contact Sterling Wong by phone at (808) 594-0248 or e-mail him at sterlingw@oha.org.

'O wau iho nō me ka 'oia'i'o,

Clyde W. Nāmu'o Administrator

C: OHA Kaua'i CRC Office

alexan Dos

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

Joanne Hiramatsu Oceanit 828 Fort Street Mall, Suite 600 mHonolulu, HI 96813



June 19, 2009

State of Hawaii
Office of Hawaiian Affairs
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813

Attention:

Mr. Clyde W. Nāmu'o

Chief, Engineering Division

Subject:

Draft Environmental Assessment

Aliomanu Road Repair and Seawall, Anahola, Kauai

TMK: 4-8-18-028 and 029

This letter is in response to your comment letter of May 1, 2009 for subject project:

1. Best Management Practices will be required to prevent pollutants entering receiving waters during construction.

2. An archaeological monitor will be on site during all excavation work. All construction work will cease immediately in the event subsurface cultural or archaeological resources are uncovered. The Planning Department and the State Historic Preservation Division will be contacted in the event subsurface cultural or archaeological resources are uncovered.

If you have any questions, please call me or Joanne Hiramatsu at 531-3017 ext.

262.

Sincerely:

Warren E. Bucher, Ph.D., P.E.

Senior Ocean Engineer

BERNARD P. CARVALHO, JR.

GARY K. HEU
ADMINISTRATIVE ASSISTANT



DONALD M. FUJIMOTO COUNTY ENGINEER TELEPHONE 241-4992

EDMOND P.K. RENAUD
DEPUTY COUNTY ENGINEER
TELEPHONE 241-4992

AN EQUAL OPPORTUNITY EMPLOYER COUNTY OF KAUA'I

DEPARTMENT OF PUBLIC WORKS 4444 RICE STREET MO'IKEHA BUILDING, SUITE 275 LIHU'E, KAUA'I, HAWAI'I 96766-1340

May 5, 2009

Oceanit 828 Fort Street Mall, Suite 600 Honolulu, HI 96813

Attention: Ms. Joanne Hiramatsu

SUBJECT: DRAFT ENVIRONMENTAL ASSESMENT FOR ALIOMANU ROAD REPAIR

TMK: 4-8-18-028 & 029

PW 3.09.128

Dear Ms. Hiramatsu,

We reviewed the subject draft environmental assessment for Aliomanu Road Repair. We offer the following comments:

A. ALIOMANU ROAD REPAIR:

- 1. We recommend comments be solicited from the County's Flood Plain Manager.
- 2. Figure 3-1 Plan and Profile of Road Repair and Rock Revetment: The typical roadway section shows a 2 feet minimum shoulder width. The shoulder width is narrow and does not accommodate pedestrian traffic and presents traffic safety problems. We are also concerned with the roadway drainage. We believe the 2 foot shoulder width will serve as a bioretention area to accommodate the roadway drainage. We believe some of the storm flows from the roadway will percolate through the 2 foot strip and will be trapped between the geotextile fabric separating the rock revetment and filled section of the roadway repair and will further erode or undermine the roadway prism.
- 3. Page 8, 4.1.1 Impacts: The second paragraph states that "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." We recommend comments be solicited from our Planning Department whether the road repair is located within the shoreline area. Section 22.7.5(H) of Ordinance No 808 referred to as the County's Sediment and Erosion Control Ordinance prohibits the use of soil as fill within any shoreline area as defined by Section 2.5A-41 Hawai'i Revised Statues, except for sand as defined in Section 22-7.4 of this article.

- 4. Page 21, 8 Significance Criteria, bullet 1 (Involves an irrevocable commitment to loss or destruction of any natural or cultural resources). The response is "The project will not result in irrevocable commitment to loss or destruction of any natural or cultural source. However, if subsurface cultural resources are uncovered during construction, work will cease and the Kauai Historical Society will be contacted." If historic remains such as artifacts, burials, concentrations of shell or charcoal be encountered during construction activities, work shall be ceased immediate in the vicinity of the find and the Contractor is to notify the Planning Department (241-6677) and the State Historic Preservation Division at (808) 241-3690 rather than the Kauai Historical Society.
- 5. Although a grading permit is not required for this project since the work will be within a self contained government control area, however, we expect Best Management Practices be provided at all times to the maximum extent practicable to prevent damage by sedimentation, erosion or dust to streams, watercourses, natural areas and the property of others.

Thank you for this opportunity to provide our comments. Should you have questions, please contact me at (808) 241-4981.

Very truly yours,

Wallace Kudo, P.E.

Mailan Kus

Chief, Engineering Division

CONCUR:

DONALD M. FUTIMOTO, P.E.

County Engineer

WK

cc: Ryan Nishikawa

Planning Department
Design and Permitting
Construction Inspection

Office of Environmental Quality Control



June 19, 2009

County of Kauai Department of Public Works 4444 Rice Street Mo'ikeha Building, Suite 275 Lihue, HI 96766-1340

Attention:

Mr. Wallace Kudo, P.E.

Chief, Engineering Division

Subject:

Draft Environmental Assessment

Aliomanu Road Repair and Seawall, Anahola, Kauai

TMK: 4-8-18-028 and 029

This letter is in response to your comment letter of May 5, 2009 for subject project:

- 1. We will consult with the County's Flood Plain Manager for this project on any requirements that are necessary for the construction of this project.
- 2. The scope of the project is to repair the road to existing conditions, therefore additional shoulder width for pedestrian traffic has not been included in the construction plans. The two-foot shoulder area will be filled with flowable fill and will not cause storm water runoff to penetrate the shoulder and cause undermining of the new road and revetment. A concrete swale within the roadway will also be constructed to direct mauka storm water to the revetment.
- 3. Discussions with the Kauai Planning Department indicate that the project is within the Special Management Area and the Shoreline Setback. The fill material used as back fill will be sand from the existing site or flowable fill. The flowable fill will be used between the road and the revetment, while the backfill material for the sloping revetment will use sand from the existing site.
- 4. We will revise the Environmental Assessment to indicate that the Planning Department and the State Historic Preservation Division will be contact in the event subsurface cultural or archaeological resources are uncovered, instead of contacting the Kauai Historical Society. We concur that construction work will cease immediately in the event cultural or archaeological resources are uncovered.
- 5. Best Management Practices will be required to prevent pollutants entering receiving waters.

If you have any questions, please call me or Joanne Hiramatsu at 531-3017 ext.

262.

Sincerely:

Warren E. Bucher, Ph.D., P.E.

Wanes & Bucher

Senior Ocean Engineer

LINDA LINGLE





STATE OF HAWAI'I DEPARTMENT OF LAND AND NATURAL RESOURCES Office of Conservation and Coastal Lands

POST OFFICE BOX 621 HONOLULU, HAWAI'I 96809 CHAIRPERSON BOARD OF LAND AND NATURAL RESOURCES COMMISSION ON WATER RESOURCE MANAGEMENT

RUSSELL Y. TSUJI FIRST DEPUTY

KEN C. KAWAHARA

AQUATIC RISQUECTS
BOATING AND COTEAN RISCREATION
BURIEAU OF CONVIEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTIAL LANDS
CONSERVATION AND COASTIAL LANDS
CONSERVATION AND COASTIAL LANDS
FORESTRY AND WILDLIFF
INSTORC PRESERVATION
KAHOOLAWE ISLAND RISSREVE COMMISSION
LAND
STATE PARKS

DLNR:OCCL:. DE June 19, 2009

JUN 19 2009

Correspondence: KA-09-180

County of Kauai Department of Public Works Moikeha Building 4444 Rice Street, Suite 255 Lihue, Kauai 96766

Draft Environmental Assessment (DEA) Aliomanu Road Repair, Kauai SUBJECT:

TMK(4) 4-8-18:28 & 29

The Department of Land and Natural Resources' (DLNR), Office of Conservation and Coastal Lands (OCCL) is in receipt of the March, 2009 Draft Environmental Assessment (DEA) for the proposed road repairs to prevent the undermining and failure of the road. The project includes a rock revetment along the affected length of roadway.

The OCCL is supportive of the effort to mitigate and reduce exposure to coastal hazards in this area and provide a stable access for residents and emergency services. The OCCL understands the intent of the project to stabilize the existing roadway. Based on the information provided, the OCCL has a number of concerns and offers the following comments and recommendations regarding the proposed activities.

General Comments:

- The area is subject to a pending DLNR Conservation District violation by the County of Kauai for the placement of rocks along the shoreline (KA-03-21). Describe the proposed activities in relation to the recommended resolution of the violation.
- The area is also subject to DLNR Emergency Permit (KA-08-02). You need to describe the emergency measures that were recently initiated to protect the road and how these relate to the proposed activities.
- It appears the project area includes submerged lands seaward of the upper reach of the wash of the waves. The DEA should include a map depicting the high tide line and shoreline for reference in relation to the proposed actions. Please include a copy of a shoreline survey and include the shoreline on Figure 3.1 in the plan view and cross-section.
- 4. We suggest you add a background section with a chronology of events to the site. Please describe the history of the erosion and subsequent actions to protect the road. A description of other erosion control activities in the area would also be helpful.
- The DEA should include an engineering analysis of the proposed shoreline revetment. The analysis should include:
 - a. Engineering specifications for the proposed revetment including the calculations to derive the proposed design specifications and rock size and design life.

- b. A project maintenance schedule and description. This is mentioned in Section 3.2 briefly but no details are offered.
- c. A wave analysis describing the design wave height and run up calculations.
- d. A tidal analysis describing the effect of tides on the design wave height.
- e. The DEA should describe the potential impact of projected sea level rise on the proposed activities. Recent research indicates the possibility of up to 1 meter of sea level rise by the end of this century. Please include the potential impact of sea level on the design parameters for the project as well as the alternatives analysis.
- 6. Please clarify how public beach access will be addressed upon completion of the project. Describe if and how the revetment will impact lateral public access.

Specific Comments:

- 7. Section 2.1 Project Description. This section should include the basic dimensions of the proposed project including length, width, height and rock size.
- 8. Section 3.2 Proposed Project Alternative. This section mentions 25 foot soil borings. Please reference a study with figures and or maps to support the claim no hard substrate was encountered.
- 9. Section 3.2 Proposed Project Alternative. This section fails to identify the proposed revetment as the preferred alternative and why it was selected. Explain why the proposed footing is -6.0 feet below MSL.
- 10. Section 3.2 Proposed Project Alternative. This section fails to mention road relocation as an alternative. The OCCL suggests this be added as an alternative with an analysis of the option.
- 11. Figure 3-1. Please add the total structure length and the shoreline to the figure. Figure 3 of Appendix C Cultural Survey Report indicates a much larger project area.
- 12. Figure 3-1. Please provide the estimated structure height and width ranges (currently reads varies) to the figure. It is not clear from this figure how far seaward the proposed activities will extend.
- 13. Figure 3-1. Please describe the quantity and type of fill material to be used as backfill behind the revetment.
- 14. Section 4. Physical, Biological and Cultural Environment. Please add a coastal resource assessment. This section should include:
 - a. A description of the existing beach and inter-tidal resources. Include a description of the beach and nearshore wave processes in the project area.
 - b. Historical shoreline analysis. This can be obtained from the University of Hawaii at: http://www.soest.hawaii.edu/asp/coasts/kauai/
 - c. Description of the sediment transport characteristics and sediment type.
- 15. Section 4.2. Natural Hazards. Please include a FIRM map for this area.
- 16. Section 4.2. Natural Hazards. Please include a discussion of sea level rise and coastal erosion as coastal hazards for this section.
- 17. Section 4.3. Aquatic Resources. Please reference Figure 1 of Appendix A for this section. A more detailed map of the exact locations of these corals may be helpful for avoiding impact to these features. What type of habitat will the new rocks provide?
- 18. Section 8.1 Significance Criteria. Please address the direct placement (burial) impact of the proposed structure in relation the statement "the project will not result in the irrevocable commitment to loss or destruction of **any** natural or cultural resource (emphasis added). We ask that this section be realistic about the direct placement loss and instead describe the

quality and character of the environment buried by the rocks. This might be supported by statements made in Section 4.3.1 regarding the lack of coral growth.

Thank you for the opportunity to comment on this DEA. Should you have any questions, please contact the Office of Conservation and Coastal Lands, at (808) 587-0377.

Sincerely,

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

CC: Chairperson

Kauai Board Member

Mayor Carvalho-County of Kauai

County of Kauai Planning Department 4444 Rice Street, Suite 255 Lihue, Kauai 96766

Land Division

Oceanit 828 Ft. Street Mall Suite 600 Honolulu HI 96813

DOH, CWB

OHA



August 10, 2009

Mr. Samuel J. Lemmo, Administrator Office of Conservation and Coastal Lands Department of Land and Natural Resources P.O. Box 621 Honolulu, HI 96809

Dear Mr. Lemmo:

SUBJECT: Comments on Draft Environmental Assessment (DEA) Aliomanu

Road Repair, Kauai, TMK (4) 4-8-18:28 & 29

Thank you for the review of and comments on the Draft Environmental Assessment (DEA). Below are responses to your numbered comments:

General Comments:

- 1. The County of Kauai and the State Department of Land and Natural Resources entered into a Memorandum of Agreement (MOA) back in July 2008 regarding the placement of rocks along the shoreline. The County has paid the \$2,000 fine for this activity. In the MOA, the County of Kauai Department of Public Works agreed to remove the violation by incorporating those rocks into the permanent solution to a revetment seaward of the repaired road that will protect it from future coastal erosion. The County is preparing construction plans and specifications.
- The emergency measures include placement of coir sandbags along 200 feet of the shoreline at the damaged section of the roadway as recommended by OCCL. For the permanent solution, these coir sand bags will be removed and replaced with a rock revetment about 500 feet long.
- A shoreline certification map is currently being prepared and will be submitted for review and approval so that the required permits can be obtained. The shoreline certification map will not be done in time to include in the Final EA.
- 4. With the help of Kauai County, we will add a chronology of events regarding the history of the erosion of Aliomanu Road to the EA.

5. An engineering analysis for the revetment design is as follows:

a-d. The rock revetment was designed using Corps of Engineers' methods given in the Shore Protection Manual (U.S. Army Corps of Engineers, 1984). The design depends on the revetment slope, nearshore bathymetry, and the size of waves that could strike the structure. The selected revetment slope is 1 vertical to 1.5 horizontal (1:1.5). A 1:1.5 revetment uses less rock and therefore costs less than a shallower sloped revetment. When waves are depth limited (i.e., they break before reaching the shoreline), the highest unbroken wave that hits the revetment is used with empirical factors to estimate armor stone size. Unbroken wave height depends on water depth, which is a combination of still water depth, tide, wave setup, and any future sea level rise during the revetment's 50-year design life. The Mean sea level (MSL) contour is about 45 feet seaward from the edge of the eroded road, so most of the revetment will be above MSL. Nearshore water depth is about 1 foot below MSL. Extreme tide (not including hurricanes) measured on Kauai is 2.19 feet above MSL. Wave setup, calculated from the significant wave height of deepwater waves measured at Data Buoy 5101 northwest from Kauai, is about 1.94 feet above MSL, although storm waves would make setup higher. Sea level rise in Hawaii between 1992 and 2007 was about 2 mm/yr. Over 50 years the rise is estimated at 100 mm or about 4 inches (0.33 feet). The total design water depth seen by an approaching wave is about 5.46 feet. The largest unbroken wave that can pass this depth is approximately 4.26 feet high. Using Hudson's formula, the mean armor stone weight is calculated at 1,800 lbs (0.9 tons). The armor stone size range is from 75% to 125% of the mean weight or 1350 to 2250 lbs (0.68 to 1.13 tons) with 50% greater than 1800 lbs. Bedding stone is one tenth the weight of the armor stone, so 135 to 225 lbs. Both the armor and the bedding layers are two stones thick. The revetment concept is shown in Figure 3-1.

The estimated design life of a revetment is 50 years with maintenance. The first five years will require the most maintenance because settling could dislodge a few armor stones that would have to be placed back onto the revetment. After the revetment is stable, periodic inspection is recommended, especially after high wave events. If bedding or filter layers are damaged, a revetment section may have to be rebuilt.

6. The section of roadway that is currently damaged does not provide easy access to the shoreline because the eroded embankment drops vertically several feet before the slope becomes shallow enough to walk on. A revetment may actually provide a safer path to the water. By walking less than 200 feet south, a person reaches lower elevation



where access is easy. As it moves south along the beach, the road curves to the southwest away from the shoreline giving space for cars to park along the beach side of the road near the shoreline.

Specific Comments:

- 7. Section 2.1 Project Description We will add the basic dimensions and a graphical scale into the plan and profile drawing (Figure 3-1).
- 8. Section 3.2 Proposed Project Alternative Oceanit received a preliminary geotechnical report; however, the proposed revetment was not being considered at that time. The findings on soil type are valid, but the discussion on using the concrete retaining wall alternative is no longer applicable. We will add the preliminary report as an appendix to the FEA.
- 9. Section 3.2 Proposed Project Alternative There are several reasons why a rock revetment was chosen as the preferred alternative. A rock revetment was viewed as the most environmentally friendly alternative, because it will reduce energy from waves as they pass through voids in the revetment. The filter lining in the back of the revetment will minimize sand migration through the revetment to the ocean. Repairing a revetment is less costly than repairing a concrete vertical seawall with a rock toe. The cost to build a revetment is also less than building the other alternatives that were considered.
- 10. Section 3.2 Proposed Project Alternative Kauai County initially reviewed road relocation options. However, topography and land ownership issues made this option too expensive or legally difficult. There is a steep slope inland from the damaged road that limits grading a new road. The road provides access to only about 20 residences. The surrounding land is owned by the State Department of Hawaiian Home Lands, and alternative road routes would require a roadway easement through homestead properties. We will add this alternative to the EA. An additional option, already addressed in the EA, is to reconnect the two sections of Aliomanu Road with a bridge thereby opening another route to Kuhio Highway. The county has determined that a bridge would be too expensive and would also involve right-of-way issues.
- 11. Figure 3.1 We will add a dimension to the figure for the 500-foot revetment length.
- 12. Figure 3.1 We added a graphical scale to the figure's plan view so that dimensions can be measured.



- 13. Figure 3.1 Fill material to build the revetment slope and road bed includes sand, rock, existing soil, and flowable fill (thin concrete). Total fill volume is approximately 2800 cubic yards.
- Section 4. Physical, Biological and Cultural Environment We will add a coastal resource assessment as follows:
 - a. The beach along Aliomanu Road becomes thin and variable at the project site. The northern section contains boulders and smaller rock with very little sand. The beach grows wider as it leaves the project area toward Anahola Stream. The nearshore reef area is flat, consists of rock and hardened sediment, and is partially dry at very low tides. The reef flat gradually becomes deeper as it extends about 600 feet out from the shoreline. Deep water waves break at the outer reef edge, and only small waves propagate over the reef flat. Biological information is included in Appendix A of the EA.
 - The historical shoreline map, with calculated erosion rates produced by the University of Hawaii for Kauai County, will be included in the EA.
 - c. The sediment of interest is beach sand and soil eroded from the road embankment. The layer of sand on the beach at the erosion site is not usually very thick and is mixed with boulders, cobbles, and gravel. Sand is typically transported to the south toward the apex of Anahola Bay where it collects on the beach near the Anahola Stream mouth or is moved offshore by the stream flow. Both trade winds and wave-driven currents push water over the reef flat causing strong currents to flow south along the shoreline. Aerial photos show a gap through the reef at the north end of the project where more wave energy and tidal flow can enter to erode the shoreline and increase longshore current flow. The outer reef is closer to the shoreline as it gets near the stream mouth creating a funnel where current velocity and consequently sediment transport rate increases. A large sand channel heads directly offshore from the stream mouth.
- 15. Section 4.2 Natural Hazards Kauai County is receiving new FIRM maps from FEMA. We will include a FIRM map in the Final EA.
- 16. Section 4.2 Natural Hazards Sea level rise has been predicted to be 0.5 to 1.4 meters over the next hundred years (Dr. Chip Fletcher, Presentation, November 22, 2008). However, sea level trends in Hawaii have had a near zero change between 1992 and 2007. Relative sea level rise for Kauai has been estimated to be 1.75 mm/yr based on the NOAA tide gauge network. The proposed shore protection structure is a rock revetment that has a design life of 50 years and can easily be changed to increasing its size. The damaged road is at an elevation of



DLNR/OCCL Response to EA Comments August 10, 2009

about 10 feet above MSL, well above predicted sea level rise. The major problem at the road is bank erosion, not beach erosion. The embankment was apparently built many years ago as a bed for a railroad. Now a paved road has replaced the railroad. By the time sea level rise really threatens the road, it will be time to rebuild the road and decisions on road size and location can be made.

