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FILE COPY
MAY 23 2013

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COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

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OFC. OF ENVIRONMENTAL QUALITY CONTROL

April 17, 2013

Gary Gill, Acting Director
Office of Environmental Quality Control
State of Hawaii
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED WAIAKOA GULCH CULVERT REPLACEMENT PROJECT, KIHEI, MAUI, HAWAII

Dear Mr. Gill:

With this letter, the County of Maui, Department of Public Works hereby transmits the Draft Environmental Assessment and Anticipated Finding of No Significant Impact (DEA-AFNSI) for the proposed Waiakoa Gulch Culvert Replacement Project situated on the border between the Wailuku and Makawao District on the island of Maui for publication in the next available edition of the Environmental Notice.

Enclosed is a completed OEQC Publication Form, two (2) copies of the DEA-AFNSI, 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.

Should you have any questions, please do not hesitate to contact Leilani Pulmano at Munekiyo & Hiraga, Inc. at (808) 244-2015.

Sincerely,

David Goode
Director of Public Works

CY/JS:gq(ED-13-334)
Enclosure

S:\ENG\DESIGN\CIP\2011\11-20 Waiakoa Stream Drainage\Correspondence\TO 04172013 Munekiyo and Hiraga Draft EA LOT

AGENCY ACTIONS
SECTION 343-5(B), HRS
PUBLICATION FORM (JULY 2012 REVISION)

Project Name	**Waiakoa Gulch Culvert Replacement Project**
Island:	Maui
District:	On the border between Wailuku and Makawao
TMK:	
Permits:	Department of Army Nationwide Permits pursuant to Section 10 of the Rivers and Harbors Act and Section 404 Clean Water Act; National Flood Insurance Program, as applicable; Federal Coastal Zone Management Consistency; National Pollutant Discharge Elimination System Permit, as applicable; Department of Health Community Noise Permit, as applicable; Department of Health 401 Water Quality Certification; Special Management Area Assessment; Special Flood Hazard Development Permit, as applicable; Work to Perform in County Right-of-Way Permit; and Construction Permits (Building, Grading, Grubbing)
Proposing/Determination Agency:	**County of Maui, Department of Public Works** 200 South High Street Wailuku, Hawaii 96793 Contact: John Smith Phone No.: (808) 270-7745
Consultant:	**Munekiyo & Hiraga, Inc.** 305 South High Street, Suite 104 Wailuku, Hawaii 96793 Contact: Leilani Pulmano, Program Manager Phone No.: (808) 244-2015

Status (check one only):

X DEA-AFNSI	Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of DEA, a completed OEQC publication form, along with an electronic word processing summary and a PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov); a 30-day comment period ensues upon publication in the periodic bulletin.
__FEA-FONSI	Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and a PDF copy (send both summary and PDF to oeqchawaii@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin.
__FEA-EISPN	Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov); a 30-day consultation period ensues upon publication in the periodic bulletin.
__Act 172-12 EISPN	Submit the proposing agency notice of determination on agency letterhead, an OEQC publication form, and an electronic word processing summary (you may send the summary to oeqchawaii@doh.hawaii.gov). NO environmental assessment is required and a 30-day consultation period upon publication in the periodic bulletin.
__DEIS	The proposing agency simultaneously transmits to both the OEQC and the accepting authority, a hard copy of the DEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the DEIS (you may send both the summary and PDF to oeqchawaii@doh.hawaii.gov); a 45-day comment period ensues upon publication in the periodic bulletin.
__FEIS	The proposing agency simultaneously transmits to both the OEQC and the accepting authority, a hard copy of the FEIS, a completed OEQC publication form, a distribution list,

along with an electronic word processing summary and PDF copy of the FEIS (you may send both the summary and PDF to oeqchawaii@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin.

__ Section 11-200-23 Determination

The accepting authority simultaneously transmits its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS to both OEQC and the proposing agency. No comment period ensues upon publication in the periodic bulletin.

__Section 11-200-27 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 determines that a supplemental EIS is not required. No EA is required and no comment period ensues upon publication in the periodic bulletin.

__Withdrawal (explain)

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

The Waiakoa Gulch channels stormwater runoff from the slopes of Haleakala to the Pacific Ocean. South Kihei Road crosses Waiakoa Gulch near the shoreline in South Maui. There are two (2) existing concrete drainage culverts, 48-inch and 24-inch diameter, that allow the stormwater runoff in the gulch to flow under South Kihei Road to the ocean. Long-term erosion, flooding, and overtopping of the culverts from rain events has undermined the upslope shoulder of Waiakoa Gulch culverts at South Kihei Road. The purpose of the proposed project is to repair the critical condition of the deteriorating culverts. The proposed project involves replacing the existing culverts with two (2) 3 feet high by 10 feet wide concrete box culverts placed on a concrete slab, new wing walls to maintain the roadway shoulder and resurfacing South Kihei Road over the culverts. One (1) or two (2) utility poles will be relocated. Grading and slope protection may be required outside the existing right-of-way. The proposed improvements will not significantly alter the banks of the existing drainage channel upstream nor downstream of the roadway.

Draft Environmental Assessment

SOUTH KIHEI ROAD WAIAKOA CULVERT REPLACEMENT PROJECT

Prepared for:

County of Maui,
Department of Public Works

Approving Agency:

County of Maui,
Department of Public Works

May 2013

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MUNEKIYO & HIRAGA, INC.