- 17. Section 4.3 Aquatic Resources We will reference Figure 1 of Appendix A. Exact locations of corals were not measured; however, the new revetment will not cover any corals. The unburied part of the revetment will be dry at low tide. At high tide some places on the toe will be wet enough so that algae might grow; however, very little algae growth is seen on existing rocks unless they are far enough seaward to be mostly submerged. We do not expect the new revetment to create much new habitat except perhaps for crabs, which live in the existing rocks.
- 18. Section 8.1 Significance Criteria Both a cultural impact study and an archaeological study were made for the project site. No burials or other cultural sites or materials were identified in the area where the new revetment will be constructed. Therefore, none will be destroyed by the construction. Geotechnical borings were made at both the north and south ends of the repair site. At the north end the soils include silty clay fill to a depth of about 3 feet below ground surface with residual stiff clays and silts below the fill to a depth of 16 feet. The boring at the south end showed clayey silt fill to a depth of 2.5 feet and medium dense beach sand to a depth of 8 feet below the ground surface. Soft basalt was found below the sand. The clay and silt material are not considered a valuable natural resource. The layer of sand at the south end of the project has some value as a beach resource. However, the beach to the south and around the Anahola Stream mouth is quite healthy and contains a large quantity of sand that is already part of the beach system. The proposed revetment will cover some beach sand especially at the south end where the beach is being eroded. Sand is already being washed away as evidenced by a small erosion scarp. The revetment does not extend seaward far enough to cover any coral, limu, or fish habitat. It will not cover the rock area where monk seals like to rest. And the revetment will reduce the amount of non-beach soil being washed into the ocean.



DLNR/OCCL Response to EA Comments August 10, 2009

If you have additional questions, please contact Joanne Hiramatsu or me at (808) 531-3017.

Sincerely,

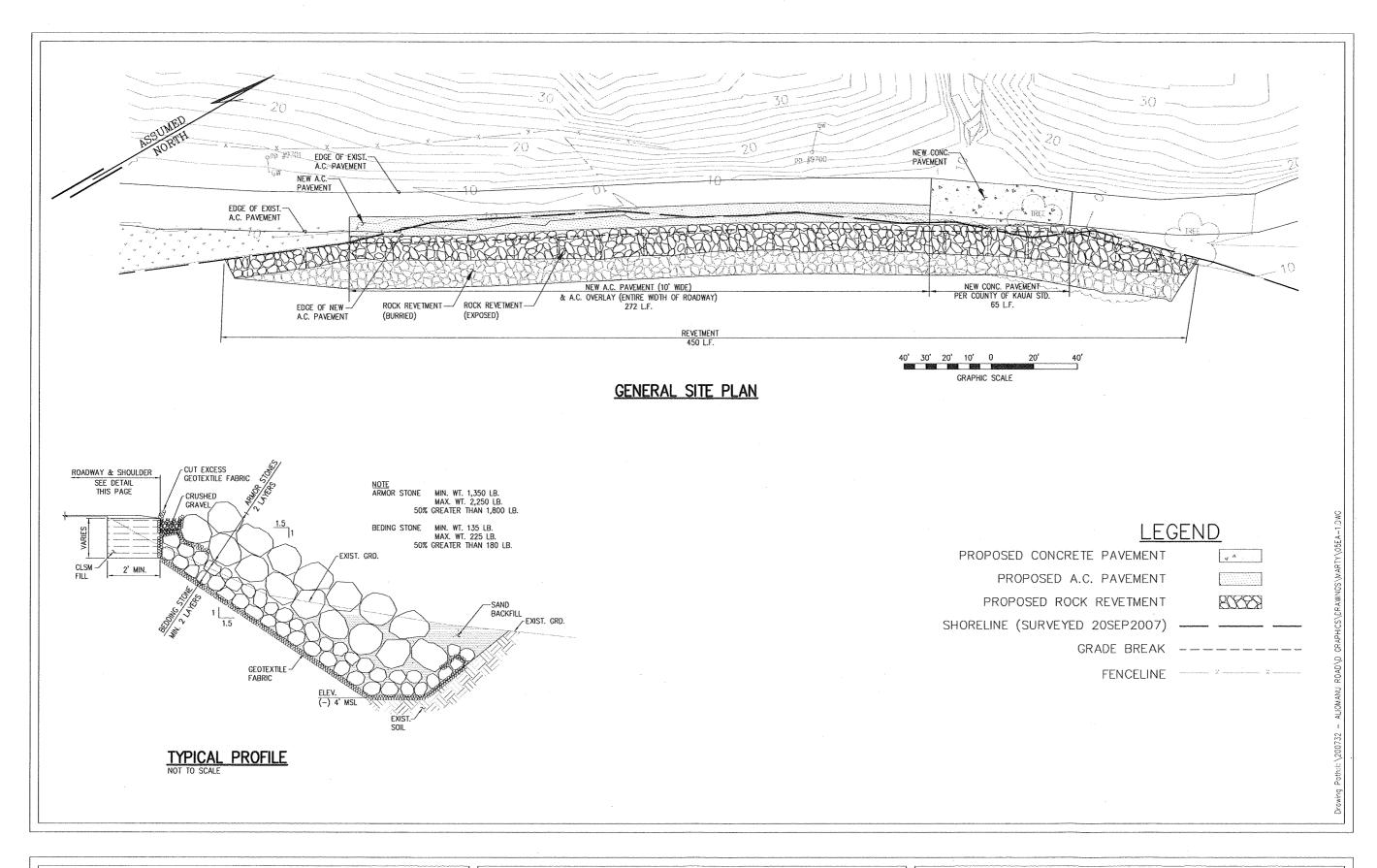
Warren E. Bucher, Ph.D., P.E.

benen E Bucher

Senior Engineer

Cc: Mr. Donald Fujimoto, Kauai Department of Public Works







ALIOMANU ROAD REPAIR
FIGURE 3-1
PLAN AND PROFILE FOR ENVIRONMENTAL ASSESSMENT

DEPARTMENT OF PUBLIC WORKS
COUNTY OF KAUAI



DATE:

ATTN:

January 8, 2008

TO:

Oceanit

Mr. Warren Bucher

SUBJECT: Alic

Aliomanu Road Stabilization

Preliminary Findings and

Recommendations

OW

FROM: Clayton S. Mimura/Glenn Barut

W.O. No.: 5971-00

NO. OF PAGES: 3

(Including cover sheet)

REMARKS:

The following contains our preliminary findings and geotechnical engineering recommendations for the design of the proposed retaining wall.

Subsurface Conditions

We drilled two borings, designated as Boring Nos. 1 and 2, at the site. Boring Nos. 1 and 2 were drilled at the north and south ends of the site, respectively. A hard layer of basalt rock or coral formation was not encountered in the borings.

Boring No. 1 (drilled at the north end of the site) generally encountered silty clay fill that extended to a depth of about 3 feet below the existing ground surface. Residual soils, which consisted of stiff clays and silts, were encountered below the fills and extended to a depth of about 16 feet below the existing ground surface. The residual soils were underlain by saprolitic soils that extended to the maximum depth explored. The saprolitic soils consisted of stiff silts.

Boring No. 2 (drilled at the south end of the site) generally encountered clayey silt fill that extended to a depth of about 2.5 feet below the existing ground surface. Below the fill, we encountered beach deposits that consisted of medium dense sand. The beach deposits extended to a depth of about 8 feet below the existing ground surface. Extremely weathered and soft basalt formation was encountered below the beach deposits and extended to the maximum depth explored.

We encountered groundwater at depths of about 5.8 and 6.1 feet below the existing ground surface at the time of our field exploration. It should be noted that groundwater levels are expected to fluctuate with variation in tides, rainfall, surface water runoff, groundwater withdrawal, and other factors.

Retaining wall

We understand that a reinforced concrete retaining wall will be constructed along the east side of the road. This will allow for construction of a new lane and shoulder. The

Hard Copy will be in the Mail ()

Hard Copy will not be Sent (X)

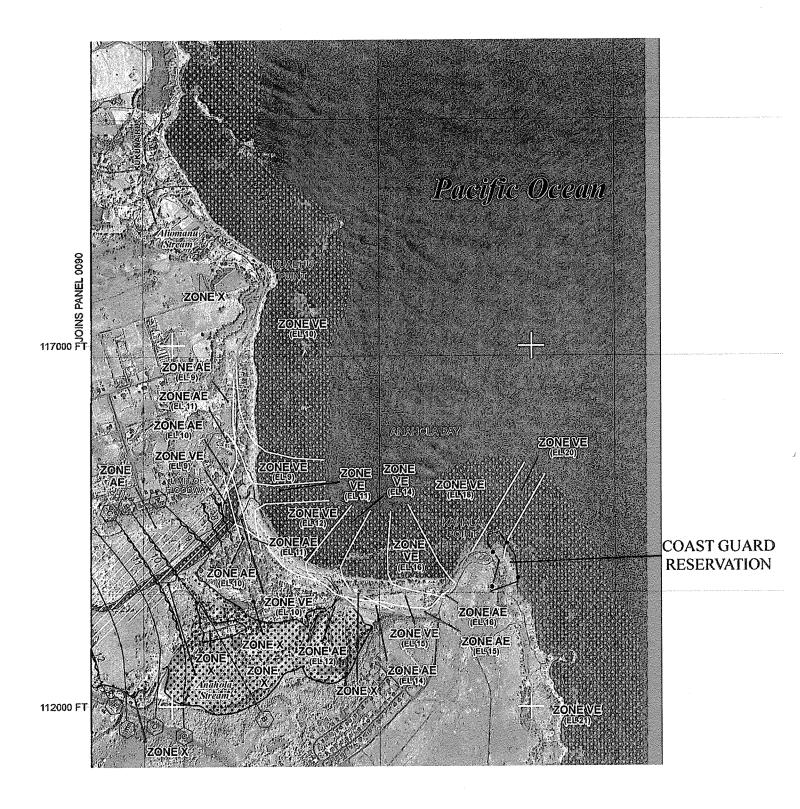
Surcharge pressures due to areal surcharges, traffic loads, line loads, and point loads within a horizontal distance equal to the depth of the retaining wall should be considered in the design. For uniform surcharge pressures imposed on the loaded side of the structure, a rectangular distribution with uniform pressure equal to 33 percent of the vertical surcharge pressure acting on the entire height of the wall, which is free to deflect (cantilever), may be used in design. For retaining walls that are restrained, a rectangular distribution equal to 50 percent of the vertical surcharge pressure acting over the entire height of the wall may be used for design. Additional analyses during design may be needed to evaluate the surcharge effects of point loads and line loads.

Wall Drainage

The retaining wall should be well drained to reduce the potential for build-up of hydrostatic pressures behind the wall. A typical drainage system for the retaining wall should consist of about 1 cubic foot of permeable material, such as open-graded gravel (ASTM C 33, No. 67 gradation), wrapped with non-woven filter fabric (Mirafi 180N or equivalent) at each of the weephole locations. The weepholes should be spaced no more than 6 feet apart. Unless covered by concrete or asphaltic concrete, the upper 12 inches of backfill should consist of relatively impervious materials, such as the on-site soils, to reduce the potential for significant water infiltration behind the retaining wall.

Closure

If you have questions or need additional information, please contact our office.





MAR 23 2018

Bernard P. Carvalho Jr. Mayor Corp

Lyle Tabata
Acting County Engineer

Wallace G. Rezentes Jr.
Managing Director

DEPARTMENT OF PUBLIC WORKS

County of Kaua'i, State of Hawai'i

4444 Rice Street, Suite 275, Līhu'e, Hawai'i 96766 TEL (808) 241-4992 FAX (808) 241-6604

February 8, 2018

Scott Glenn, Director
Office of Environmental Quality Control
Department of Health, State of Hawaii
235 South Beretania Street, Room 702
Honolulu, Hawaii 96813

Dear Mr. Glenn:

With this letter, the Department of Public Works hereby transmits the Final environmental assessment and finding of no significant impact (FEA-FONSI) for the Aliomanu Road Repair project situated at TMK 4-8-18: 028 and 029 in the Kawaihau District on the island of Kauai for publication in the next available edition of the Environmental Notice.

The Department of Public Works has included copies of public comments and the corresponding responses from the applicant that were received during the 30-day public comment period on the draft environmental assessment and anticipated finding of no significant impact (DEA-AFNSI).

Enclosed is a completed OEQC Publication Form, two copies of the FEA-FONSI, an Adobe Acrobat PDF file of the same, and an electronic copy of the publication form in MS Word. Simultaneous with this letter, we have submitted the summary of the action in a text file by electronic mail to your office.

If there are any questions, please contact Don Fujimoto, P.E., Project Manager, Department of Public Works at 808-241-4882.

Sincerely,

M Lyle Tabata

Digitally signed by Lyle Tabata Date: 2018.02.07 16:06:47 -10'00'

Lyle Tabata, P.E.

Acting County Engineer

Enclosures:

18-428

AGENCYPUBLICATION FORM

Project Name:	Aliomanu Road Repair
Project Short Name:	Aliomanu Road Repair
HRS §343-5 Trigger(s): Use of County Lands, Use within a Conservation District, Use within a shoreline area	
Island(s): Kauai	
Judicial District(s): Kawaihau	
TMK(s): 4-8-18: 028, 029	
Permit(s)/Approval(s):	Conservation District Use Permit, Army Section 404 Permit, Section 401 Water Quality Certification,
	Coastal Zone Management Consistency, Shoreline Setback Variance, Special Management Area
	Permit, Request Form for Non-Homesteading Land Use Purposes
Proposing/Determining Department of Public Works	
Agency:	
Contact Name, Email,	Donald Fujimoto, dfujimoto@kauai.gov, 808-241-4882,
Telephone, Address	4444 Rice Street, Suite 175 Lihue, Hawaii 96766
Accepting Authority: (for EIS submittals only)	
Contact Name, Email,	
Telephone, Address	
Consultant:	Oceanit
Contact Name, Email,	Dayan Vithanage, dvithanage@oceanit.com, 808-531-3017,
Telephone, Address 828 Fort Street Mall, Suite 600 Honolulu, Hawaii 96813	

Status (select one) DEA-AFNSI	Submittal Requirements Submit 1) the proposing agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the DEA, and 4) a searchable PDF of the DEA; a 30-day comment period follows from the date of publication in the Notice.
FEA-FONSI	Submit 1) the proposing agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEA, and 4) a searchable PDF of the FEA; no comment period follows from publication in the Notice.
FEA-EISPN	Submit 1) the proposing agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEA, and 4) a searchable PDF of the FEA; a 30-day comment period follows from the date of publication in the Notice.
Act 172-12 EISPN ("Direct to EIS")	Submit 1) the proposing agency notice of determination letter on agency letterhead and 2) this completed OEQC publication form as a Word file; no EA is required and a 30-day comment period follows from the date of publication in the Notice.
DEIS	Submit 1) a transmittal letter to the OEQC and to the accepting authority, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the DEIS, 4) a searchable PDF of the DEIS, and 5) a searchable PDF of the distribution list; a 45-day comment period follows from the date of publication in the Notice.
FEIS	Submit 1) a transmittal letter to the OEQC and to the accepting authority, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEIS, 4) a searchable PDF of the FEIS, and 5) a searchable PDF of the distribution list; no comment period follows from publication in the Notice.
FEIS Acceptance Determination	The accepting authority simultaneously transmits to both the OEQC and the proposing agency a letter of its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS; no comment period ensues upon publication in the Notice.
FEIS Statutory Acceptance	Timely statutory acceptance of the FEIS under Section 343-5(c), HRS, is not applicable to agency actions.
Supplemental EIS Determination	The accepting authority simultaneously transmits its notice to both the proposing agency and the OEQC that it has reviewed (pursuant to Section 11-200-27, HAR) the previously accepted FEIS and

Agency Publication Form February 2016 Revision

	determines that a supplemental EIS is or is not required; no EA is required and no comment period ensues upon publication in the Notice.
Withdrawal	Identify the specific document(s) to withdraw and explain in the project summary section.
X Other	Contact the OEQC if your action is not one of the above items.

Project Summary

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

This Final Environmental Assessment (FEA) was prepared to update a previous EA published for the repair of 'Aliomanu Road. The subject road is located along the shoreline in Anahola Bay. Wave induced erosion has severely undermined the road and has caused collapse of a portion of the pavement into the ocean. The FEA describes the potential impact of projected sea level rise on the proposed road repair project and evaluates alternative means for re-establishing a safe and reliable vehicular access. The proposed repair includes rebuilding the damaged road section into a two-lane road, with a supporting rock revetment on the makai side to protect the road from long term erosion and prevent soil erosion from running off and contaminating the ocean. The revetment design consists of boulder rocks and a CRM curb wall along the roadway. The design retains the rocky nature of the existing shoreline and the contractor may use boulders that exist on the project footprint for the revetment structure. Two agency comment letters and responses to these agencies were added to the Appendix at the end of the FEA.

Final Environmental Assessment 'Aliomanu Road Repair

Island of Kaua'i, Hawai'i



Prepared for:

County of Kaua'i 4444 Rice Street Līhu'e, Hawai'i 96766

Prepared by:

Oceanit Laboratories, Inc. 828 Fort Street Mall, Suite 600 Honolulu, Hawai'i 96813

February 2018



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1. INTRODUCTION

This Final Environmental Assessment (FEA) was prepared for the County of Kaua'i Department of Public Works (DPW) for the repair of 'Aliomanu Road. This document incorporates by reference a Final Environmental Assessment published on October 8, 2009, including the analysis of significance of the proposed project. 'Aliomanu Road is located along the shoreline in Anahola Bay, Kaua'i (Figure 1). Erosion has severely undermined the roadway, causing the collapse of a portion of the pavement into the ocean (cover image).

'Aliomanu Road is the only means of vehicular access and public utilities to about 18 properties in the 'Aliomanu neighborhood. In the eroded area, the roadway runs adjacent to a naturally sandy and rocky shoreline. Presently, the steep slope below the eroding road appears unstable and puts the structure at risk of further collapse into the ocean. Access for emergency vehicles is of concern, as is safe passage for evacuation during an emergency. In its existing condition, 'Aliomanu Road is a risk to public safety, health and welfare.



Figure 1. Location map of the 'Aliomanu Road Repair Site.

1.1 Background

The trend of shoreline erosion in the project area has been documented by the University of Hawai'i at Mānoa Coastal Geology Group. Using orthorectified and georeferenced historic aerial photographs and National Ocean Survey topographic survey charts dating to 1927, the University determined that the average shoreline change for the project area is about -1.3 feet horizontally per year [1]. The beach erosion has caused progressive damage to the most seaward portion of 'Aliomanu Road (Figure 2) reducing the width of the road. Currently, the road is only one lane wide in the project area and the erosion continues to progress (Figure 3 and Figure 4). If the erosion continues to go unaddressed, the damage may make the road impassible. The County of Kaua'i proposes to repair the road and restore it to two lanes.

The Kaua'i County Code 1987 restricts development within the shoreline setback areas. The proposed repair is within this setback, so a shoreline setback variance will be required. Section 8-27.10 of the Code states that a variance may be approved for "private and public structures that may artificially fix the shoreline but not adversely affect beach processes; provided that, the Commission also finds that shoreline erosion is likely to cause severe hardship to the applicant if the facilities or improvements are not allowed within the shoreline setback area and all alternative erosion control measures, including retreat, have been considered" [2].



Figure 2. Photograph of the shoreline erosion undermining 'Aliomanu Road.



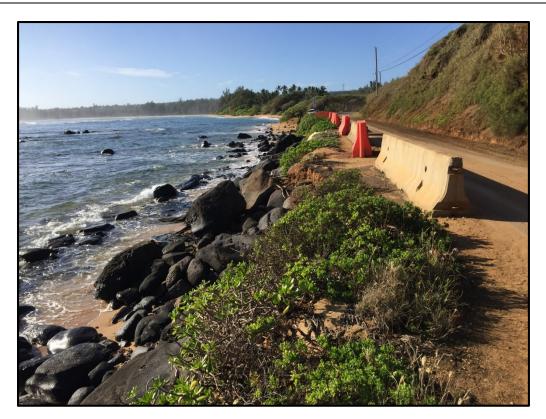


Figure 3. Photograph looking south along the damaged road.



Figure 4. Photograph looking north along the damaged road.

1.2 Objective and Scope

The objective of this Final EA is to describe the potential impact of projected sea level rise on the proposed road repair project and to evaluate alternative means for re-establishing safe, reliable vehicular access to the residences impacted by this damaged section. Possible solutions of 'Aliomanu Road include repairing the roadway, or retreating and establishing other means of access. The scope of this evaluation is to present technically feasible alternatives, and to provide information on the approximate costs and timeline of the environmental, economic and social impacts with each alternative.

2. DISCUSSION OF ALTERNATIVES

This evaluation considers several options to provide access to the 'Aliomanu community impacted by the damage to the existing road. The alternatives identified are technically feasible and deemed reasonable given the existing conditions of the Anahola area. The alternatives, shown in Figure 5, include:

- No Action;
- Proposed repair and revetment at the project site (white line);
- Repair 'Aliomanu Road into a single lane at the project site (white line);
- Realignment of 'Aliomanu road mauka of site (red line);
- Rebuild a bridge to connect the north and south ends of 'Aliomanu Road (blue line);
- Extend Hokualele Road to connect with 'Aliomanu Road (orange line); or
- Pave and extend a private gravel drive to connect with 'Aliomanu Road (yellow line).

The method for the evaluation and comparison of the alternatives accounts for the following criteria:

- Provides reliable, safe access to the neighborhood;
- Coastal and environmental impacts including the potential impact of sea level rise;
- Construction, operation, and maintenance costs;
- Community and stakeholder acceptance; and
- Timeline for project completion including planning, design, permitting and construction.

To gain information for this evaluation, the project team engaged with stakeholders in the community. The County of Kaua'i Department of Public Works, Oceanit, and the State of Hawai'i Department of Hawai'ian Home Lands (DHHL) Planning and Land Use staff met on November 23, 2016 and on February 22, 2017 to discuss road repair alternatives. On March 29, 2017, the project team met with the DHHL lessees in Anahola to discuss the alternatives. On April 25, 2017, the County held a public information meeting with the larger Anahola community to present and discuss the project alternatives. Insights gained from these meetings are included in this report.

The assessment estimated the time for completion of each alternative based on experience with the required time to secure project funds, develop designs, seek approvals from environmental regulatory



agencies and complete the construction. Many unknowns can affect the amount of time required to take a project from the planning phases to construction. Future changes in regulations, reviewing agency procedures, budget priorities, economy, etc. may change the expected timeline for each project.

The cost figures in this report are rough estimates based on conceptual scopes for each potential project. The study applies the analogous and/or work-breakdown techniques to develop these order of magnitude estimates. The analogous method compares the expected project requirements to cost data from similar projects. The work-breakdown technique calculates the rough project cost based on potential labor and material requirements. The construction capital costs estimate and total 50-year cost estimate include maintenance and expected repairs. Not included in these estimates are the costs of pre-construction services such as investigations, design, environmental documents, permitting, etc. Costs are provided in 2017 dollars and do not account for inflation.

A 50-year period was a basis for comparison for the total lifetime costs of different project alternatives. The 50-year lifetime total cost estimates account for the capital construction cost and the expected costs of inspections, maintenance, repairs and/or replacements over a 50-year project period.



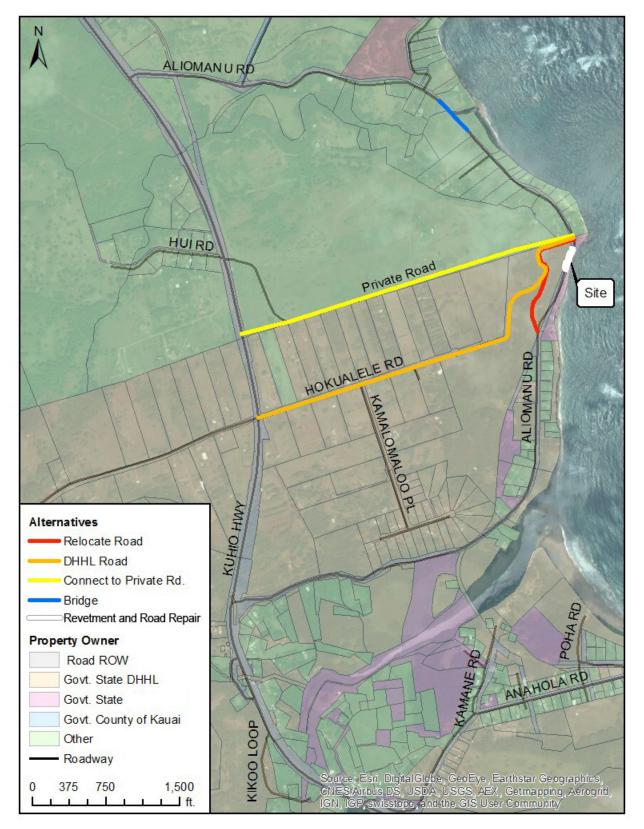


Figure 5: Map showing the Project alternatives and property ownership.

2.1 No Action

If Kaua'i County takes no action, the damaged roadway will continue to pose a risk to public safety, health, and welfare. The roadway may continue to erode and the community would be increasingly vulnerable to natural hazards due to limited access for emergency vehicles and evacuation. The damaged roadway could also collapse resulting in possible injury. The erosion of soils from under the roadway will continue to cause pollution into the ocean. Should a storm event further damage the road and make it impassable an emergency road repair would follow. An emergency repair may not have the same level of planning and scrutiny to prevent negative environmental impacts as a capital improvements project. The community stakeholders may also have less input into the road repair project if the damage worsens and results in a hazardous condition that presents an imminent danger to the public or public trust resources. No action is not a viable option.

No action requires no capital expenditure. The continuous damage to the road will require ongoing temporary repairs to keep the road passable. Over the course of 50 years, operation and maintenance costs (O&M) will include temporary road repairs and shoreline protection such as sand filled erosion barriers. Temporary projects to the approximately 400 feet of damaged roadway may cost about \$175,000 and may be required at a frequency of about once every two years. The required repair frequency may increase with projected sea level rise. Total operation and maintenance costs combine to about \$4.4 million over a 50-year period. These estimates do not account for the cost of a large emergency road repair if a severe storm makes the road impassable; nor does it account for the potential cost to the County if it must condemn and purchase the private properties with no vehicular access. Table 1 provides a summary of this discussion.

Table 1: No Action Summary

<u>ISSUES</u>	<u>DESCRIPTION</u>
Provide reliable, safe roadway access	• A risk to public safety, health and welfare will continue unabated and will increase with time with SLR.
	• If shoreline erosion continues, the road may become impassable without constant repairs and temporary shoreline protection.
	• A severe storm event may make the road impassable. At this point, a road repair may be rushed and/or the County may buy out the private properties with no road access.
Coastal and environmental impacts	 Soil will continue to erode from the shoreline into the ocean and contaminate the nearshore reef and ecosystem. Does not mitigate or adapt to the increasing erosion and flooding hazards expected with sea level rise.
Capital costs	None
50-year total costs	~\$4.4 million unless storm or SLR causes severe damage
Operation and maintenance	• Temporary repairs to the roadway may cost about \$175K every two years, or \$4.4 million total 50-year O&M cost.



Community acceptance	• Community members and the County of Kaua'i do not
	accept this option because it does not provide safe, reliable
	access to the 'Aliomanu neighborhood.
Timeline and ease of implementation	None

2.2 Proposed Repair and Revetment

The proposed repair consists of rebuilding the damaged section of 'Aliomanu Road to a two-lane road with a rock revetment, as shown in Figure 6. The rock revetment would protect the road for the long term from erosion and prevent soil erosion from running off and contaminating the ocean. The revetment design consists of boulder rocks and a concrete curve along the roadway. The design retains the rocky nature of the existing shoreline. The construction contractor may use the boulders that already exist in the project footprint as part of the revetment structure.

According to a recent topographic survey [6], the existing alignment for 'Aliomanu Road uses about 2,000 square feet of property owned by the DHHL. This small area of DHHL property was likely accidently used during the original road construction. The two-lane road repair alternative requires that DHHL provide an easement or right of entry to the County of Kaua'i for the use of this land.

This portion of DHHL land is at the base of a steep sloping hillside. The steep terrain makes development of the adjacent property difficult for residential homes and agriculture. This study identified no negative impacts to DHHL by officially leasing this property to the County for long-term use. At its greatest, the width of the pavement outside of the DHHL property is only five feet. If required to avoid DHHL property entirely, a segment of the road must be moved makai to maintain roadway continuity.

The proposed repair and revetment would require capital expenditures to construct a 387-foot long boulder stone revetment with concrete rubble masonry (CRM) curb walls and a grouted riprap end section. The project repairs the road surface and replaces a four-inch blow-off waterline. The estimated construction cost for capital improvements is about \$2.2 million, including the roadway repairs and shoreline stabilization to keep 'Aliomanu Road passable while construction is completed. Over the course of our 50-year comparison period, the proposed revetment may require maintenance to address damage due to large storm events and settling of the structure. The County may expect one repair to address structural settling over the 50-year period at a cost of about \$200,000. Roadway maintenance at intervals of approximately 15 years at about \$700 per linear foot (LF), or \$225,000 for each repair project. The operation and maintenance costs combine to about \$1 million over a 50-year period. Table 2 provides a summary of this discussion.

The County is currently developing a plan to provide beach nourishment seaward of this revetment project. This plan may call for the placement of about 500 cubic yards of sand from the Anahola Stream mouth along the coastline in the project area. The frequency of the beach nourishment projects may be about every two to four years at an approximate cost of \$150,000 per replenishment effort. These costs were not included in the road repair estimates because nourishment is a separate project.



'Aliomanu Road Repair Final Environmental Assessment

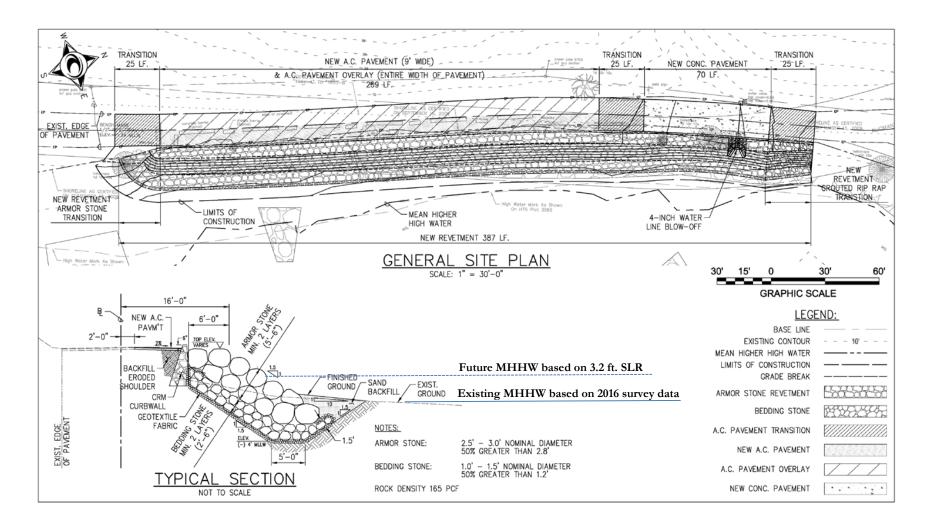


Figure 6. Schematic of proposed road repair. Note that this design is slightly different than that previously published in the October 8, 2009 Environmental Assessment. The major difference is that the south end of the revetment design returns into the existing property, while the previous design did not feature a return.



Table 2: Summary of the Proposed Road Repair and Revetment Alternative

<u>ISSUES</u>	<u>DESCRIPTION</u>
Provide reliable, safe roadway access	• This option would restore the use of the two lane 'Aliomanu Road and provide safe and reliable access to the neighborhood.
Coastal and environmental impacts	 The repair would prevent the long-term contamination of the coastal water by preventing soil erosion into the ocean. During construction, a BMP plan may prevent contaminants from entering the ocean, but there may be a risk of sediments entering the water due to wave conditions. Limiting work to favorable conditions would reduce the risk. Work in the coastal area may require a Nationwide Permit from the US Army Corps of Engineers. The beach nourishment plan may mitigate end erosion effects of the revetment on the adjacent sandy beach. The costs below do not include beach nourishment.
Capital costs	~ \$2.2 million
50 year total costs	~ \$3.2 million
Operation and maintenance	 This repair is a permanent solution. The revetment may require repairs after severe weather events. Roadway maintenance may be required about every 15 years and could cost about \$225,000 for each occurrence. Revetment repairs may be required about once every 50 years and could cost about \$200,000 per occurrence. Total 50-year O&M costs combine to about \$1 million.
Community acceptance	• Members of the community view the road repair and revetment as the most practicable means of providing safe access to the neighborhood. Some community members have raised concerns that the repaired road would increase speeding in the area. A long-term land use agreement with the DHHL is required.
Timeline and ease of implementation	• The project may require two years to complete. The DLNR has a policy against new shoreline armoring projects, but has approved this repair project in the past.

2.3 Convert 'Aliomanu Road to Single-Lane

This alternative consists of keeping this portion of 'Aliomanu Road as a single-lane and constructing a revetment to protect against future erosion or damage to the roadway (Figure 7). Keeping the roadway as a single-lane may allow the County to avoid the need to lease property from DHHL. This option would also preserve the current character of the narrow road, which may discourage speeding in the area. A single lane, however, is a bottleneck that will affect the flow of traffic and poses a



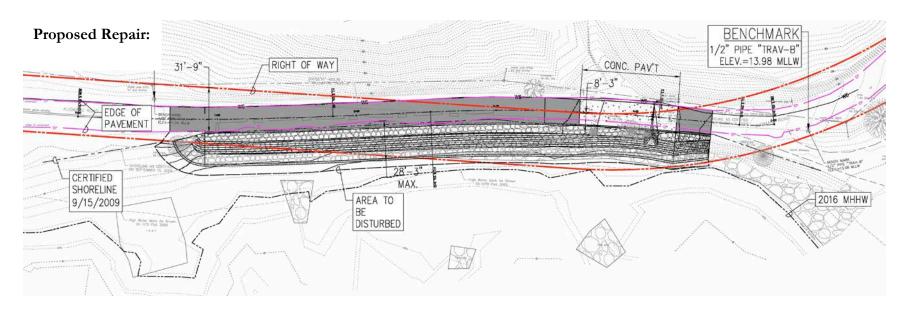
potential safety risk during an emergency or evacuation. The community seems split on whether they prefer a single-lane verses a two-lane roadway repair.

The material costs for a single-lane project may be slightly less than for two-lanes because less pavement would be required. The cost of design, permitting, and construction would be similar as a full two-lane project. A single-lane, 10-feet wide, road repair would have no shoulder on either side and would still require DHHL land or moving the project makai of the existing shoreline at the north end of the project area. Building makai of the existing shoreline may cause an increase in the project completion timeline and costs due to added environmental permitting and construction challenges.

The estimated construction costs for the single-lane capital improvements are \$2.0 million, including the roadway repairs and shoreline stabilization to keep 'Aliomanu Road passable while construction is completed. The maintenance cost associated with the alternative is about \$200,000 for each repair project at intervals of about 15 years. One repair project to address structural settling over a 50-year period may cost about \$200,000. Total operation and maintenance costs combine to under about \$0.9 million over a 50-year period. Table 3 provides a summary of this discussion.



'Aliomanu Road Repair Final Environmental Assessment



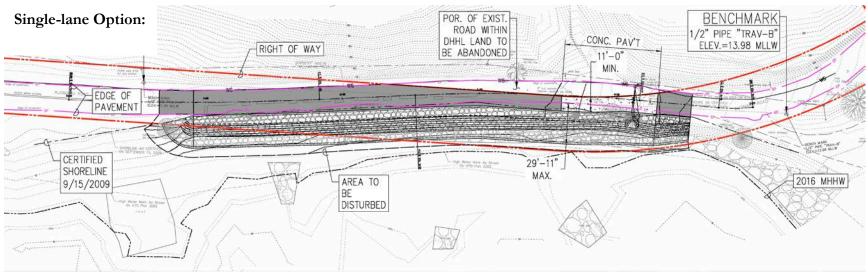


Figure 7. Schematic comparing the proposed repair to the option of converting 'Aliomanu Road to a single lane road at the project site. The single lane option avoids DHHL property, but pushes the revetment slightly seaward.

Table 3: Summary of the Single Lane Alternative

ISSUES	DESCRIPTION
Provide reliable, safe roadway access	 This option would restore the use of 'Aliomanu Road and provide reliable, safe access. A single lane road will reduce access during an emergency.
Coastal and environmental impacts	 The repair would prevent the long-term contamination of the coastal water by preventing soil erosion into the ocean. During construction, a BMP plan may prevent contaminants from entering the ocean, but there may be a risk of sediments entering the water due to wave conditions. Limiting work to favorable conditions would reduce the risk. The beach nourishment plan may mitigate end erosion effects of the revetment on the adjacent sandy beach. The costs below do not include beach nourishment.
Capital costs	~ \$2.0 million
50 year total costs	~ \$2.9 million
Operation and maintenance	 This option would avoid a long-term land use agreement with DHHL. This repair is a permanent solution. The revetment may require repairs after large weather events. Roadway maintenance may be required about every 15 years and could cost about \$200,000 for each occurrence. Revetment repairs may be required about once every 50 years and could cost about \$200,000 per occurrence. Total 50-year O&M costs combine to about \$0.9 million.
Community acceptance	 This option avoids DHHL lands. Some community members view this option as a practicable means of providing access to the neighborhood while keeping the road in its current narrow condition. Some community members are concerned that the narrow road would be a safety risk.
Timeline and ease of implementation	• The project may require two years to complete. This alternative would be a design change for a shoreline protection project that the DLNR has previously approved.

2.4 Mauka Realignment of 'Aliomanu Road

Realignment of 'Aliomanu Road would involve constructing a new roadway located mauka, approximately 300 feet inland of the existing road as shown by the red line on the map in Figure 5. The new road alignment would run along the ridgeline above the existing 'Aliomanu roadway (Figure 8). The new road alignment would be entirely on DHHL land and would require a long-term land use agreement. The proposed location is along a steep rocky slope. The design would likely follow the



existing contours to limit grading. The steep terrain would require the design and construction of slope stability and retaining structures to support the roadway, which would add to project costs.



Figure 8. Looking north along 'Aliomanu Road showing a conceptual alignment of a new mauka roadway.

Construction of this alternative may include about 1,350 linear feet of grading, grubbing, slope stability, and roadway construction through the hillside. The estimated construction cost for capital improvements is \$3.3 million. The roadway would require repairs every 20 years at approximately \$700/LF, \$945,000 per project. Slope stability measures would require inspection and maintenance estimated at \$300,000 per project at an interval of 20 years. Total operation and maintenance costs combine to about \$3.1 million over a 50-year period.

The option for a realignment of 'Aliomanu Road mauka through DHHL property is not popular with the DHHL community. This alternative is not viable because there is no support to build this road on Hawaiian Homes' property. Table 4 provides a summary of the discussion on the mauka realignment of 'Aliomanu Road.