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List of Acronyms

ALISH	Agricultural Lands of Importance to the State of Hawaii
AMSL	Above Mean Sea Level
BMP	Best Management Practice
CFS	Cubic Feet per Second
CIA	Cultural Impact Assessment
CLUB	Kihei Canoe Club
CSH	Cultural Surveys Hawaii, Inc.
CZM	Coastal Zone Management
DA	U.S. Department of the Army
DLNR	Department of Land and Natural Resources
DOE	Department of Education
DOH	Department of Health
DPW	Department of Public Works
DWS	Department of Water Supply
EA	Environmental Assessment
ESA	Endangered Species Act of 1973
FIRM	Flood Insurance Rate Map
FONSI	Findings of No Significant Impact
HAR	Hawaii Administrative Rules
HCZMP	Hawaii Coastal Zone Management Program
HC&S	Hawaiian Commercial & Sugar Company

HRS	Hawaii Revised Statutes
KWRF	Kihei Wastewater Reclamation Facility
LOS	Level of Service
LSB	Land Study Bureau
MBTA	Migratory Bird Treaty Act
MCC	Maui County Code
MGD	Million Gallons per Day
MIP	Maui Island Plan
MPD	Maui Police Department
MPH	Miles per Hour
OHA	Office of Hawaiian Affairs
PpA	Pulehu Silt Loam
RGB	Rural Growth Boundary
SHPD	State Historic Preservation Division
SMA	Special Management Area
SRB	Small Town Boundaries
UGB	Urban Growth Boundary
UHMC	University of Hawaii Maui College
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WWRD	Wastewater Reclamation Division

Executive Summary

Project Name:	South Kihei Road Waiakoa Culvert Replacement
Type of Document:	Draft Environmental Assessment
Legal Authority:	Chapter 343, Hawaii Revised Statutes
Anticipated Determination:	Anticipated Finding of No Significant Impact (FONSI)
Applicable Environmental Assessment review "Trigger":	Proposed Use of County Funds and Lands
Location:	South Kihei Road at Waiakoa Gulch Kihei, Maui, Hawaii
Landowner:	County of Maui, Department of Public Works Maalaea Surf Kihei Beach Resort Harry & Jeanette Weinberg
Applicant:	County of Maui Department of Public Works 200 South High Street Wailuku, Hawaii 96793 Contact: John Smith Phone: (808) 270-7745
Approving Agency:	County of Maui Department of Public Works 200 South High Street Wailuku, Hawaii 96793 Contact: David Goode, Director Phone: (808) 270-7745
Consultant:	Munekiyo & Hiraga, Inc. 305 High Street, Suite 104 Wailuku, Hawaii 96793 Contact: Leilani Pulmano, Program Manager Phone: (808) 244-2015
Project Summary:	The Waiakoa Gulch channels stormwater runoff from the slopes of Haleakala in a westerly direction to the Pacific

Ocean. South Kihei Road crosses Waiakoa Gulch near the shoreline in South Maui. There are two (2) existing concrete drainage culverts, 48-inch and 24-inch diameter, that allow the stormwater runoff in the gulch to flow under South Kihei Road to the ocean. The drainage channel banks on the downstream side of the South Kihei Road are protected by a combination of concrete lining and rock placed rip-rap to prevent erosion of the stream banks. The drainage channel banks on the upstream side of the South Kihei Road are not protected. The upstream banks are in its natural state. Long-term erosion, flooding, and overtopping of the culverts from rain events has undermined the upslope shoulder of South Kihei Road. The purpose of the proposed project is to repair the critical condition of the deteriorating South Kihei Road at the location of the culverts. The proposed project involves replacing the existing culverts with two (2) 3 feet high by 10 feet wide concrete box culverts placed on a concrete slab, new wing walls to maintain the roadway shoulder and resurfacing South Kihei Road over the culverts. One (1) or two (2) utility poles will be relocated. Grading and slope protection may be required outside the existing right-of-way. The proposed improvements will not significantly alter the banks of the existing drainage channel upstream nor downstream of the roadway.

The South Kihei Road Waiakoa Culvert Replacement project will be funded by the County of Maui. In addition, South Kihei Road is owned by the County of Maui. The use of public lands and funds are triggers for the preparation of an Environmental Assessment pursuant to Chapter 343, Hawaii Revised Statutes (HRS) and Section 11-200, Hawaii Administrative Rules (HAR).