Table 4: Summary of the Alternative for a Mauka Realignment of 'Aliomanu Road

Table 1. Summary of the Internative for a Madria Realignment of Informatic Road			
<u>ISSUES</u>	<u>DESCRIPTION</u>		
Provide reliable, safe roadway access	• This option would restore full use of 'Aliomanu Road and provide permanent, reliable and safe access to residents.		
Coastal and environmental impacts	• Would require clearing of the existing vegetation on the hillside and disruption of the natural coastal landscape.		
	• Project avoids armoring of the shoreline		
	• The exposed shoreline may continue to erode soil into the ocean waters.		
	• A beach nourishment plan may or may not be included in this alternative. The costs below do not include beach nourishment.		
Capital costs	~ \$3.3 million		
50 year total costs	~ \$6.4 million		
Operation and maintenance	• This solution aims to avoid coastal erosion issues in the near future.		
	• The slope may be prone to erosion or rock falls requiring maintenance.		
	 Retaining walls and a drainage culvert may be required. Roadway maintenance may be required about every 20 		
	years and could cost about \$945,000 for each occurrence.		
	• Retaining wall repairs may be required about once every 20 years and could cost about \$300,000 per occurrence.		
	• Total 50-year O&M costs combine to about \$3.1 million.		
Community acceptance	• A long-term land use agreement for DHHL property would be required.		
	• There are cultural concerns, such as burials, associated with developing a road through the coastal hillside.		
	• The Hawaiian Homes community does not support this option.		
Timeline and ease of implementation	• The project may require about three to four years for completion.		

2.5 Bridge Connecting North and South Ends of 'Aliomanu Road

The County has the alternative to reconstruct a bridge to connect the north and south portions of 'Aliomanu Road and create a discontinuity at the currently eroding area. A bridge once crossed the stream in this area (Figure 9). In meetings held for this FEA, community members recalled that a past hurricane or tsunami event destroyed the original bridge. The blue line on Figure 5 shows the location of the bridge alternative. This option consists of investigating the previous bridge design failure, designing a new bridge and building the structure. The design of a new bridge requires hydrologic and hydraulic study of the stream and its watershed. Time would be required to conduct engineering studies and make design recommendations. A new bridge design would account for the risk of



flooding and channel erosion caused by large storm events. Construction of the structure might fit within the existing road right of way and may not require additional land purchase or agreements. Construction of the bridge would provide full access to the neighborhoods along 'Aliomanu Road, but would alter the existing character by moving the road discontinuity from the bridge location to the currently eroding area.

The estimated cost of construction for a new bridge is between \$2.7 and \$6 million based on comparison of the recent construction cost information published by the State Procurement Office for the Keāhua Forest Reserve Bridge on Kaua'i [7] and the Kawela Stream Bridge on Moloka'i [8]. The cost would largely depend on the required length, width, height, foundation and construction materials. The cost of a bridge may be in the higher range because it would be in the coastal environment. Corrosion resistance of the construction materials would be a design issue. The bridge may also be of significant size because storm forces and flood volumes are typically high in the coastal zone. A detailed planning and design study would be required to refine the cost estimate and the expected timeline for this option.

Post-construction, annual bridge inspections may occur once per year at a cost of \$10,000 per inspection. Bridge repairs may occur at a frequency of 20 years at \$750,000 per repair project. Total estimated operation and maintenance costs combine to about \$2.4 million over a 50-year period. Table 5 provides a summary of the discussion on this alternative.



Figure 9. Photograph looking across 'Aliomanu stream at the site of the bridge alternative.

Table 5: Summary of the Bridge Alternative

<u>ISSUES</u>	<u>DESCRIPTION</u>
Provide reliable, safe roadway access	• This option would provide permanent, reliable and safe access to 'Aliomanu Road residents.
Coastal and environmental impacts	• The bridge project would require in-stream construction work. A BMP plan may minimize the environmental impacts of this work.
	• The exposed shoreline at the damaged road may continue to erode soil into the ocean.
Capital costs	Between \$2.7 million to \$6 million based on construction costs for recent roadway bridge projects in Hawai'i. A planning study is required to refine the design details.
50 year total costs	\$5.1 to \$8.4 million
Operation and maintenance	• This solution avoids the shoreline erosion area, but it exposes the roadway to stream flood hazards.
	• The annual inspection costs may be about \$10,000 per year.
	• Bridge repairs may be required about every 20 years and could cost about \$750,000 for each occurrence.
	• Total 50-year O&M costs combine to about \$2.4 million.
Community acceptance	• This option would change the character of two existing cul-de-sac neighborhoods. The community has expressed concerns over the potential to disrupt the public access to the beach, but some in the community are supportive of rebuilding a bridge in this area.
Timeline and ease of implementation	• The bridge project may require about four to eight years for completion depending on design recommendations.

2.6 Extend Hokualele Road to Connect with 'Aliomanu Road

The alternative of extending Hokualele Road to connect with 'Aliomanu Road is shown by the orange line in Figure 5. This option would require an easement through DHHL lands to allow the DHHL owned Hokualele Road to become a County road. About 2,050 LF of grading, grubbing, slope stability and roadway construction may be required along with improvements to the existing 1,980 feet of Hokualele Road to meet county standards (Figure 10). The cost of construction for this project alternative may be about \$3.2 million. Road maintenance projects would be required approximately every 30 years at an estimated \$2.7 million. Total operation and maintenance costs combine to about \$4.6 million over a 50-year period.

The DHHL community is not supportive of this option because providing access to 'Aliomanu Road through Hokualele Road may significantly change the character of the rural farming neighborhood by increasing public traffic (Figure 11). Section 4 of this FEA provides more information on the community perception of this option. Table 6 provides a summary of the discussion on this alternative.





Figure 10. Photograph of the end of Hokualele Road looking west toward the Kūhiō Hwy.



Figure 11. Photograph of the posted warnings at the end of Hokualele Road.

Table 6: Summary of the Hokualele Road Connection Alternative

<u>ISSUES</u>	<u>DESCRIPTION</u>
Provide reliable, safe roadway access	• This option may provide permanent, reliable and safe access to residents.
Coastal and environmental impacts	• Would require clearing of the existing vegetation and disruption of the natural coastal landscape.
	• The existing erosion on the shoreline may continue to release soil into the ocean.
Capital costs	~ \$3.2 million
50 year total costs	~ \$7.8 million
Operation and maintenance	• This is considered a permanent solution with little operation and maintenance over the life of the structure.
	• A road repair project may be necessary once every 30 years and could cost about \$2.7 million.
	• Total 50-year O&M costs combine to about \$4.6 million.
Community acceptance	• A land easement with DHHL would be required.
	• The Hawaiian Home Lands community does not support this alternative.
Timeline and ease of implementation	• The project may take about four to five years.

2.7 Extending Private Drive to Connect with 'Aliomanu Road

Another alternative means to provide access to the 'Aliomanu community involves developing a road through private land from Kūhiō Highway to connect with 'Aliomanu Road (Figure 12). A potential route is along an existing gravel drive on private agricultural land about 800 feet north of Hokualele Road. The new road would require significant grading, grubbing, slope stability, and roadway construction to connect 'Aliomanu Road with the existing gravel drive and to relocate utilities as shown by the yellow line on Figure 5. To develop the project, the County would require a large purchase of private property. The estimated cost of this alternative includes land purchase cost from published property tax records. The private property owners may oppose the acquisition of their land for a new public roadway. The community did not support this option during public meetings. Section 4 provides more information on the community perception of the alternatives.

The construction of this alternative may cost about \$4.2 million. Road maintenance projects may be required approximately every 30 years at an estimated cost of \$2.7 million. Total operation and maintenance costs combine to about \$4.5 million over a 50-year period. Table 7 provides a summary of the discussion on this alternative.





Figure 12. Photograph looking east along the entrance to a private drive along Kūhiō Hwy.

Table 7: Summary of the Alternative to Connect 'Aliomanu Road through a Private Road

<u>ISSUES</u>	<u>DESCRIPTION</u>
Provide reliable, safe roadway access	• This option may provide permanent, reliable and safe access to residents.
Coastal and environmental impacts	 Would require clearing of the existing vegetation and disruption of the natural coastal landscape. The existing erosion on the shoreline may continue to release soil into the ocean.
Capital costs	~ \$4.2 million
50 year total costs	~ \$8.7 million
Operation and maintenance	 This may be considered a permanent solution with little operation and maintenance over the life of the structure. A road repair project may be necessary once every 30 years and could cost about \$2.7 million. Total 50-year O&M costs combine to about \$4.5 million.
Community acceptance	 Would require securing private property. The private property landowners may oppose. The community objects to the option.
Timeline and ease of implementation	• The project may require about four to five years for completion.



3. WATER LEVEL CHANGE

The following sections provide a discussion of the expected changes to ocean water level and a comparison of how each project alternative may help mitigate or adapt to the increased erosion and flooding hazards that are expected with the rise in sea levels.

3.1 Expected Future Water Level Change

Water level measurements within closest proximity to the site are available from the U.S. National Oceanic and Atmospheric Administration (NOAA) tidal station located at Nāwiliwili, Hawai'i (Station ID: 1611400) [6]. The tide station datum defines the range in water levels at the site: Mean Higher-High Water (MHHW) is 1.01 ft. above Mean Sea Level (MSL), while Mean Lower-Low Water (MLLW) is 0.82 ft. below MSL. Removal of the short term water level fluctuations from the water level recorded by station 1611400 from 1955 to 2016, the historic trend in sea level at the project site shows a rise at a rate of 1.52 \pm 0.44 mm/year (Figure 13).

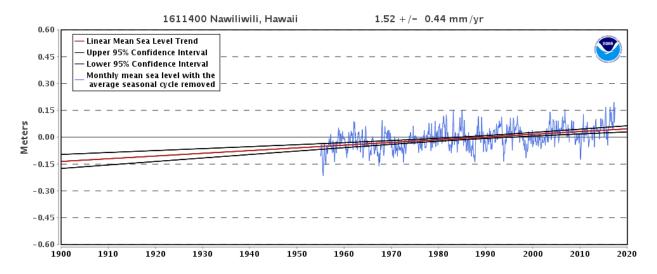


Figure 13: Mean sea level trend with the short term fluctuations removed from the recorded water levels by the NOAA tide gauge 1611400 in Nāwiliwili [6].

The United States Army Corps of Engineers (USACE) Sea-Level Change Curve Calculator [7] applied the data from gauge 1611400 to calculate the expected relative sea level change over the expected lifecycle of the project. According to both NOAA and USACE data, the sea level rise (SLR) predictions at the site vary between a low of 0.4 feet and a high of 3.5 feet by 2070 compared to the sea levels in 1992 as illustrated in Figure 14. The data plot shown in the figure starts in 1992, which corresponds to the midpoint of the current National Tidal Datum Epoch of 1983-2001. The Kaua'i County General Plan departmental draft published on June 13, 2017 suggests a planning target of at least three feet of sea level rise [8]. Similarly, the Hawai'i Climate Change Mitigation and Adaptation Commission has recommend a planning target of 3.2 feet of sea level rise [9].



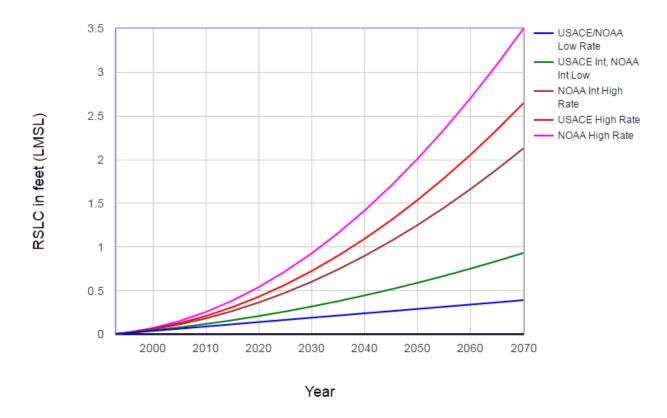


Figure 14: Relative sea level change projections from 1992 to 2070 for NOAA tide gauge 1611400 in Nāwiliwili [6]

3.2 Sea Level Rise Impact on Project Area

To visualize the potential impacts of 3.2 feet of sea level rise on the project area, a "bathtub" model of passive flooding was created by raising the static water level over a digital topographic map. Data on the existing elevations of the land relative to the mean sea level (MSL) [6] was used to identify areas with elevations between 0.0 ft. MSL and 4.21 ft. MSL (MHHW+3.2 ft. SLR). These area were shaded pink in Figure 15 to represent the land that may be flooded by high tide after SLR.

This static model of SLR does not take into account future erosion or increased wave inundation. The Hawai'i Sea Level Rise Vulnerability and Adaptation Report [9] provides an assessment of SLR that includes these impacts on the project area. The shaded blue area in Figure 16 is the expected "SLR exposure area", which accounts for passive flooding, annual high wave flooding and expected coastal erosion. The following sections discuss the impacts of SLR on each project alternative and compare how each alternative may help mitigate or adapt to the increased erosion and flooding hazards.

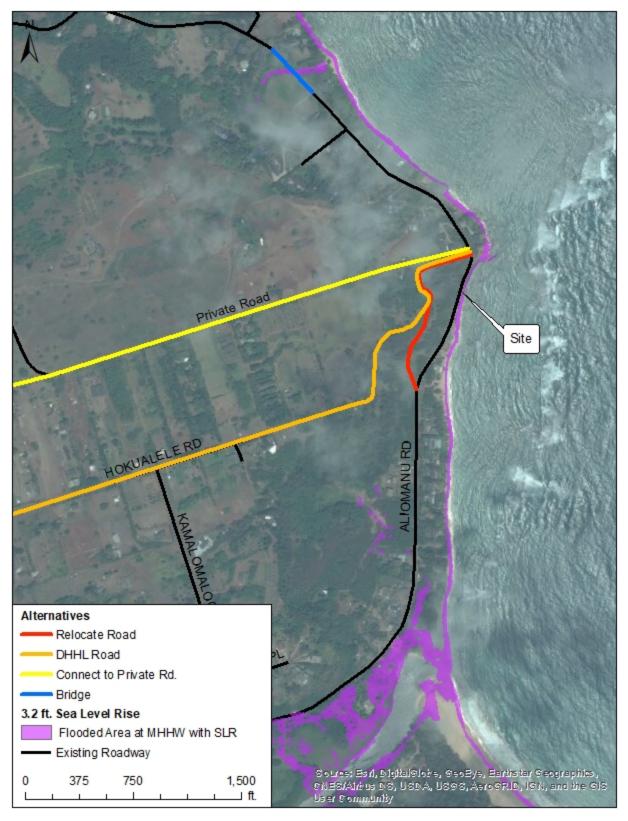


Figure 15: Map of the project area and proposed project alternatives showing the area of expected passive flood inundation during high tide after a static sea level rise of 3.2 feet.

'Aliomanu Road Repair Final Environmental Assessment



Figure 16: Map of the project area showing the area of expected passive flooding, annual high wave flooding and coastal erosion under a 3.2 feet sea level rise scenario [9].

3.2.1 No Action

While the extent of the future flooding and erosion will ultimately be determined by the measures taken to protect the coast, Figure 15 and Figure 16 provide a comparison of the potential impacts of SLR on the area. SLR will decrease the buffer between the Aliomanu Road and the ocean. While the existing roadway in the project area is sufficiently elevated to avoid passive flooding after 3.2 ft. of SLR, coastal erosion and waves may expose the project area to increased risk of flooding if no action is taken to mitigate SLR impacts (Figure 15). South of the project site, near the mouth of the Anahola Stream, SLR may cause nuisance flooding along portions of the existing roadway (Figure 15) and future erosion and waves could expose much of this area to SLR (Figure 16). Kaua'i County, DHHL and other property owners need to consider a plan to adapt to SLR in these low laying coastal neighborhoods. If Kaua'i County takes no action, SLR will likely lead to increasing shoreline erosion, which may further damage the roadway. This option does not help mitigate or adapt to the increased erosion and flooding hazards that are expected with SLR.

3.2.2 Proposed repair and revetment at the project site

The design for the road repair helps to mitigate the increased erosion and flooding hazards that are expected with SLR. The repair design that includes a revetment will stop the shoreline erosion in the project site. The design will also prevent wave swash from flooding the roadway. An elevated curbwall will separate the roadway from the rock revetment along the shoreline. The minimum elevation of the curbwall will be 10.3 feet above MLLW or 8.5 feet above MHHW. Accounting for the State's recommend 3.2 feet sea-level rise planning target, in the future the curbwall will be 5.3 feet above water level during MHHW. The elevation is sufficient to prevent waves from flooding the road except under the most extreme conditions.

3.2.3 Repair 'Aliomanu Road into a single lane at the project site

Like the proposed repair in 3.2.2, the elevation of the road and the curbwall will be sufficient to withstand the impacts from the recommended sea level rise of 3.2 feet. Therefore, the option of repairing the 'Aliomanu Road to a single lane is a viable alternative to mitigate the increased erosion and flooding hazards that are expected with SLR.

3.2.4 Realignment of 'Aliomanu road mauka of site

Realigning the road mauka of the site will not prevent the increased erosion expected with SLR. However, this alternative moves the road away from the potential wave erosion area to a higher elevation. Therefore, this option does not help mitigate or adapt to the increased erosion and flooding hazards that are expected with SLR.

3.2.5 Rebuild a bridge to connect the north and south ends of 'Aliomanu Road

The bridge alternative will not prevent the increased erosion expected with SLR. The bridge and roadway can be designed so that it is not affected by the increased flooding expected with SLR. Therefore, this option does not help mitigate or adapt to the increased erosion and flooding hazards that are expected with SLR.



3.2.6 Extend Hokualele Road to connect with 'Aliomanu Road

The option of extending Hokualele Road to connect with 'Aliomanu Road will not prevent the increased erosion expected with SLR. The alternative will avoid the coastal area that may experience increased flooding with SLR. The SLR will not adversely impact this option. Therefore, this option does not help mitigate or adapt to the increased erosion and flooding hazards that are expected with SLR.

3.2.7 Pave and extend a private gravel drive to connect with 'Aliomanu Road (yellow line)

The option of building this new road to connect with 'Aliomanu Road will not prevent the increased erosion expected with SLR. The alternative does avoid the coastal area that may experience increased flooding with SLR. The SLR will not adversely impact this option. Therefore, this option does not help mitigate or adapt to the increased erosion and flooding hazards that are expected with SLR.

4. COMMUNITY MEETINGS

The County of Kaua'i held meetings to discuss the road repair alternatives with the community and to gage public opinions on the options. The first meeting was with the DHHL beneficiaries living in the Anahola area. The second meeting was open to the public.

Prior to the public meetings, the County and Oceanit consulted with Department of Hawaiian Home Lands (DHHL) staff to discuss the project and potential issues that may arise within the Hawaiian Home Lands community. DHHL expressed concern with the source of the stones for the construction of the proposed revetment. It was agreed that the issue could be resolved by stipulating in the construction plans that the contractor must not source the stones from culturally important sites and that the source of stone would require the County's approval prior to construction. Also raised was the potential to disturb cultural remains such as *iwi* (ancient human skeletal remains), especially if the County decides to develop a new road on the undeveloped inland areas. Archeological survey and monitoring plans may resolve this issue. Overall, the DHHL staff felt that repair of the existing road was the best option.

On March 29, 2017, the County of Kaua'i held a meeting with the beneficiaries living on the DHHL lands in Anahola. Nine DHHL lessees attended the meeting. The County presented the alternatives detailed in this FEA and sought feedback. The County was particular interested in the community perception on whether road development in or near the DHHL neighborhood was seen as a positive or negative option. Overall, the community opposed the new road development alternatives and was supportive of the existing road repair and/or the bridge replacement options.

A second community meeting took place on April 25, 2017. This meeting was open to the public. Fifty-two (52) residents including twenty-two (22) DHHL lessees attended. The County presented the alternatives and discussed any public comments and questions. Towards the end of the evening, the



community showed their support for the various options by a show of hands vote (Figure 17). The majority of those present supported the road repair option, while a few supported the option of a new bridge; there was no community support for developing a new roadway. Materials from these meetings are included in the Appendix A of this SEA report.