I. PROJECT OVERVIEW

I. PROJECT OVERVIEW

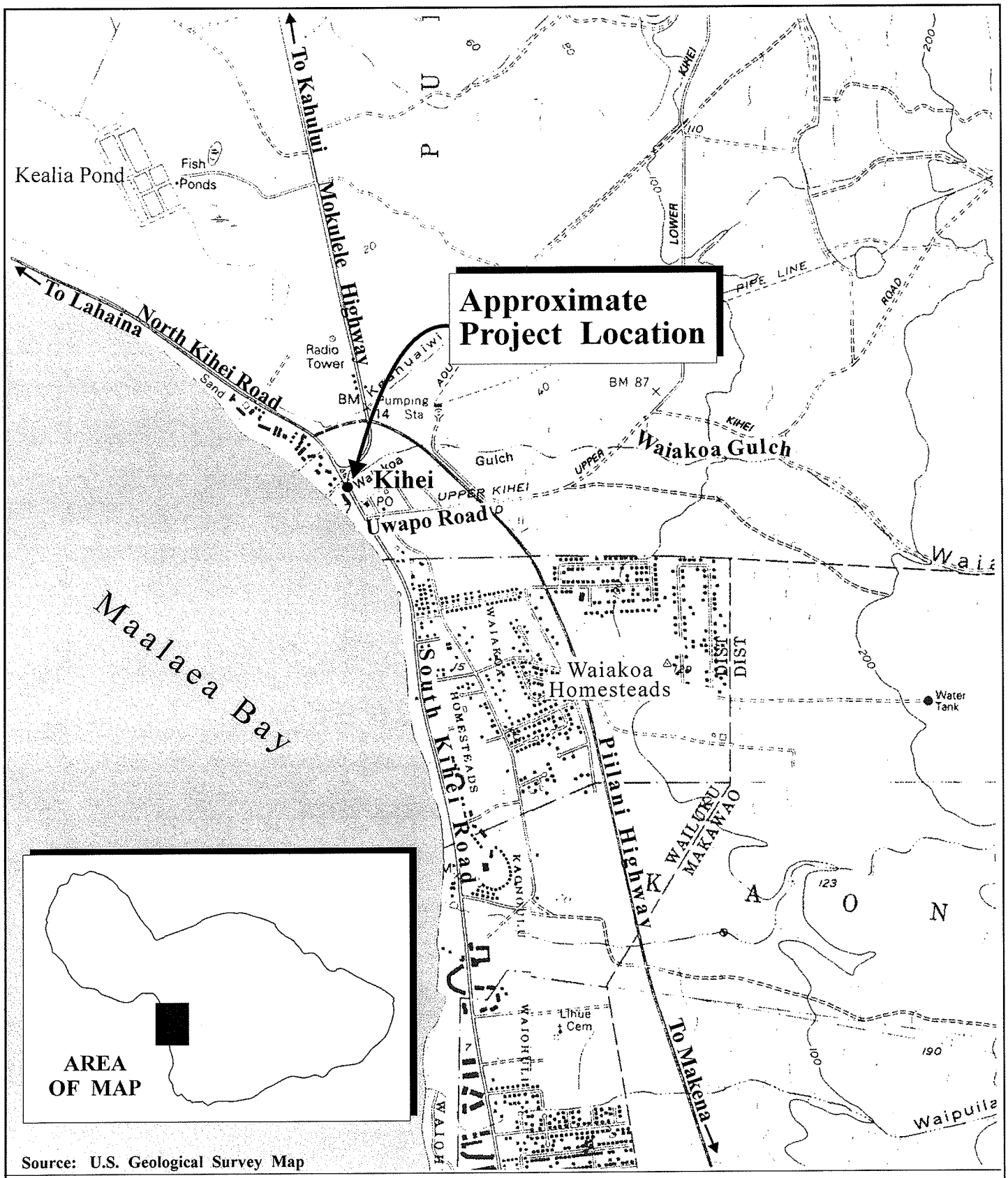
A. PROJECT LOCATION, CURRENT LAND USE, AND OWNERSHIP

The County of Maui, Department of Public Works (DPW) proposes to replace the existing culverts under South Kihei Road at the Waiakoa Gulch crossing. See **Figure 1**. The project site is located within the South Kihei Road right-of-way, south of the intersection with Mokulele Highway and adjacent to the property identified by TMK No. (2) 3-8-013:005 and 006. See **Figure 2**. There are two (2) existing culverts under South Kihei Road, a 48-inch and 24-inch diameter concrete culvert, each approximately 40 feet in length. The DPW proposes to replace the existing culverts with two (2) box culverts measuring approximately 3 feet high and 10 feet wide and approximately 36 feet in length placed on a concrete slab. Additional improvements include new wingwalls to support the roadway shoulder, guard rails, resurfacing of South Kihei Road over the replacement culverts and relocation of one (1) or two (2) utility poles.

South Kihei Road is a County collector roadway running in a north-south direction along the coastline from Maalaea (via North Kihei Road) at its northern terminus to Wailea at its southern terminus. The South Kihei Road right-of-way is 40 feet in width at the Waiakoa culvert crossing. The County of Maui owns the right-of-way for South Kihei Road. Minor grading and slope work will be required outside the right-of-way on adjacent properties that are within the Waiakoa Gulch or vacant lands.

The adjacent property to the north, identified as TMK (2) 3-8-013:006, is owned by Maalaea Surf while the adjacent property to the south, identified as TMK (2) 3-8-013:005, is owned by Kihei Beach Resort. In addition, work outside of the right-of-way will require a laydown area directly mauka of the Waiakoa Gulch, identified as TMK (2) 3-8-077:009, which is owned by Harry & Jeanette Weinberg. Refer to **Figure 2**.

The DPW will be working with the adjacent property owners to secure easements for improvements outside of the right-of-way.



Source: U.S. Geological Survey Map

Figure 1

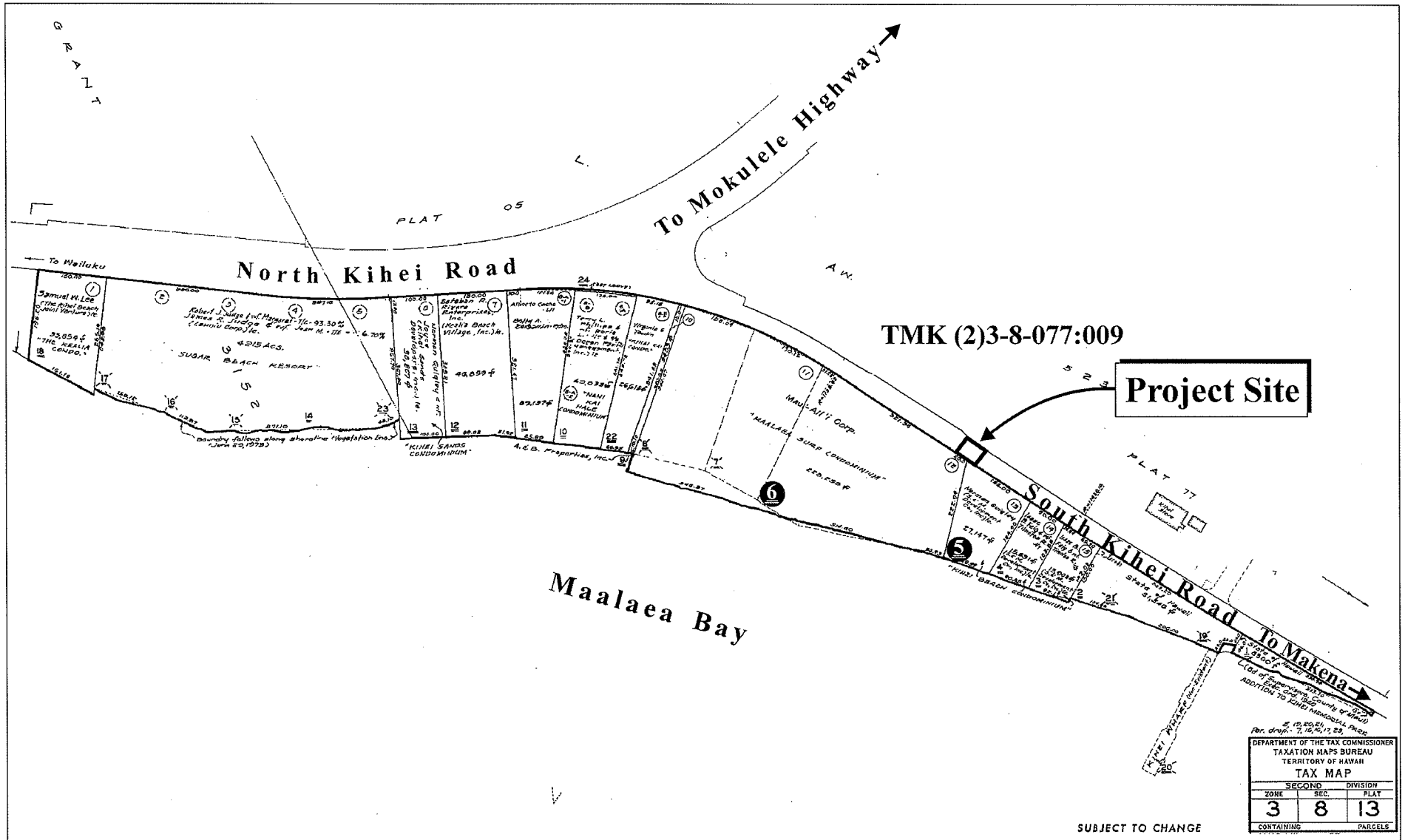
South Kihei Road
Waiakoa Culvert Replacement
Regional Location Map

0 500 1000 2000 Feet

Prepared for: County of Maui, Department of Public Works

MUNEKIYO & HIRAGA, INC.

COM\DPW SKiheiRd Culvert\REGIONAL



Source: State of Hawaii, Realty Atlas 2011

Figure 2 South Kihei Road Waiakoa Culvert Replacement

Property Location Map

NOT TO SCALE

MUNEKIYO & HIRAGA, INC.

Prepared for: County of Maui, Department of Public Works

COM/DPW SKiheiRd Culvert/propertylocation

B. PROPOSED ACTION

The Waiakoa Gulch channels stormwater runoff from the upslope Kihei/Kula area in a westerly direction to the Pacific Ocean. South Kihei Road crosses Waiakoa Gulch near the shoreline in South Maui. The existing drainage improvements at Waiakoa Gulch include a 48-inch and a 24-inch diameter concrete culvert that allows the stormwater runoff in the gulch to flow under South Kihei Road to the ocean. See **Figure 3**. The drainage channel banks on the downstream side of the South Kihei Road are protected by a combination of concrete lining and rock placed rip-rap to prevent erosion of the stream banks. The drainage channel banks on the upstream side of South Kihei Road are not protected and left in its natural state. The proposed project involves replacing the existing culverts with two (2) 3 feet high by 10 feet wide concrete box culverts placed on a concrete slab, new wing walls to maintain the roadway shoulder, guard rails, resurfacing South Kihei Road over the replacement culverts and relocation of one (1) or two (2) utility poles. A rip-rap apron will be installed upstream and downstream of the concrete slab to prevent scouring. See **Figure 4** and **Appendix "A"**. Placement of a portion of the rip-rap up-slope of the concrete slab will be outside of the right-of-way and minor grading and slope work to tie into the existing banks may also be required outside the right-of-way. The proposed improvements will not significantly alter the existing drainage channel upstream nor downstream of the right-of-way. The resurfacing of the South Kihei Road will include a ford crossing that allows for water to flow across the roadway. The County of Maui, Department of Public Works will be working with the adjacent property owners to secure easements for improvements outside the right-of-way.

C. PROJECT NEED

The existing culverts at Waiakoa Gulch are inadequate and do not have enough capacity to handle the stormwater runoff flowing in Waiakoa Gulch during heavy rains. East of the project site, at the widened Piilani Highway crossing at Waiakoa Uka Bridge, the stormwater capacity for a 100-year storm is estimated to be approximately 8,209 cubic feet per second (cfs). See **Appendix "B"**. After crossing Piilani Highway, stormwater flows through a flat and shallow earth channel to South Kihei Road. The existing culverts at South Kihei Road have an approximate capacity of 89 cfs. The drainage channel on the downstream side of South Kihei Road is usually blocked at the outlet by accumulated sand which temporarily prevents the discharge of stormwater to the ocean. During heavy storms these circumstances contribute to the stormwater runoff overtopping South Kihei Road often closing the roadway until the flooding subsides or the drainage channel is open by DPW, and the roadway is

North view of the cuvert crossing along South Kihei Road

West view of the upstream headwall and inlet.
The upstream headwall length is about 25 feet wide