Figure 17. Show of hands vote in support of the proposed option of repairing the 'Aliomanu road, which includes coastal armoring. Photograph taken by the County during a public information meeting held on April 25, 2017 in Anahola, Kaua'i.

5. CONCLUSION AND DETERMINATION

This FEA presents several options to provide safe and reliable access to properties that may lose roadway access and public utilities should the existing damage to the 'Aliomanu road continue to worsen. Considering the potential environmental impacts, total costs and project timelines of the alternatives (Table 8), the County of Kaua'i, Department of Public Works prefers to repair the damaged section of 'Aliomanu Road in its existing location and restore two-lanes of roadway. The project includes armoring the coastline with a boulder stone revetment. The County is developing a beach nourishment plan for the coastal armoring area that will undergo environmental permitting as a separate project. The road repair design will mitigate the increased erosion and flooding hazards that are expected with Sea Level Rise. The County can complete the preferred repair alternative relatively quickly and economically, while also limiting the environmental and socio-economic impacts to the surrounding community. The Anahola community has shown strong support for the road repair option during recent public information meetings regarding this FEA.

Based on the review of the Draft Environmental Assessment and analysis of significance criteria, the County of Kaua'i Department of Public Works is filing this Finding of No Significant Impact (FONSI).



Table 8: Summary of the Alternatives for 'Aliomanu Neighborhood Access

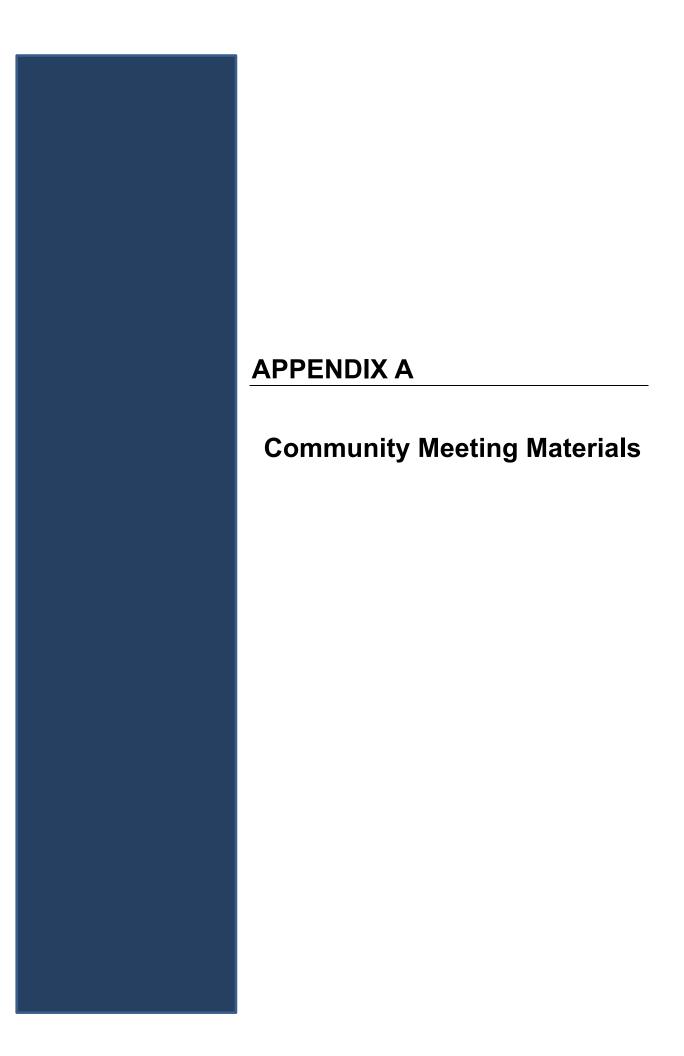
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		TOTAL FO VE AR	ТОТАТ		
	<u>CAPITAL</u>	<u>50-YEAR</u> <u>O&M</u>	TOTAL PROJECT	<u>PROJECT</u>	
<u>ALTERNATIVE</u>	<u>COST</u>	COST	COST	<u>TIMELINE</u>	<u>NOTES</u>
No Action		\$4.4M	\$4.4M	N/A	Unaddressed hazard to
					public safety. If road
					becomes impassable due
					to severe storm or SLR,
					costs will be much greater.
Proposed repair	\$2.2M	\$1.0M	\$3.2M	~2 yrs.	Restores original two-lane
and revetment					road. Prevents pollution.
					Coastal armoring with
					beach nourishment plan.
Convert	\$2.0M	\$0.9M	\$2.9M	~2 yrs.	No DHHL land required.
'Aliomanu Road					Constricted route for
to a single-lane					emergency and evacuation
					access. Coastal armoring
					with plan for beach
					nourishment.
Realignment of	\$3.3M	\$3.1M	\$6.4M	~3-4 yrs.	Requires DHHL lands and
'Aliomanu road					approval. Develops
mauka					natural coastal landscape.
					DHHL lessees opposed.
Rebuilding bridge	\$2.7M -	\$2.4M	\$5.1M -	~4-8 yrs.	Connects two cul-de-sac
connecting both	\$6M		8.4M		neighborhoods. Separates
sides of					DHHL from other
'Aliomanu Road					community. Prevents
					shoreline armoring.
					Previous bridge failed and
	****	*	*= 03 5		additional studies required.
Extend	\$3.2M	\$4.6M	\$7.8M	~4-5 yrs.	Requires DHHL lands and
Hokualele Road					approval. Develops
to connect with					natural coastal landscape.
'Aliomanu Road	\$4.03. £	ቀ ለ ፫ አ ጠ	¢0 71 r	4 . 5	Community opposed.
Extend private driveway to	\$4.2M	\$4.5M	\$8.7M	~4-5 yrs.	Requires securing private property. Separates
connect with					DHHL from other
'Aliomanu Road					community. Community
momanu Road					opposed.
					оррозец.



6. REFERENCES

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Meeting Notes

Date: March 29, 2017

Time: 6:00 p.m

Location: Anahola Clubhouse

Project: 'Aliomanu Road Repair

Subject: Discussion with the Department of Hawaiian Home Lands community in

Anahola on the Alternatives for Repairing the Aliomanu Road

Attendees:

DHHL:

Robert Freitas (RF), Nancy McPherson (NM), Erna Kamibayashi (EK), Kaipo Duncan (KD)

Kauai County:

Don Fujimoto (Kauai County, DF), Michael Moule (Kauai County, MM)

Oceanit:

Dayan Vithanage (Oceanit, DV)

Community members:

Wini Fred Ku'ulei Smith; Leiola Kamalani Oliver; Elizabeth Goo; Dennis Neves; Tory Simons; L. Haulani Fernandez; (handwriting not legible); Nailani Kameaheu;

Elise Gavitt

Discussion Items:

- 1. Since the time of the Aliomanu Road temporary repair, the law has changed and now an alternative assessment is required for shoreline armoring projects. This meeting is to present the findings of the study and discuss the alternatives with the Department of Hawaiian Home Lands (DHHL) community.
- 2. A portion of the road was constructed on Hawaiian Home Lands. The County hopes to repair the road to what was existing since the 1940s, which would involve a small portion of the DHHL land.
- 3. Kauai County and Oceanit presented a PowerPoint on the alternatives assessment including repairing the existing road, moving the road to a new mauka alignment, constructing a new bridge, connecting Aliomanu Rd. with Hokualele Rd., and extending the Aliomanu Road to the highway through private property.
- 4. Questions and comments from the DHHL community included:

- a. How much land has been lost due to the erosion?
- b. Why has it taken so long to do this road repair?
- c. What is a revetment? How long will the repair last? What the impact be on the beach?
- d. Who lives at the end of the road and how does this project benefit Hawaiian Homes? Will there be negotiation on the terms of using DHHL land?
- e. Could you rebuild the road a few feet inland to buy more time against the erosion instead of building further mauka on virgin land where there may be concerns with seabirds, owls, iwi, etc.?
- f. One community member expressed concern over where beach visitors will park.
- g. The option of connecting Aliomanu rd. with Hokualele rd. is "out". Several community members voiced opposition to this option and to the option of developing a road through the large private lot.
- h. Reconstructing the bridge is a good idea to provide an additional route for emergency evacuation; it is just a matter of time and money. This option would also change the character of the natural stream environment.
- i. The County could help DHHL by moving sand out of the Anahola River mouth and up to road repair area as a condition of the use of DHHL property.
- j. A community member suggested that there are other places in the Anahola community where the County could potentially help DHHL with repairs or improvements.
- 5. The County will invite the DHHL community will to the public informational meeting in April.
- 6. Oceanit has already completed an environmental assessment for this project. A supplemental document with information on alternatives and sea-level rise is being prepared. Information from this meeting will be included in the new document.
- 7. The meeting was recorded and Oceanit has prepared a written transcript documenting the meeting.

Action Items:

- Kauai County and Oceanit will present this information at the public informational meeting in April 25, 2017.
- Oceanit will summarize the community feedback from these two meetings in the Final Environmental Assessment (FEA).

COMMUNITY INFORMATIONAL MEETING SIGN-IN SHEET

EVENT 'Aliomanu Road Repair, Anahola

DATE Wed. March 29, 2017

(Please print)			
NAME	SIGNATURE	E-MAIL	TELEPHONE
Winikhulei Smith	Mini Leulei Smith	wkstata@hauaii.rr.com	(808) 8231228
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DENVIS MENES		Discussification	346-2568
Tay Xmac			8888-169
L. HALLANI FERMANDEZ	Synthe A. Forwarder	upjetjimkok Yahoo.ea	639-4176
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Kalani Kamashin	Me	hoka/ei8080 live com	
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Public Meeting Notice April 25, 2017



ALIOMANU ROAD REPAIR ENVIRONMENTAL ASSESSMENT ALTERNATIVES ANALYSIS

Public Meeting Anahola Neighborhood Center Kawelo Street, Anahola, Kauai Tuesday, April 25, 2017; 6:00 PM to 8:00 PM

The Kaua'i County Public Works Department will provide an update on alternatives to the road repair based on global warming and rising sea level. The public is invited to provide feedback on the various options.

- Repair Existing Road Erosion
- Mauka Realignment
- Reconstruct Bridge
- Tie into Hokulele Roadv- Mauka
- Tie into Private Road Mauka

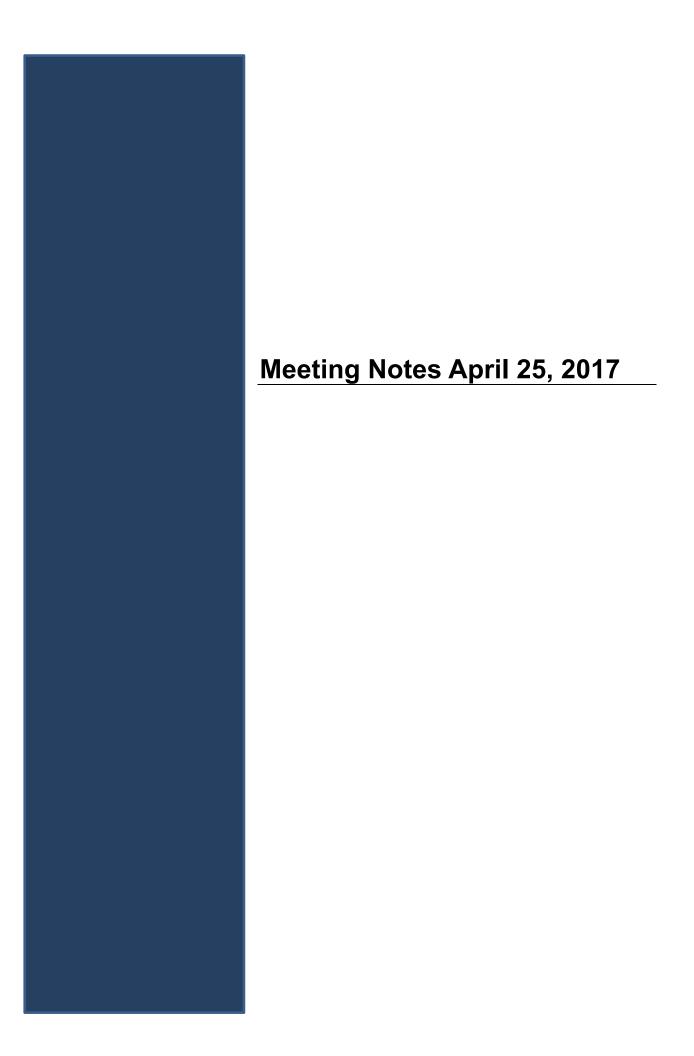
If you need an ASL interpreter, materials in an alternate format or other auxiliary aide support or language assistance, contact Donald Fujimoto at (808) 241-4882 or dfujimoto@kauai.gov at least 5 days before the meeting.



Doors Open at 6:00 PM

Presentation at 6:15 PM







Meeting Notes

Date: April 25, 2017

Time: 6:00 p.m

Location: Anahola Clubhouse

Project: 'Aliomanu Road Repair

Subject: Discussion with the Department of Hawaiian Home Lands community in

Anahola on the Alternatives for Repairing the Aliomanu Road

Attendees: Kauai County:

Don Fujimoto (Kauai County, DF), Michael Moule (Kauai County, MM)

Oceanit:

Mike Foley (Oceanit, MF)

DHHL:

Robert Freitas (RF), Nancy McPherson (NM), Erna Kamibayashi (EK) Community members (Sign In Sheet Attached):

Lily Yamamoto, Armin Rapaport, Tilly Kanekolani, Kim Kain, Mark Pomstouh, Terilynn Makanani, Chad Rapozo, Sal Marti V, Leiola Kamalani Oliver, Wehi Nakano, Nick Wilke, Lindyl Laniham, Nalani Kaneakua, Jeff Fremine, Candace Kleven, Kimo Aluli, Jim Liesse, Sat Rattan Khalsa, Maybelle K Kaia'a, Franth Coatride, Yvonne Stoner, Steve Stoner, Clyde & Oma, Aggie Marti-Kimi, Lahaina Grance, Joseph H Kaaukiai, Cindy Griffin, Gary Dueret, Luella Lemn, Colleen Kohlsaat, Hari Khaisa, Robin Young, Rich Young, Vaclav Burger, Iris Caycayon, Mahealani Hookane, Larry Arruoa, Donna Bodine, Joel Madrazo, Wini Smith, Jesse Reiff, Dan Kallai, Kuulei W, Sue Strickland, Greg Strickland, Malia Locey, Bonnie Morris, D Manaka, Kaee Ahloo

Discussion Items:

- Introduction by MM and DF to state that the reason for this public information
 meeting is to discuss the alternatives that the County has considered during the
 design phase of this road repair project and to review the proposed repair plan
 including a rock revetment along the shoreline.
- 2. MF presents about the history of the project, existing site conditions and issues, and alternatives evaluated (Presentation slides attached).
- 3. Comments and questions from the community members present at the meeting are received by MM, DF and MF.

4. Consensus reached among the community members in attendance that the proposed road repair is their preferred alternative. A brief discussion of the associated design parameters ensued, mainly focusing on whether the County should repair the road to have one or two lanes.

Comments/Questions:

- A community member commented that he does not believe public funds should be used to fix the road when he is not allowed to access the lands at the end of the road and the river. He believes the homeowners should be responsible for the road repairs. He then left the meeting without awaiting a response.
- 2. Q: How wide does a road need to be?
 - A: Minimum ~10 feet for safe access, however, the County intends to replace the roadway to its original width. With the width that remains now, access for emergency vehicles and garbage trucks still exists, however, if we do nothing and let it continue to erode then the passage of larger trucks becomes dangerous.
- 3. Q: What types of archaeological surveys were done?
 - A: The proposed construction will include an archaeological monitoring plan. The area immediately under the existing road is fill material and will likely not contain items of archaeological significance. If the County pursues another option such as rerouting the road mauka, additional archaeological studies will be required.
- 4. Q: The original EA was published in 2009, what has happened since then?
 A: Environmental studies were conducted as part of the permit requirements. County funds are earmarked for FY19 for the repairs project. Temporary sandbag installations will occur as necessary until the repairs project commences.
- 5. A community member suggested that the County use sand from the north side of the Anahola river mouth for the beach nourishment plan associated with this project because flooding is a concern. She stated that the roadway adjacent to the stream flooded after the County used sand from the south portion of the stream mouth for the last emergency erosion response project.
- 6. A community member asserted that the alternative to relocate the road mauka is on Hawaiian Homelands property. There would need to be an agreement in place for any alternatives that include the use of Hawaiian Homelands.
- 7. The alternative to replace the bridge would be a very involved process such as land acquisition, analysis of previous bridge failure, additional studies involving the hydrology and hydraulics of the stream would be needed. The eroding portion of the road would be abandoned. This alternative would be very costly and take longer.

- There was an initial assessment for the bridge replacement alternative in the 2009 EA. There was another bridge replacement project that took place recently that took only 1.5 years and \$2.2M. The estimate for this alternative may be an overestimate.
- 8. Hokulele Rd extension through DHHL property alternative. DHHL is not in favor of the change of the character of the neighborhood by extending the road. The hillside is more like a cliff and it is hard to imagine cutting a road through there. Would large trucks still be able to pass through? Yes, it is feasible but it would be expensive and involve major grading work and retaining walls.
- 9. Can we make this road a single lane because there are only 28 homes past this point in the road? Yes, that's an option.
- 10. A survey of the public support for each alternative was taken by a show of hands: Alternative 1, Repairing the road as is: Very supported (see attached photo). Alternative 2, Realignment of the road mauka: No one likes this alternative, public suggests alternative 1 but making it one lane so that there is no need for DHHL land use. Cutting more into the slope/DHHL property is not supported.

Alternative 3, Bridge: Some support

Alternatives 4 & 5, Roads inland through DHHL/private property: No support

- 11. Alternative 1 is the most popular. There was discussion of having the road one lane vs two lanes and another suggestion of having one lane with a pedestrian walkway as well. The cost for having a one lane vs two lane road is similar because most of the cost is in the protection of the road with a coastal revetment and not the road construction itself. There was debate of having one lane to deter speeding. Tsunami evacuation needs to be taken into account as well since this area is within the evacuation zone. Vacation rentals and tourists speeding down the road is a reason to make it one lane. Is installing speed bumps an option? There is a separate process with the county to request speed bumps and that should be followed.
- 12. The road was a historic pathway.
- 13. MF passed out business cards to receive any additional comments or questions regarding the project through the EA process.

Action Items:

- Oceanit will summarize the community feedback from these two meetings in the Supplementary Environmental Assessment (SEA). The SEA will be completed and published with OEQC.
- The county will take into account all comments and will decide on having one lane vs two lanes as a part of the final design.

Aliomanu Road Repair - Public Meeting, 4/25/17; 6:00 pm to 8:00 pm Anahola Clubhouse,

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13	Lindyl Lanham	4929 Aliomanu	713 859-3582	Lindyl C Homeopathylfo	lston-con
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Aliomanu Road Repair - Public Meeting, 4/25/17; 6:00 pm to 8:00 pm Anahola Clubhouse,

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5 CLYDE & OMA	P.O. BOX 442	431-4883		
6 Aggie Marte-1	Cini P.O. BOX 52	346-0473	3242 Leavergmal	Con
7 Lahaina Grance	Po Bar 30899 Anchola	284-2882	Ggrances @gmail.	
8 OEPH H KARUMAN	tox 623 ANDAHOLA	652-0732		
9 CINDY GRIFFIN	POBOX 30878 ANAHOLA	281-381-9455	GAIFFINCLG@ GMAIL.C	54
10 GARY DUERT	4953 ALIONANO	876-8981	adverst C shegt	bal,
11 Luella Lenn	42 To Anahola R		wounder 17@gnail.co	m
12 Colleen Kohlsa	SOUTB ALIDNAMUR	1 3426461	gopita@como	AST.
13 HATZT KMAISA	PO 640 96763	808353	DRYOSI @ DIZYOS	
14 Robin jours	P.O. B 0x204	508-511-0316		
15 Rich Young	n Hill	727 430-0646		
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Aliomanu Road Repair - Public Meeting, 4/25/17; 6:00 pm to 8:00 pm Anahola Clubhouse,

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Slides of April 25, 2017 Public Information Meeting

Aloha and Welcome

ALIOMANU ROAD REPAIR

PRESENTATION OF PROPOSED ALTERNATIVES TO REPAIRING OF ALIOMANU ROAD

BY: COUNTY OF KAUAI AND OCEANIT





AGENDA

- Background information
- Purpose of project
- Activities conducted to date
 - Topographic surveys
 - Wave analysis and erosion assessment
 - Archaeological studies
- Proposed alternatives and evaluation
- Summary
- Questions and Comments



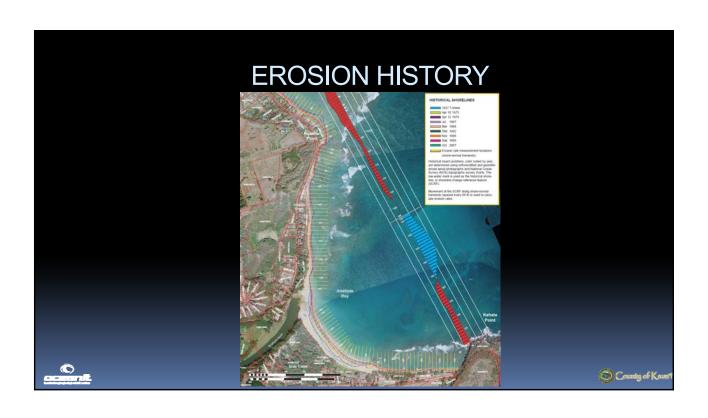


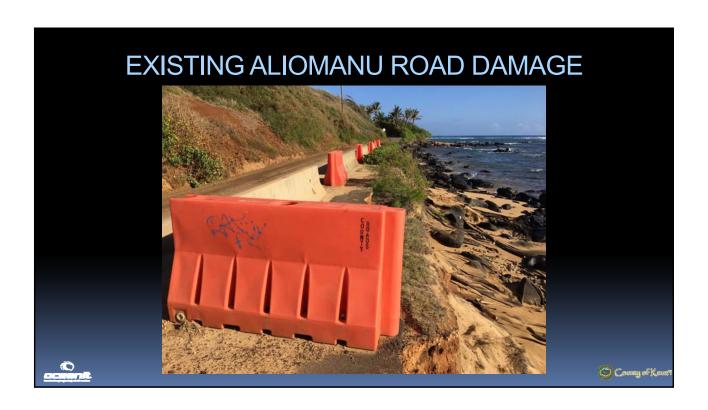
PROBLEM STATEMENT

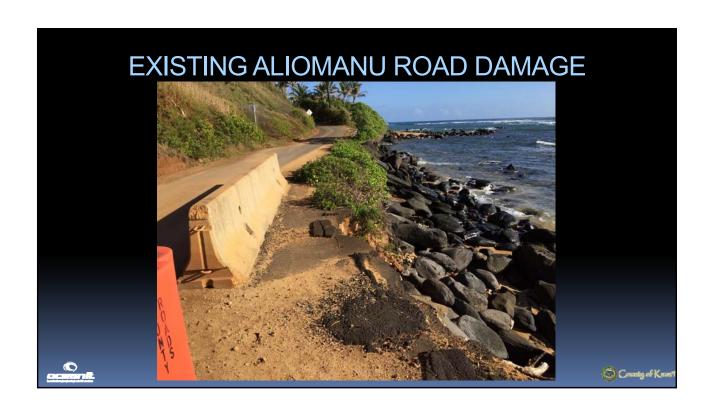
- Aliomanu Road has been eroding for the last decade and currently is posing a safety hazard to users
- Threat to the only means of access to about 28 residences
 - Limited access for emergency vehicles
 - Limited route for evacuation during a hazardous situation
 - Threat to vital utilities (water and electric)

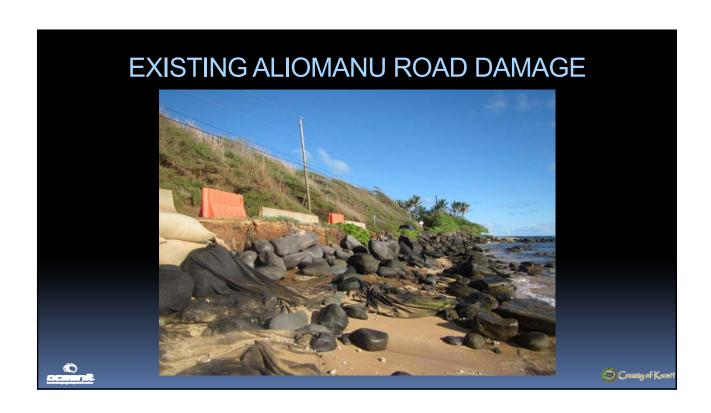


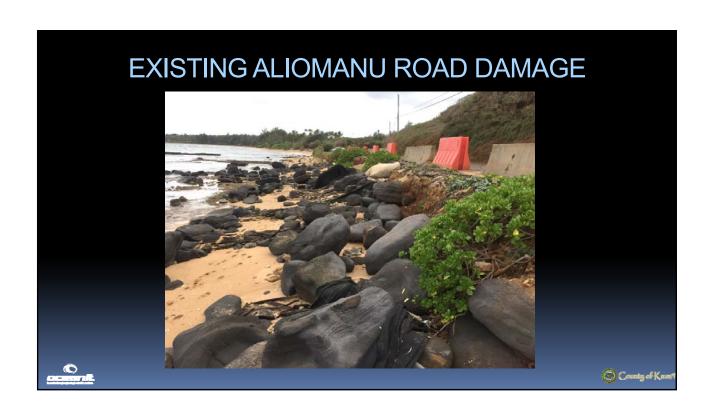


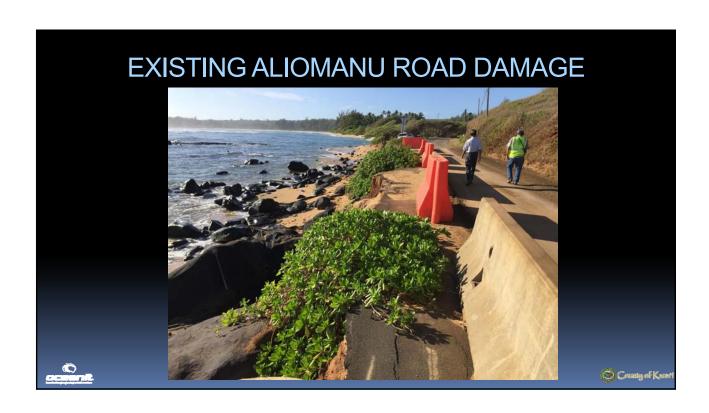












PURPOSE OF THE PROJECT

Provide safe reliable vehicular access to the residents affected by the damage to Aliomanu Road by:

- Accounting for expected change in sea level
- Repairing the existing road and protecting it from future erosion
- Analyzing alternate access routes





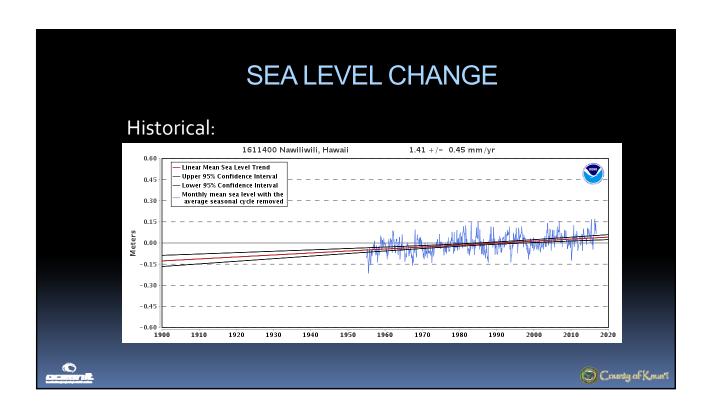
CURRENT PROJECT STATUS

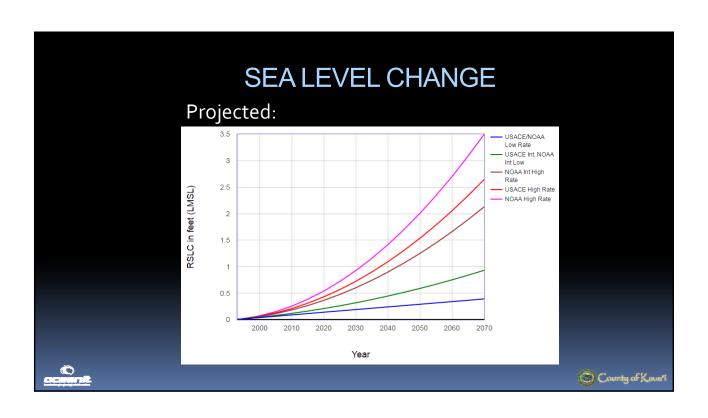
Activities to date:

- Topographic surveys
- Wave analysis and erosion assessment
- Archaeological studies
- Beach nourishment studies
- Supplementary environmental assessment (ongoing)
 - Sea level change studies (ongoing)
 - Alternatives assessment (ongoing)
- Evaluate permit requirements



County of Kaue'i





PROPOSED ALTERNATIVES 1. Repair Road and protect with a revetment (white line) 2. Realign road mauka of existing site (red line) 3. Construct bridge to provide access from north (blue line) 4. Extend Hokulele Road to connect with Aliomanu Road (orange line) 5. Pave and extend private gravel road to connect with Aliomanu Road (yellow line)



1. REPAIR ROAD AND BUILD REVETMENT Location and extent of repair and revetment

1. ROAD REPAIR AND REVETMENT

- Repair the road to condition prior to erosion
- Build an engineered rock revetment to prevent future erosion
- Includes a beach restoration plan
- Improves water quality by stopping soil from eroding into the ocean
- Cost about 2.2 million dollars
- Time to complete project: 2 years







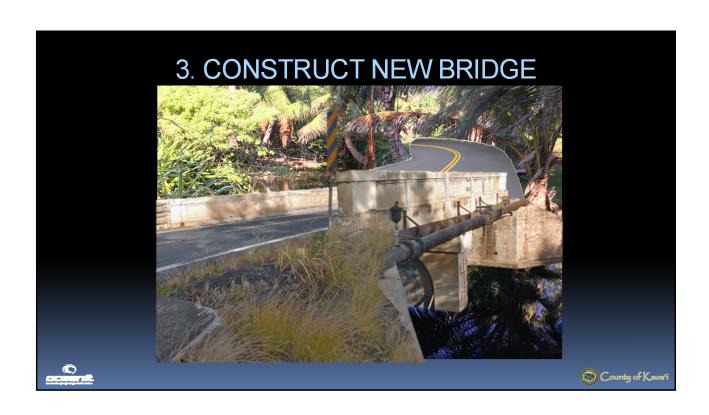
2. MAUKA REALIGNMANT OF ROAD

- Construct a new roadway alignment on the hillside landward of the existing road alignment.
 - Clear vegetation and cut into hillside for road, shoulders and drainage culvert
- Avoids shoreline hardening
- Existing roadway abandoned and soil erosion continues to enter ocean
- Utilizes undisturbed land (potential to disturb cultural sites)
- Cost about 3.8 million dollars
- Time to complete project: 3 to 4 years







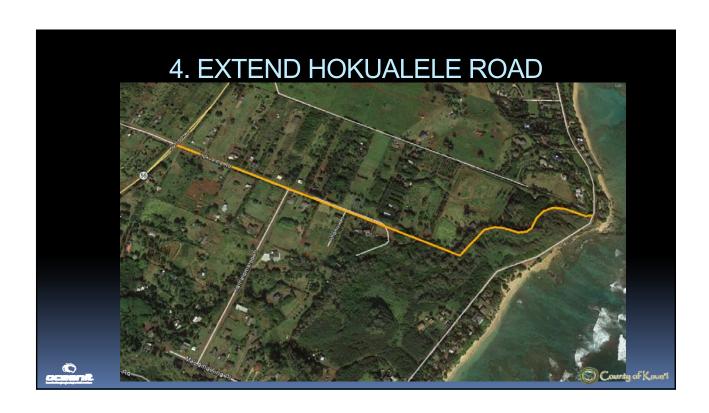


3. CONSTRUCT NEW BRIDGE

- Rebuild the bridge that once connected both ends of Aliomanu Road
- Re-establishes Aliomanu Road as a loop, creating two access ways for residents, and increasing safety during emergencies.
- Disruption to stream environment
- Road right-of-way already in place
- Aliomanu Road will continue to erode
- Cost about 6.3 million dollars
- Time to complete project: 6 to 8 years







4. EXTEND HOKUALELE ROAD

- Change character of the neighborhood.
 Hokualele Road is currently a dead end.
 Connecting the roadway would open the neighborhood to more public traffic.
- Potential impact to cultural sites
- Clearing existing vegetation on hillside
- Require a large tract of DHHL land
- Avoids shoreline hardening.
- Cost about 3.3 million dollars
- Time to complete project: 4 to 5 years







5. EXTEND PRIVATE ROAD

- Changes the character of the neighborhood.
 Private road would become open to public and more traffic.
- Acquisition of private land. Development in between homes.
- Clearing vegetation on hillside and heavy grading to accommodate steep slopes.
- Costs about 4.3 million dollars
- Time to complete project: 4 to 5 years





SUMMARY OF ALTERNATIVES			
ALTERNATIVE	COST	PROJECT TIMELINE	NOTES
No Action		N/A	Unaddressed hazard to public safety.
Repair and revetment	\$2.2M	~2 yrs.	Restores original two-lane road. Prevents pollution. Includes coastal armoring and beach nourishment plan.
Realignment of 'Aliomanu road mauka	\$3.8M	~3-4 yrs.	Requires DHHL lands and approval. Develops through a natural coastal landscape.
Bridge connecting both sides of 'Aliomanu Road	\$6.3M	~6-8 yrs.	Connects two cul de sac neighborhoods. Separates DHHL from other community.
Extend Hokualele Road to connect with 'Aliomanu Road	\$3.3M	~4-5 yrs.	Requires DHHL lands and approval. Develops natura coastal landscape. Changes the character of the community.
Extend private driveway to connect with 'Aliomanu Road	\$4.3M	~4-5 yrs.	Requires securing private property. Changes the character of the community. Separates DHHL from other community.
			© Country of Kasel



Written Comments from Community

Marcia Batcheller Harter PO Box 280 Anahola, HI 96703

April 25, 2017

Mr. Donald Fujimoto Kauai County Planning Commission dfujimoto@kauai.gov

Dear Mr. Fujimoto,

I am writing in response to the proposals for addressing the deteriorating conditions of Aliomanu South in Anahola.

I am pleased to see the most recent Environmental Study and resulting recommendation to improve the existing road. I am unable to evaluate the efficacy of the various strategies for this road repair, but hope that the long term stability of the beach will be a primary consideration when deciding how to proceed with the road construction.

I thank you very much for your efforts on behalf of the people and land of Kauai.

Sincerely yours,

Marcia Harter Kolea91@aol.com



February 23, 2018

Ms. Marcia Harter P.O. Box 280 Anahola, Hawaii 96703

Dear Ms. Harter:

Subject: County of Kaua'i, Department of Public Works (DPW)

'Aliomanu Road Repair

Consultation for Final Environmental Assessment (FEA)

On behalf of DPW thank you for reviewing the Draft EA and providing your comment letter dated April 25, 2017. In response to your comments we offer the following responses.

- After considering potential environmental impacts, total costs and project timelines of seven (7) alternatives, the County of Kaua'i, Department of Public Works has chosen to repair the damaged section of 'Aliomanu Road in its existing location and restore two-lanes of roadway, including supporting the roadway with a boulder stone revetment.
- The long term stability of the beach is a primary consideration for this road repair effort. DPW is developing a beach nourishment plan which would augment the portion of the project where the boulder revetment is proposed.

If there are any questions, please contact Dayan Vithanage at (808) 531-3017 or by email at dvithanage@oceanit.com.

Sincerely,

Dayan Vithanage Project Manager

cc: Department of Public Works – Donald Fujimoto

DAVID Y. IGE



STATE OF HAWAII DEPARTMENT OF HEALTH KAUAI DISTRICT HEALTH OFFICE 3040 UMI STREET

November 1, 2017

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH

JANET M. BERREMAN, M.D., M.P.H., F.A.A.P.
DISTRICT HEALTH OFFICER

DEPARTMENT OF PUBLIC WORKS
ADMINISTRATION

Mr. Donald Fujimoto
P.E. Project Manager
Department of Public Works, County of Kauai
4444 Rice Street
Lihue, Hawaii 96766
Email: dfujimoto@kauai.gov

Dear Mr. Fujimoto,

SUBJECT: Draft Environmental Assessment (EPO 17-256)

Project: Aliomanu Road Repair

Applicant: Department of Public Works, County of Kauai

Based on our review, we offer the following environmental health concerns for your consideration, which needs to be addressed, prior to the Departments' approval:

- 1. Noise will be generated during the construction phase of this project. The applicable maximum permissible sound levels as stated in Title 11, Hawaii Administrative Rules (HAR), Chapter 11-46, "Community Noise Control" shall not be exceeded unless a noise permit is obtained from the State Department of Health (DOH).
- 2. Temporary fugitive dust emissions could be emitted when the project site is prepared for construction and when construction activities occur. In accordance with Title 11, HAR Chapter 11-60.1, "Air Pollution Control", effective air pollution control measures shall be provided to prevent or minimize any fugitive dust emissions caused by construction work from affecting the surrounding areas. This includes the off-site roadways used to enter/exit the project. The control measures include but are not limited to the use of water wagons, sprinkler systems, dust fences, etc.
- 3. The construction waste that will be generated by the project shall be disposed of at a solid waste disposal facility that complies with the applicable provisions of Title 11, HAR, Chapter 11-58.1, "Solid Waste Management Control", the open burning of any of these wastes on or off site prohibited.

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

- 5. Any project and its potential impacts to State waters must meet the following criteria:
 - a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.
 - b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.
 - c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).
- 6. You may be required to obtain National Pollutant Discharge Elimination System (NPDES) permit coverage for discharges of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55).

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

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

Pursuant to Federal Water Pollution Control Act [commonly known as the "Clean Water Act" (CWA)], Paragraph 401(a)(1), a Section 401 Water Quality Certification (WQC) is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may **result** in any discharge into the navigable waters..."

(emphasis added). The term "discharge" is defined in CWA, Subsections 502(16), 502(12), and 502(6); Title 40 of the Code of Federal Regulations, Section 122.2; and Hawaii

Administrative Rules (HAR), Chapter 11-54.

- 8. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 WQC are required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of \$25,000 per day per violation.
- 9. It is the State's position that all projects must reduce, reuse, and recycle to protect, restore, and sustain water quality and beneficial uses of State waters. Project planning should:
 - a. Treat storm water as a resource to be protected by integrating it into project planning and permitting. Storm water has long been recognized as a source of irrigation that will not deplete potable water resources. What is often overlooked is that storm water recharges ground water supplies and feeds streams and estuaries; to ensure that these water cycles are not disrupted, storm water cannot be relegated as a waste product of impervious surfaces. Any project planning must recognize storm water as an asset that sustains and protects natural ecosystems and traditional beneficial uses of State waters, like community beautification, beach going, swimming, and fishing. The approaches necessary to do so, including low impact development methods or ecological bioengineering of drainage ways must be identified in the planning stages to allow designers opportunity to include those approaches up front, prior to seeking zoning, construction, or building permits.
 - b. Clearly articulate the State's position on water quality and the beneficial uses of State waters. The plan should include statements regarding the implementation of methods to conserve natural resources (e.g. minimizing potable water for irrigation, gray water re-use options, energy conservation through smart design) and improve water quality.
 - c. Consider storm water Best Management Practice (BMP) approaches that minimize the use of potable water for irrigation through storm water storage and reuse, percolate storm water to recharge groundwater to revitalize natural hydrology, and treat storm water which is to be discharged.
 - d. Consider the use of green building practices, such as pervious pavement and landscaping with native vegetation, to improve water quality by reducing excessive runoff and the need for excessive fertilization, respectively.