Source: County of Maui, Department of Public Works

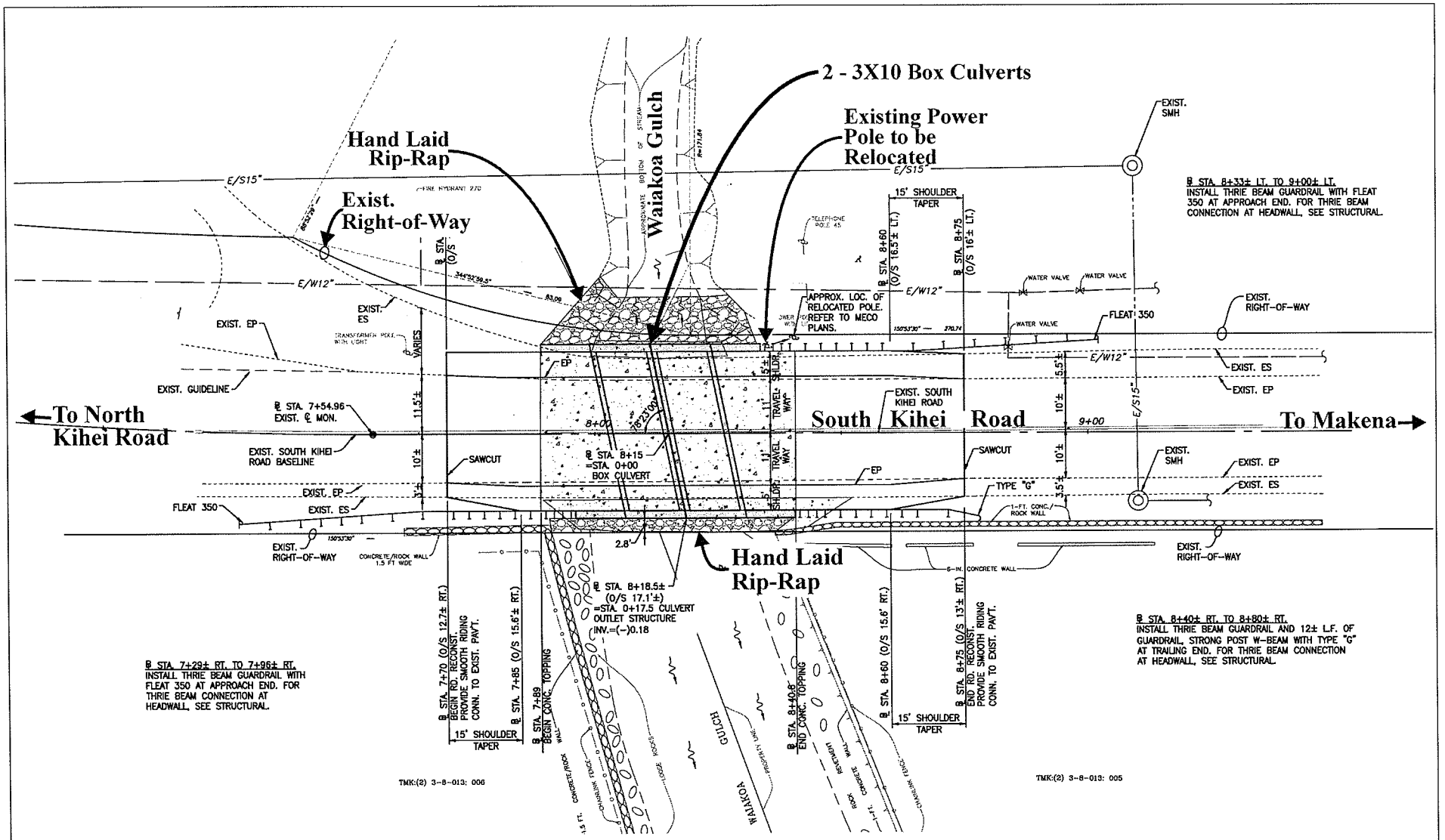
Figure 3 South Kihei Road Waiakoa Culvert Replacement

Existing Conditions Photographs

MUNEKIYO & HIRAGA, INC.

Prepared for: County of Maui, Department of Public Works

COM\DPW SKiheiRd Culvert\existphotos



Source: County of Maui, Department of Public Works

Figure 4 South Kihei Road Waiakoa Culvert Replacement

Site Plan

NOT TO SCALE

Prepared for: County of Maui, Department of Public Works

MUNEKIYO & HIRAGA, INC.

COM/DPW SKiheiRd Culvert/revisedsiteplan

capable of safe vehicular passage. Effects from stormwater runoff has also caused severe erosion of the road bed around the existing culverts and has undermined the structural stability of the upslope shoulder of the South Kihei Road. The purpose of the proposed project is to repair the critical condition of the deteriorating South Kihei Road. Refer to **Figure 3**.

The drainage capacity of the replacement culverts is estimated to be approximately 410 cfs. Refer to **Appendix "B"**. Although the replacement culverts cannot be sized to accommodate a 100-year storm for Waiakoa Gulch, the DPW is working on a comprehensive stormwater management plan for South Maui to address regional stormwater runoff which will be addressed in the future and not within this Environmental Assessment.

D. SPECIAL MANAGEMENT AREA USE PERMIT

The project site is located within County of Maui's Special Management Area (SMA), which extends from the shoreline to the Piilani Highway right-of-way in the vicinity of the Waiakoa Gulch. The proposed scope of work involves repair and maintenance to existing drainage improvements and qualifies for a SMA Assessment for an exempt action involving review and approval by the Director of Planning. An SMA Assessment for the proposed improvements was submitted by the DPW to the Department of Planning for review and approval.

E. CHAPTER 343, HAWAII REVISED STATUTES REQUIREMENT

The proposed development will involve drainage and roadway improvements that require the use of County lands and funds. The use of County lands and funds are triggers for Chapter 343, Hawaii Revised Statutes (HRS) and Section 11-200, Hawaii Administrative Rules. Based on the anticipated scope of work, the proposed action requires the preparation and processing of an Environmental Assessment (EA). It is noted that the EA will serve as the supporting technical document for the permit applications, that may include, but not be limited to, a Department of Army Section 10, Section 404, Section 401 Water Quality Certification approval and Coastal Zone Management Consistency approval. The approving agency for the EA is the County of Maui, Department of Public Works.

F. IMPLEMENTATION TIME FRAME AND PROJECT COST

The construction of the South Kihei Road Waiakoa Culvert Replacement project will commence upon receipt of regulatory and construction permits and approvals. The project will be constructed in a single phase. It is estimated that construction will be completed in six (6) months. The estimated cost of construction for the proposed project is $1,630,000.00.

II. DESCRIPTION OF EXISTING CONDITIONS, POTENTIAL IMPACTS, AND PROPOSED MITIGATION MEASURES

II. DESCRIPTION OF EXISTING CONDITIONS, POTENTIAL IMPACTS, AND PROPOSED MITIGATION MEASURES

A. PHYSICAL ENVIRONMENT

1. Surrounding Land Uses

a. Existing Conditions

The coastal area of Kihei includes numerous resort-oriented condominiums and businesses situated along South Kihei Road. The project site is located on South Kihei Road in the vicinity of the intersection with Mokulele Highway. The project site is bordered to the north and south by multi-family residential condominiums and to the east by vacant undeveloped land. Refer to **Figure 2**. Numerous public facilities, including the Kihei Community and Aquatic Center, Kihei Post Office, and Kihei Fire Station, are located within one (1) mile of the project site.

Kealia Pond and Wildlife Sanctuary and Sugar Beach are among the popular recreational facilities found to the north of the project site.

b. Potential Impacts and Proposed Mitigation Measures

The proposed project is not anticipated to have an adverse impact on surrounding land uses. The proposed project will replace two (2) existing culverts under South Kihei Road at Waiakoa Gulch and help reduce the effects of stormwater runoff flooding that would further deteriorate South Kihei Road during storm events. The proposed project is designed and intended to enhance the drainage system and the safety of the roadway from stormwater runoff.