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

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

- National Pollutant Discharge Elimination System (NPDES) permit coverage is required for pollutant discharges into State surface waters and for certain situations involving storm water (HAR, Chapter 11-55).
 - a. Discharges into Class 2 or Class A State waters can be covered under an NPDES general permit only if all of the NPDES general permit requirements are met. Please see the DOH-CWB website (http://health.hawaii.gov/cwb/) for the NPDES general permits and instructions to request coverage.
 - b. All other discharges into State surface waters (including discharges from Concentrated Animal Feeding Operations) and discharges into Class 1 or Class AA State waters require an NPDES individual permit. To request NPDES individual permit coverage, please see the DOH-CWB forms website located at: http://health.hawaii.gov/cwb/site-map/clean-water-branch-home-page/forms/
 - c. NPDES permit coverage for storm water associated with construction activities is required if your project will result in the disturbance of one (1) acre or more of total land area. The total land area includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a larger common plan of development or sale.

 NPDES permit coverage is required before the start of the construction activities.

Land disturbance includes, but is not limited to clearing, grading, grubbing, uprooting of vegetation, demolition (even if leaving foundation slab), staging, stockpiling, excavation into pavement areas which go down to the base course, and storage areas (including areas on the roadway to park equipment if these areas are blocked off from public usage, grassed areas, or bare ground).

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

Although we submit the previously mentioned concerns, the Environmental Planning Office is the Department of Health's authority for the review of environmental assessments and environmental impact statements.

Should you have any questions, please call me at 241-3323.

Sincerely,

Gerald N. Takamura, Chief

Berald W Jahanum

District Environmental Health Program Kaua'i

GNT: DTT

Cc: Environmental Planning Office

Dayan Vithanage, 828 Fort Street Mall, Suite 600, Honolulu Hawaii 96813



January 17, 2018

Mr. Gerald N. Takamura Chief Environmental Health Program, Kauai State of Hawaii Department of Health 3040 Umi Street Lihue, Hawaii 96766

Dear Mr. Takamura:

Subject: Draft Environmental Assessment (EPO 17-256)

Project: Aliomanu Road Repair

Applicant: Department of Public Works,

County of Kauai

Consultation for Supplementary Environmental Assessment (FEA)

This letter is in response to your comment letter dated November 01, 2017, regarding the County of Kauai, Department of Public Work's (DPW) Aliomanu Road Repair. On behalf of the applicant, County of Kauai DPW, thank you for reviewing the DEA and providing comments. We offer the following responses to your comments.

- 1. The FEA evaluated and discussed the project's impacts on health from a broad perspective; including social, economic and environmental determinants of health and well-being. The main impact the project will have on public health is positive in that it will provide a safe and stable road for public use.
- 2. Thank you for providing the environmental planning references. They will be reviewed throughout the design process to provide a sustainable, innovative, inspirational, transparent, and healthy design.

If there are any questions, please contact Dayan Vithanage at (808) 954-4157 or by email at dvithanage @oceanit.com.

Sincerely,

Dayan Vithanage Engineering Director

cc: Department of Public Works, County of Kauai – Donald Fujimoto

DAVID Y. IGE OVERNOR OF HAWAII





STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES OFFICE OF CONSERVATION AND COASTAL LANDS

POST OFFICE BOX 621

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

ROBERT K. MASUDA

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

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

HONOLULU, HAWAII 96809

DLNR:OCCL:.BR

Correspondence KA 18-105

Donald Fujimoto Department of Public Works, County of Kaua'i 4444 Rice Street, Suite 175 Līhue, HI 96766

NOV 2 0 2017

Dear Mr. Fujimoto,

Subject:

Comments on The Draft Supplemental Environmental Assessment for the

'Aliomanu Road Repair Project at TMKs (4) 4-8-018:028 and 029.

The Department of Land and Natural Resources (DLNR), Office of Conservation and Coastal Lands (OCCL) has reviewed the August 2017 Draft Supplemental Environmental Assessment (Draft SEA) for the 'Aliomanu Road Repair Project at Anahola Bay, Kaua'i, TMKs (4) 4-8-018:028 and 029. Oceanit Coastal Corporation (The Applicant) on behalf of the County of Kaua'i is proposing repairs to the damaged two-lane shorefront road and permanent shoreline armoring (boulder revetment along approximately 387 feet of shoreline) to protect the road from long-term shoreline erosion. The Draft SEA was prepared to update an Environmental Assessment published in September 2009 for the repair of 'Aliomanu Road to describe potential impact of projected sea level rise on the proposed project and evaluate alternative means for providing vehicular access to the residences north of the damaged area.

Erosion has caused damage to the seaward side of 'Aliomanu Road at the north end of Anahola Bay, reducing it to one lane and prompting two emergency authorizations from DLNR for temporary shore protection. A study of long-term shoreline change including the 'Aliomanu Road repair site by the University of Hawaii Coastal Geology Group indicates chronic erosion of the sandy and rocky shoreline at approximately -1.3 ft/yr since 1927. 'Aliomanu Road provides the only vehicular and emergency access to about 18 properties to the north of the repair site. A stream bridge connecting 'Aliomanu Road to the north failed decades ago.

The Applicant is recommending rebuilding the damaged section of 'Aliomanu Road to a twolane road with a rock revetment (The Preferred Alternative). The Applicant also considered several project alternatives including (1) No action, (2) Repair of the road into a single lane with permanent shoreline armoring, (3) Mauka realignment of the road, (4) Rebuild a bridge to connect the road north of the site, (5) Extend a road through Department of Hawaiian Home Lands to bypass the damaged road, and (6) Pave and extend a gravel driveway through private lands to bypass the damaged road. The Applicant conducted several meetings with County and DHHL staff, DHHL lessees, and general public to discuss the project and gain feedback.

The Department has conducted a thorough review of the Draft SEA and finds the document incomplete, overall. The OCCL offers the following comments on technical aspects of the Draft SEA, which we feel should be addressed before submitting a Final EA for an Anticipated Finding of No Significant Impact (AFNSI).

- 1. The OCCL recommends that the Applicant discuss potential impacts and potential mitigation measures for three feet of sea level rise within Part 3. Discussion of Alternatives. The Draft SEA describes sea level rise projections from the U.S. Army Corps of Engineers for Kaua'i, which range from 0.4 feet to 3.5 feet by 2070, within a 50-year expected project lifespan. In addition, the Draft SEA notes that the Kaua'i County General Plan departmental draft published in June 13, 2017 suggests a planning target of at least three feet of sea level rise. Similarly, the Hawai'i Climate Change Mitigation and Adaptation Commission is likely to recommend a planning target of 3.2 feet through the State Sea Level Rise Vulnerability and Adaptation Report (due December 2017). The Discussion of Alternatives in the Draft SEA provides no discussion of how each alternative might be affected by sea level rise individually or in comparison to the other project alternatives. In addition, the Discussion of Alternatives provides no discussion of how each alternative might help mitigate or adapt to increasing erosion and flooding hazards with sea level rise.
- 2. The OCCL recommends that the Applicant provide conceptual site maps and cross-section drawings for the Preferred Alternative and alternative for repair of the road to a single lane with permanent shoreline erosion. We ask that conceptual maps and cross-sections include the footprint of the existing and proposed road repairs and proposed revetment, and location of the existing erosion scarp. In addition, these maps and cross-sections may include potential measures to mitigate sea level rise impacts (e.g., elevation of roadbed and/or structures). The overview site map (Figure 5) and photographs showing conceptual road alignment (e.g., Figure 8) are not sufficient to visualize the project footprint or potential impacts seaward of the shoreline (within the Conservation District). Any updates to conceptual site plans provided in the September 2009 Final Environmental Assessment should be noted in the Final SEA.

Please contact the Office of Conservation and Coastal Lands at 808-587-0049, should you have any questions.

Sincerely,

SAMUEL J. LEMMO, Administrator

Office of Conservation and Coastal Lands



January 17, 2018

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

Dear Mr. Lemmo:

Subject: Comments on The Draft Supplemental Environmental Assessment

for the Aliomanu Road Repair Project at TMKs (4) 4-8-018:028 and 029

This letter is in response to your comment letter dated November 20, 2017, regarding the County of Kauai, Department of Public Work's (DPW) Aliomanu Road Repair. On behalf of the applicant, County of Kauai DPW, thank you for reviewing the DEA and providing comments. We offer the following responses to your comments.

1. The comments received from you were evaluated and responses to all comments are included in the Final Supplemental Environmental Assessment fpr the above project.

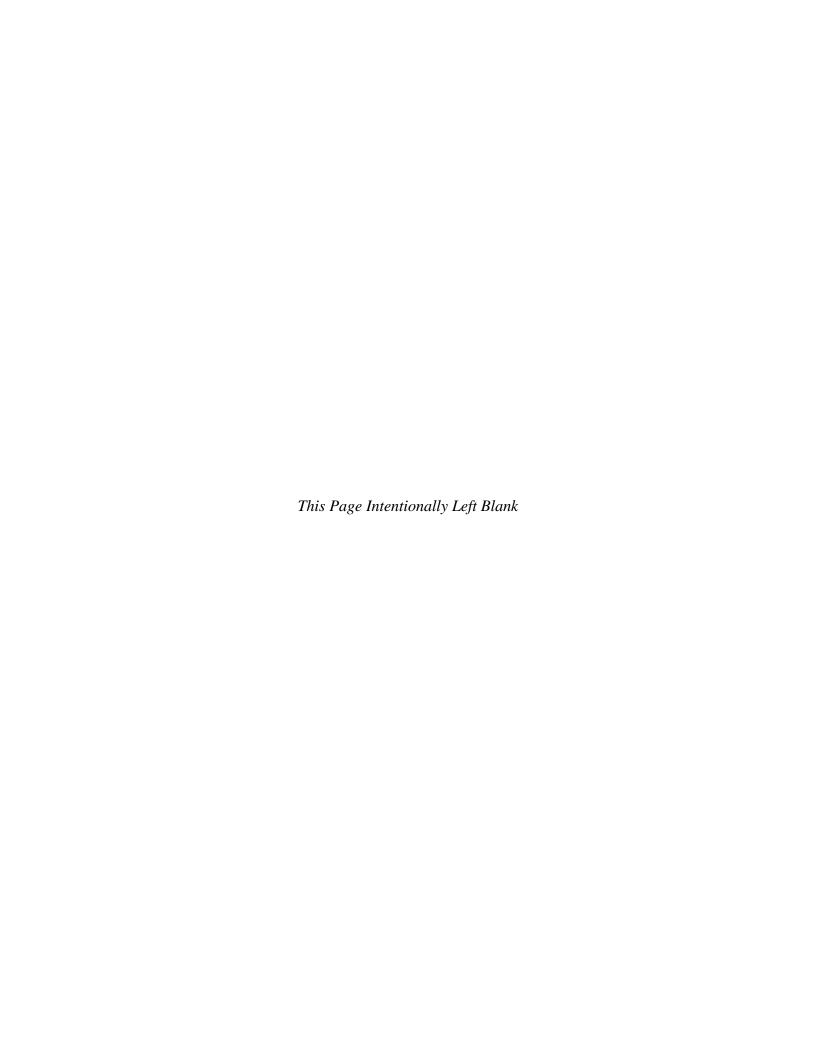
If there are any questions, please contact Dayan Vithanage at (808) 954-4157 or by email at dvithanage @oceanit.com.

Sincerely,

Dayan Vithanage Engineering Director

cc: Department of Public Works, County of Kauai – Donald Fujimoto

Attachment B: BMP Plan



'Aliomanu Road Repair

Best Management Practices (BMP) Plan

Prepared for:



4444 Rice Street Lihue, HI 986766

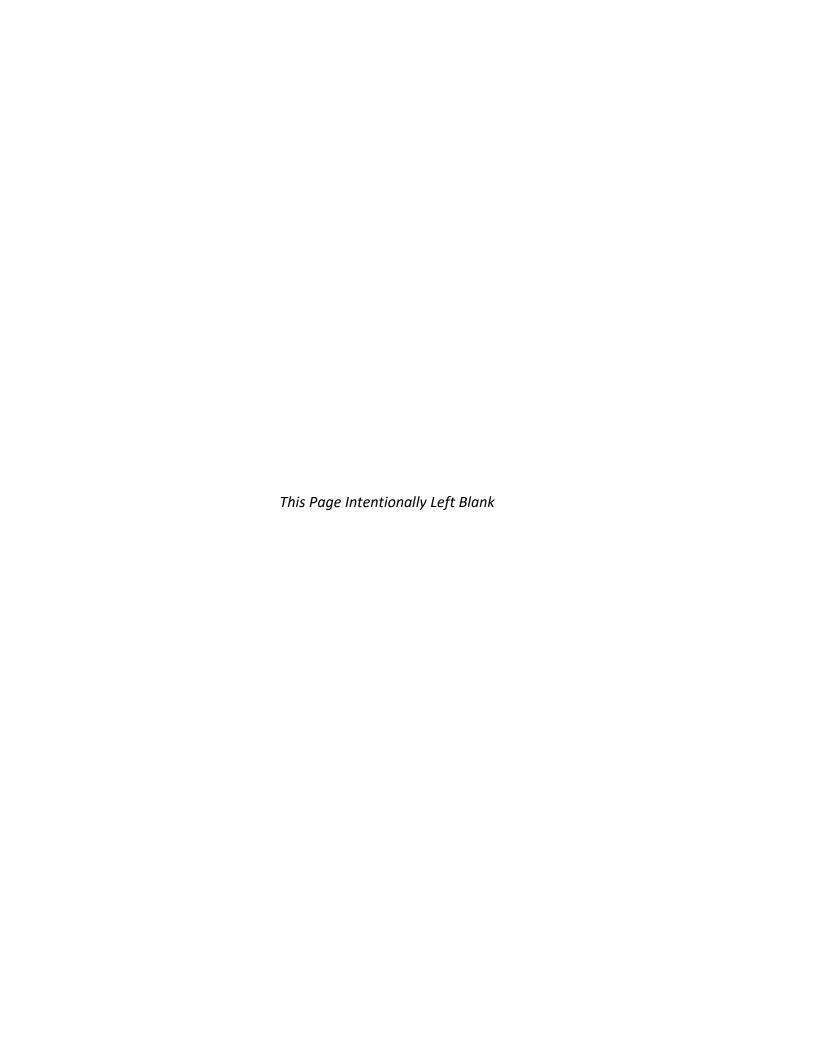


Prepared by:

Oceanit

828 Fort Street Mall, Suite 600 Honolulu, HI 96813

February 2019



BEST MANAGEMENT PRACTICES PLAN

a. Maps

A project location map is shown in Figure 1 below.

b. Site Characterization

'Aliomanu Road, which runs along the shoreline of Anahola Bay on the northeast coast of Kaua'i, has been damaged by repeated wave action and storm events. Portions of the road have collapsed, making it unsafe for vehicles (see cover photos). Barriers have been erected and only one-lane traffic is available. A vehicle could easily miss the edge of the road at night or could go off the road if the undermined shoulder and pavement collapsed. The road is the only access for emergency vehicles and residents living just to the north along the coast.

c. Construction Sequence

The County of Kauai Department of Public Works (DPW) plans to repair the road in a two-step process. The first step, which has been completed, was to install emergency sandbag bank stabilization. The second step, addressed here, is to install a permanent shore protection system and repair the road.

After all permits and approvals are received, the sandbags will be removed, a rock revetment will be constructed along the eroding shoreline, and the damaged county road will be repaired and repaved. The rock presently along the road embankment will be removed and stockpiled temporarily. Then the embankment will be graded to the desired slope. Finally, filter fabric will be laid on the slope, and the rock placed on the fabric to make a new revetment.

After the road shoulder is rebuilt and the revetment constructed, approximately 500 feet of road will be repaved. A 65-foot road section that serves as a drainage swale for storm water crossing the road will be paved with concrete. The remaining road will be repaved with asphalt concrete. All repaving and most of the revetment will be landward of the mean higher high water (MHHW) line.

The contractor or Kauai County DPW will notify State of Hawai'i Department of Health (DOH) and the United States Army Corps of Engineers at least 7 days before starting work and within 14 days after project completion. The contractor will place a construction warning sign at the work site.

Work duration – Three to four months including mobilization and construction.

Future Maintenance and Repair

Rock revetments may need repair, especially after storm waves. Typical damage to revetments includes rock displacement from the face after a new revetment settles. Replacement could require removal of other rocks above the displaced one in order to rebuild the rock face. If large waves damage both armor and under layers, then an entire revetment section from toe to top of bank needs to be disassembled and reconstructed. Repair is typically done by an excavator with a jaw attachment to move rocks, plus manual labor to lay filter fabric. Toe stones must be buried to the design depth before the revetment is rebuilt.

A revetment should be inspected once per year for the first five years to determine if settling or wave damage has occurred. After five years, a revetment should be inspected after major storm events. Repairs should be made immediately after damage is found, otherwise the entire revetment could collapse, and the road could become damaged again.

d. Construction Method

Rock Revetment

Stones from the existing revetment will be sorted into those that can be used for armor stone and those that can be used for bedding stone. Stones will be moved as needed by excavator and front loader. The broken road pavement will be saw cut and removed. Existing road base course exposed by the saw cut will be repaired or removed. The road base and damaged shoulder will be reconstructed using rock and available soil to build a new road and shoulder foundation. Flowable fill (light weight concrete) may be used in hard to fill areas. contractor will use an excavator to shape the embankment slope and excavate a trench for the revetment toe stones. The excavator will work from the road above the beach. Excavated material will be used to fill the embankment slope or be removed from the work area by truck. Filter fabric will be placed on the prepared slope. A double layer of bedding stone will be placed on the filter fabric, and then a double layer of armor stone will be placed on the bedding stone. Stone will be placed by an excavator. The revetment toe and trench will be back filled with clean beach sand by a front loader or excavator. The filter fabric and rock will be placed in increments such that the filter and bedding will not be exposed to and damaged by wave action. Leftover construction materials will be removed from the work site to storage or disposal areas.

Road Pavement

The road surface will be paved with both asphalt concrete (AC) and concrete. After the revetment is constructed, the first layer of AC pavement will be laid by a paving machine and roller on the reconstructed shoulder. The full-width road surface within the work area will then be paved to cover the existing asphalt and the new repaired sections with a second layer of AC pavement. Asphalt will be delivered to the site by truck.

The asphalt concrete covering the existing drainage swale will be removed and the road base rebuilt. The drainage swale road section will be re-paved with reinforced concrete.

e. Description of the Potential Discharges

The primary discharges are armor and bedding stones, fill required to build the revetment slope, and the geotextile filter. Toe stones will be buried four feet below mean sea level (MSL) and the top of the revetment will reach an elevation of approximately +10 feet MSL. Excavated soil not needed to shape the embankment will be removed from the project site. Existing stones will be used to build the revetment. Approximately 213 cubic yards of rock will be placed below the MHHW line, but outside of the Pacific Ocean. This placement is permanent.

f. Additional Proposed Control Measures and/or Treatment

Equipment Maintenance

Since heavy construction equipment such as an excavator will be used, the contractor will have on site materials to contain and clean up spills of fuel or lubricants. Equipment operators will inspect their machines daily at the staging area to make sure there are no problems that could result in contamination from fuels, lubricants, hydraulic fluid, or other pollutants. Any required maintenance will be done off site using methods that will not result in pollution of the water or land area. Any waste oils or lubricants will be removed from the site and disposed of according to applicable federal or state regulations.

Oil absorbent pads and a spills kit will be on site to immediately clean up any small petroleum product spillage that may occur. In the unlikely event of a bigger spill, oil absorbent pads will be used to contain the spill while an environmental emergency response crew is called in. Pacific Environmental Corporation (PENCO) can be called (808-545-5195). PENCO is a highly trained environmental emergency response company available 24 hours a day.

Pollution Response

Should any release of pollutants including fuel, fluids, etc. into the ocean occur; the contractor will notify the DPW and the DOH immediately. The contractor shall brief all personnel working on the site on best management practices and pollution control and provide a list of personnel briefed to DPW.

Staging Area BMPs

Construction equipment will be stored at night in the staging area selected by the contractor and approved by the County Engineer. Any other materials and equipment will be kept in the staging area until used. Oil absorbent pads, 10 mil plastic sheets, and a spills kit will be available for cleanup. Although no material stockpiles are planned in the staging area, should stockpiles become necessary, they will be enclosed by earth berms to minimize rainfall runoff. Should soil from the staging area be carried onto the road by vehicle wheels, the road will be swept. All trash and construction debris will be disposed of at an approved facility.

g. Control Measures

A sandbag barrier will be used to control sediment runoff. Silt curtains cannot be used at this site because the water is far too shallow. The curtains would also damage bottom-dwelling marine life including *limu* that is used by local residents. Large sandbags and geotextile fabric will be placed around the active work area to reduce wave impact on the slope and revetment construction and to minimize sediment being washed into nearshore waters. Control measures will be moved as construction progresses. Stockpiles of construction material will also be protected with control measures to minimize runoff.

An erosion control plan is included as Figure C-2.

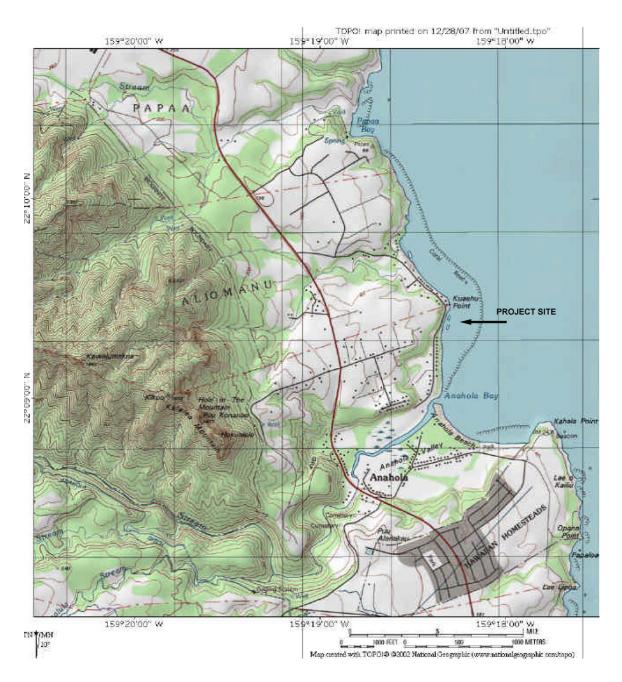
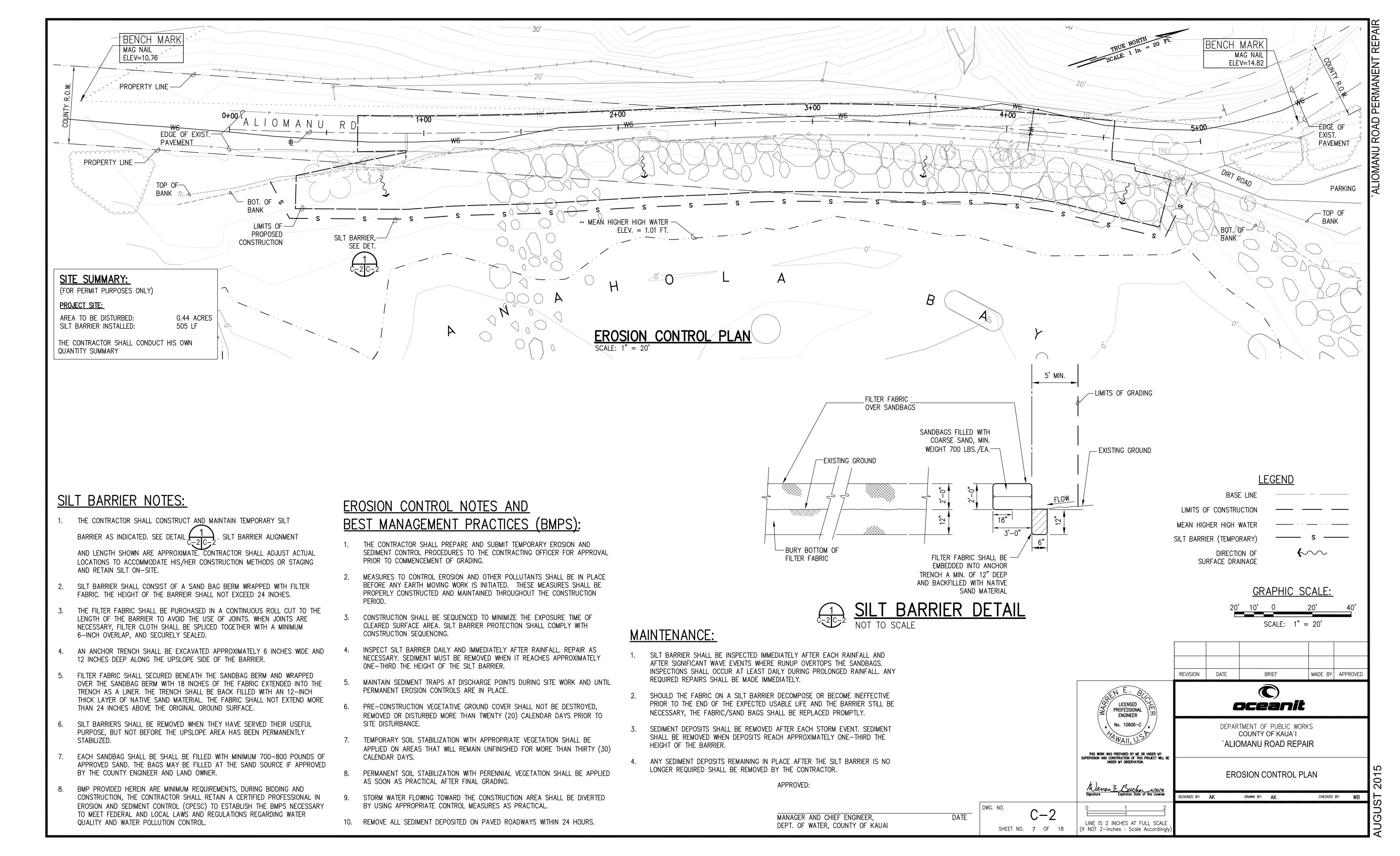


Figure 1. Project Location Map



BEST MANAGEMENT PRACTICES NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL MARINE FISHERIES SERVICE PACIFIC ISLANDS REGIONAL OFFICE PROTECTED RESOURCES DIVISION

The National Marine Fisheries Service, Pacific Islands Regional Office recommends that the following measures, as appropriate and germane to specific projects, be incorporated into projects to minimize impacts on protected resources. These measures supplement, but do not supersede, the BMPs above.

- Turbidity and siltation from project-related work should be minimized and contained to within the vicinity of the site through the appropriate use of effective silt containment devices and curtailment of work during adverse tidal and weather conditions.
- 2. Any construction-related debris that may pose an entanglement hazard to marine protected species must be removed from the project site if not actively being used and/or at the conclusion of the construction work.
- 3. All project-related materials and equipment placed in the water should be free of pollutants.
- 4. No project-related materials (fill, revetment rock, pipe, etc.) should be stockpiled in the water (intertidal zones, reef flats, stream channels, etc.)
- 5. No contamination (trash or debris disposal, alien species introductions, etc.) of marine (reef flats, lagoons, open ocean, etc.) environments adjacent to the project site should result from project-related activities.
- 6. Fueling of project-related vehicles and equipment should take place away from the water. A contingency plan to control the accidental spills of petroleum products at the construction site should be developed. Absorbent pads, containment booms and skimmers will be stored on-site to facilitate the cleanup of petroleum spills.
- 7. Underlayer fills will be protected from erosion with core-loc units (or stones) as soon after placement as practical.
- 8. Attempts must be made to prevent discharge of dredged material into the marine environment during transporting and off-loading of dredged material.
- 9. Return flow of or run-off from dredged material stored at inland dewatering or storage sites must be prevented.

MITIGATION MEASURES TO REDUCE IMPACTS TO PROTECTED SPECIES

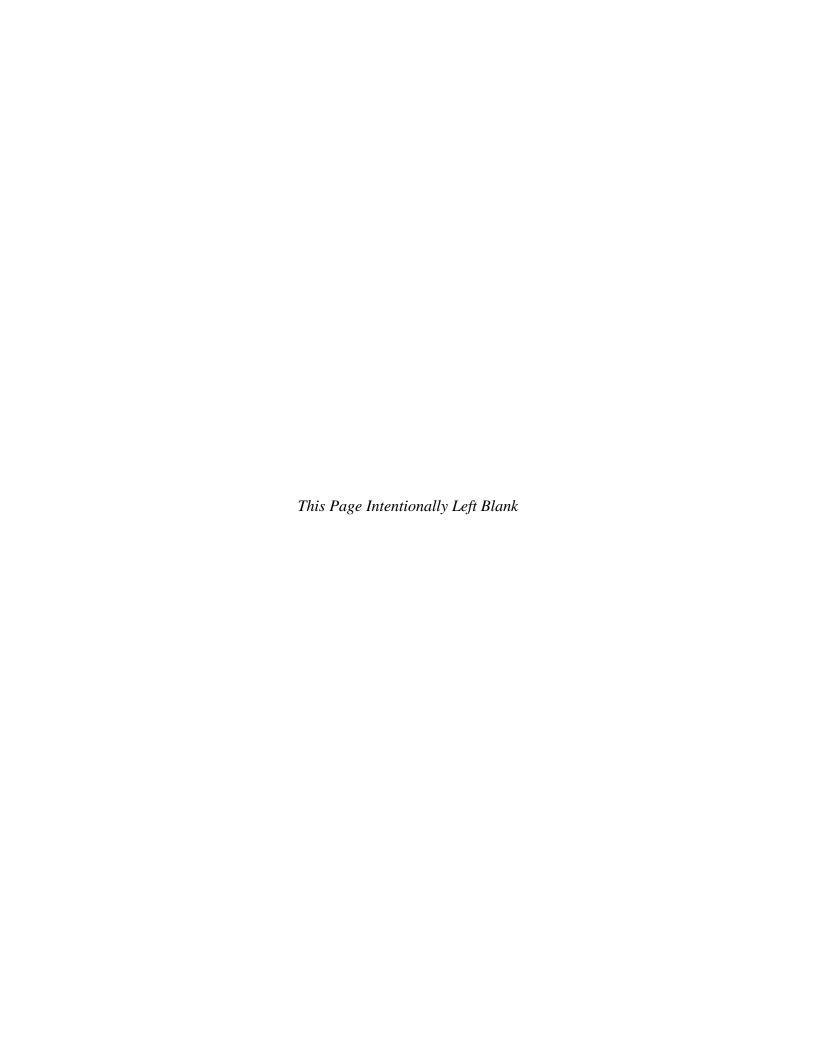
A visual survey must be performed by state personnel of the project area just prior to commencement or resumption of construction activity to ensure that no protected species are in the project area. If protected species are detected, construction activities must be postponed until the animal(s) voluntarily leave the area.

If any listed species enters the area during the conduct of construction activities, all activities must cease until the animal(s) voluntarily depart the area.

All on-site project personnel must be apprised of the status of any listed species potentially present in the project area and the protections afforded to those species under federal laws. A brochure explaining the laws and guidelines for listed species in Hawai'i, American Samoa, and Guam may be downloaded from http://www.nmfs.noaa.gov/prot_res/mmwatch/hawaii.htm

Any incidental take of marine mammals must be reported immediately to NOAA Fisheries' 24-hour hotline at 1-888-256-9840. Hawai'i only: any injuries to sea turtles must be reported immediately to NOAA Fisheries at 1-808-983-5370. Information reported must include the name and phone number of a point of contact, location of the incident, and nature of the take and/or injury.









STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES

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

AQLATIC RESOURCES
BOATING AND OCEAN BIC REATION
BERALE OF CONVEYANCES
COMMISSION ON WATER RESOURCE MAN AGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCE SEFORCEMENT
FACILITE RING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

April 1, 2009

Mr. David Shideler Cultural Surveys Hawai'i P. O. Box 1114 Kailua, Hawai'i 96734 LOG NO: 2009.1374 DOC NO: 0904WT20

Archaeology

Dear Mr. Shideler:

SUBJECT: 6E-42 Historic Preservation Review--

FINAL Archaeological Assessment (AA)--For the 'Aliomanu Road Repair Project,

Anahola Ahupua'a, Kawaihau District, Kaua'i Island, Hawai'i

TMK: (4) 4-8-018: 029, 999

Thank you for the opportunity to review this FINAL AA (FINAL archaeological Assessment (AA) for the 'Aliomanu road repair Project, Anahola Ahupua'a, Kawaihau District, Kaua'i Island, Hawai'i TMK: (4) 4-8-018: 029, 999 [Groza, Shideler and Hammatt, PhD March 2009]).

This approximately 350 linear of feet of roadway has taken extensive damaged by high surf. Exposed profiles along the ocean side reveal that Jaucas sands are found in this area, though no cultural properties were exposed in these profiles. However, the potential for impacting historic properties, including human burials, is high. Therefore we agree with Cultural survey's Hawai'i recommendation that archaeological monitoring occur during all repair activities.

This report is accepted and it meets the minimum requirements for compliance with 6E-42 and Hawaii Administrative Rules (HAR) §13-13-276 Rules Governing Standards for Archaeological Inventory Studies and Reports.

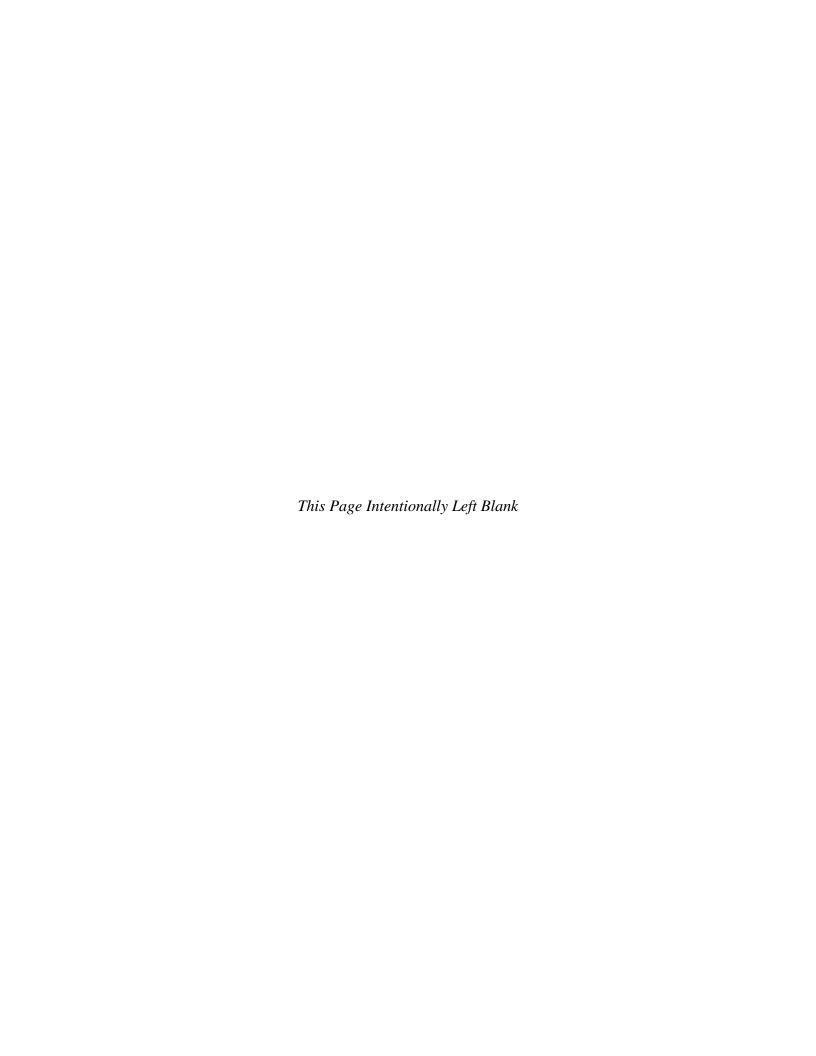
We are in receipt of a final hardcopy as well as a text-searchable PDF, and will be included in our SHPD Library here at the Kapolei SHPD office.

Please call Wendy Tolleson at (808) 692-8024 if there are any questions or concerns regarding this letter.

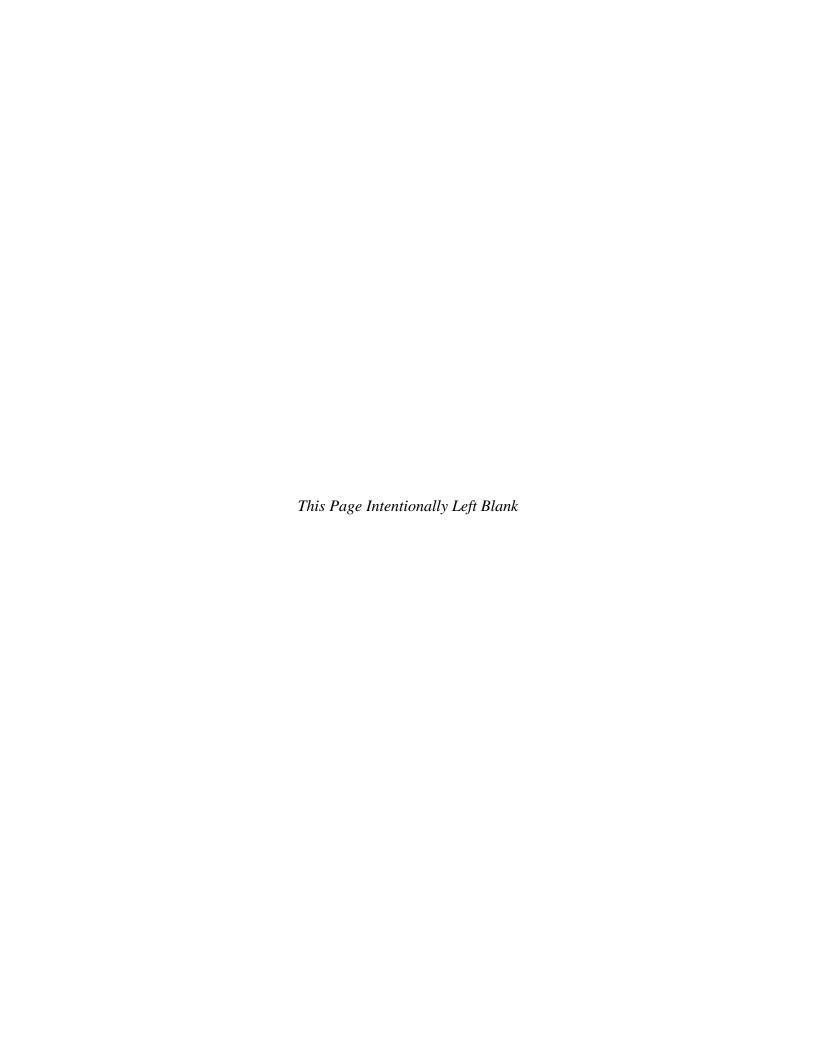
Aloha,

Nancy A. McMahon (Deputy SHPO) State Historic Preservation Officer

Nancy a. MMahon







DAND Y. IGE GOVER/OR OF HAWAII





SUZANNE D, CASE CHARPERSON BOARD OF LAND AND NATURAL RESOURCES COMMISSION ON WATER RESOURCE MANAGEMENT



STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621 HONOLULU, HAWAII 96809

August 30, 2019

File No.: KA-442

Esaki Surveying & Mapping, Inc. 1610 Haleukana Street Lihue, Hawaii 96766

Dear Applicant:

Subject:

Transmittal of Signed Shoreline Certification Maps

Owner(s):

State of Hawaii - DLNR and County of Kauai

Tax Map Key:

(4) 4-8-018:028 & 029

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

If you have any questions, please feel free to call us at (808) 587-0424. Thank you.

Sincerely,

Cal Miyahara

Shoreline Disposition Specialist

Enclosures

cc:

DAGS

KDLO