2. Climate

a. Existing Conditions

Maui is characterized by a semi-tropical climate containing a multitude of individual microclimates. The mean annual temperature of the island at all locations near sea level is approximately 75 degrees Fahrenheit. A high proportion of the rainfall that Maui receives each year falls on the northeast facing shores leaving the south and southwest coastal areas relatively dry. The project site is located within the drier area of the southwest coast.

The Kihei coast is generally sunny, warm, and dry throughout the entire year. Annual temperatures in the region average in the mid 70's. June through August are historically the warmer months of the year, while the cooler months are January through March. During the summer months, average daily temperatures in Kihei typically range from the low 70's to the high 80's (County of Maui, Office of Economic Development, 2011).

Average rainfall distribution in the Kihei-Makena region varies from under 10 inches per year along the coastline to more than 20 inches per year in the higher elevations. Rainfall in the Kihei-Makena region is highly seasonal, with most of the precipitation occurring in the winter months (County of Maui, Office of Economic Development, 2011).

Northeast tradewinds prevail approximately 80 to 85 percent of the time. Tradewinds originating from the northeast average 10 to 15 miles per hour during afternoons, with slightly lighter winds during mornings and nights. Between October and April, the southerly winds of Kona storms may be experienced (County of Maui, Office of Economic Development, 2011).

b. Potential Impacts and Proposed Mitigation Measures

The proposed project is limited to the replacement of existing drainage culverts and this will not adversely impact local climatic conditions. The proposed project, however, will help alleviate flooding conditions on South Kihei Road at Waiakoa Gulch caused by storm events.

3. Topography and Soils

a. Existing Conditions

The project site is located near Maui's south coastline and is relatively level. Elevation is approximately three (3) feet above mean sea level (amsl). Underlying the project site are soils belonging to the Pulehu-Ewa-Jaucas association. See **Figure 5**. The Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii characterizes the soils of the Pulehu-Ewa-Jaucas association as consisting of well-drained and excessively drained, moderately fine to coarse-textured soils on alluvial fans and in basins. These soils are nearly level to moderately sloping, which developed in material weathered from basic igneous rock, coral, and seashells. The association makes up about four (4) percent of the island (U.S. Department of Agriculture, 1972).

According to the above-mentioned soil survey, the specific soil type underlying the project site is Pulehu silt loam. See **Figure 6**. Pulehu silt loam at 0 to 3 percent slopes occurs on alluvial fans between sea level and 300 feet in elevation stream terraces and basins. This is a moderate-drained soil with low runoff hazard, and as such, erosion hazard is slight (U.S. Department of Agriculture, 1972).

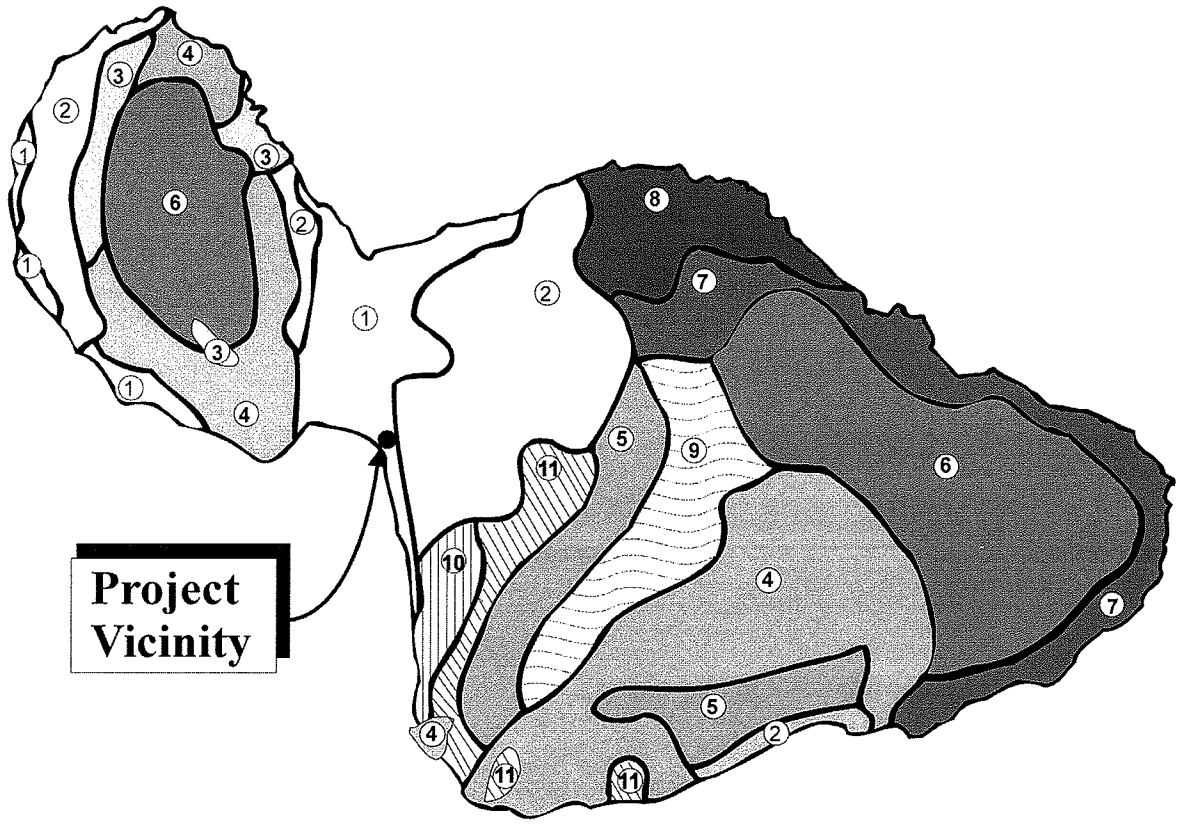
A geotechnical engineering report was prepared by Geolabs, Inc. (Geolabs, Inc., October 2012). According to the report and field exploration, the project site generally consists of moderately to closely fractured basalt rocks extending to depths of about six (6) to 12.5 feet below the existing pavement surface. Further below, dense and/or still alluvial deposits overlying hard basalt rock formation were encountered.

b. Potential Impacts and Proposed Mitigation Measures

The proposed project is not anticipated to adversely impact the underlying soil characteristics. The upstream and downstream channel beyond the South Kihei Road right-of-way will not be significantly altered with the proposed action. A rip-rap apron will be installed upstream and downstream of the concrete slab that the replacement culverts will rest on. This will prevent scouring. There are no geologic or soil hazard limitations associated with the

LEGEND

- (1) Pulehu-Ewa-Jaucas association
- (2) Waiakoa-Keahua-Molokai association
- (3) Honolua-Olelo association
- (4) Rock land-Rough mountainous land association
- (5) Puu Pa-Kula-Pane association
- (6) Hydrandepts-Tropaquods association
- (7) Hana-Makaalae-Kailua association
- (8) Pauwela-Haiku association
- (9) Laumaia-Kaipoipoi-Olinda association
- (10) Keawakapu-Makena association
- (11) Kamaole-Oanapuka association



Pacific Ocean

Source: USDA Soil Conservation Service

Figure 5

South Kihei Road Waiakoa Culvert Replacement

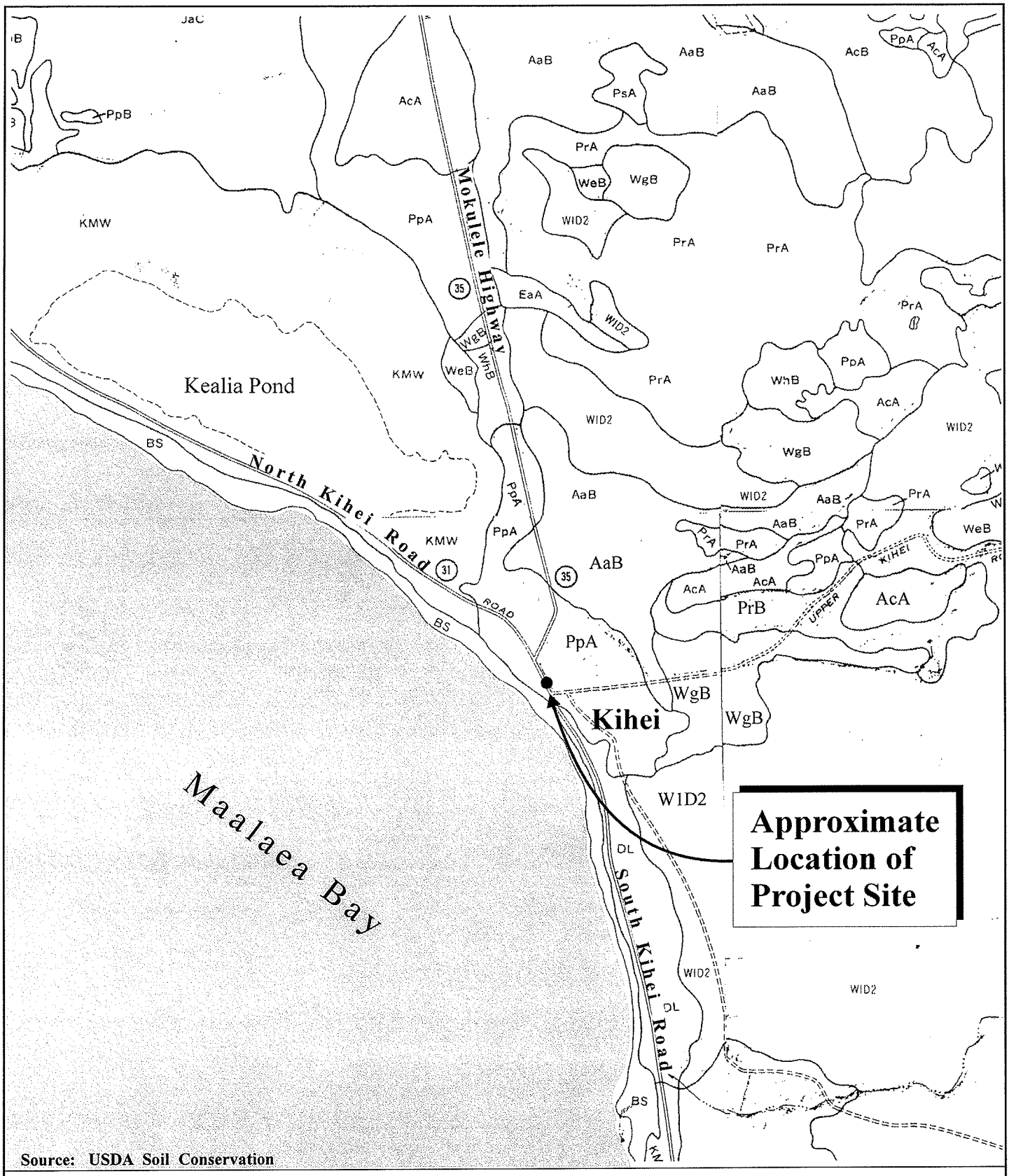
Soil Association Map

NOT TO SCALE

MUNEKIYO & HIRAGA, INC.

Prepared for: County of Maui, Department of Public Works

COM\DPW SKiheiRd Culvert\Soils



Source: USDA Soil Conservation

Figure 6 South Kihei Road Waiakoa Culvert Replacement

Soil Classification Map

NOT TO SCALE

Prepared for: County of Maui, Department of Public Works

MUNEKIYO & HIRAGA, INC.

COM\DPW SKiheiRd Culvert\SoilClass

project site, and the underlying topography does not pose a constraint to the culvert replacement project.

4. Agriculture

a. Existing Conditions

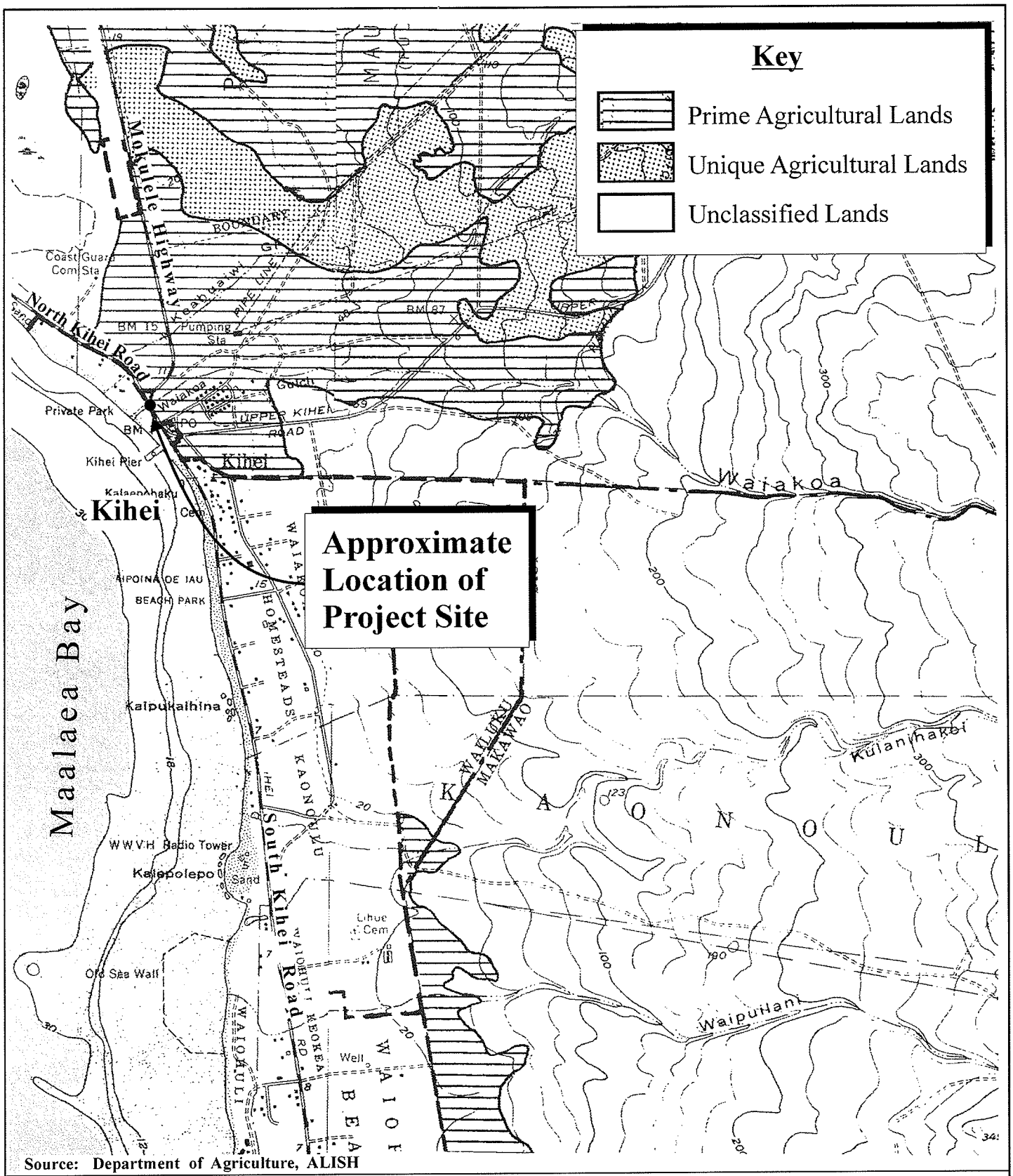
In 1977, the State Department of Agriculture developed a classification system to identify Agricultural Lands of Importance to the State of Hawaii (ALISH). The classification system is based primarily, though not exclusively, upon the soil characteristics of the lands. The three (3) classes of ALISH lands are: "Prime", "Unique", and "Other Important" agricultural land, with all remaining lands termed "Unclassified".

When utilized with modern farming methods, "Prime" agricultural lands have a soil quality, growing season, and moisture supply necessary to produce sustained crop yields economically. "Unique" agricultural lands possess a combination of soil quality, growing season, and moisture supply to produce sustained high yields of a specific crop. "Other Important" agricultural lands include those that have not been rated as "Prime" or "Unique", but are of state-wide or local importance for agricultural use. As reflected by the ALISH map for the project region, the project site is "Unclassified" but adjacent to an area designated for "Prime" Agricultural lands. See **Figure 7**.

b. Potential Impacts and Proposed Mitigation Measures

The project site is currently located within an improved section of South Kihei Road with two (2) existing culverts under the roadway.

There are no current or planned agricultural activities occurring on or near the project site. In the context of the project site's underlying designation as a roadway and its neighboring urban environs, no adverse impacts to agricultural resources are anticipated as a result of the proposed project. Best Management Practices (BMPs) for water quality and air quality will be implemented during the construction period to contain runoff, control sedimentation, and dust that may be generated by construction activities. BMPs will include silt curtains and berms to capture stormwater runoff and sediments. The quantity of sediments leaving the site will be minimized by



Source: Department of Agriculture, ALISH

Figure 7 South Kihei Road Waiakoa Culvert Replacement

NOT TO SCALE

Agricultural Lands of Importance to the State of Hawaii Map

Prepared for: County of Maui, Department of Public Works

MUNEKIYO & HIRAGA, INC.

COM\DPW SKiheiRd Culvert\ALISH

erosion control measures, such as bank stabilization and engineered soil erosion control techniques.

5. Flood and Tsunami Hazards

a. Existing Conditions

As indicated by the Flood Insurance Rate Map (FIRM) for the area, the project site is located in Flood Zone VE and Zone AE. See **Figure 8**. Flood Zone VE is a coastal flood zone with velocity hazard (wave action) with a base flood elevation of 12 feet above mean sea level (amsl). Occasionally, high wave action causes seawater to flow up through the culverts. Flood Zone AE indicates special flood hazard areas subject to inundation by the 1 percent annual chance flood (i.e. 100-year flood), with a base flood elevation of 12 feet amsl.

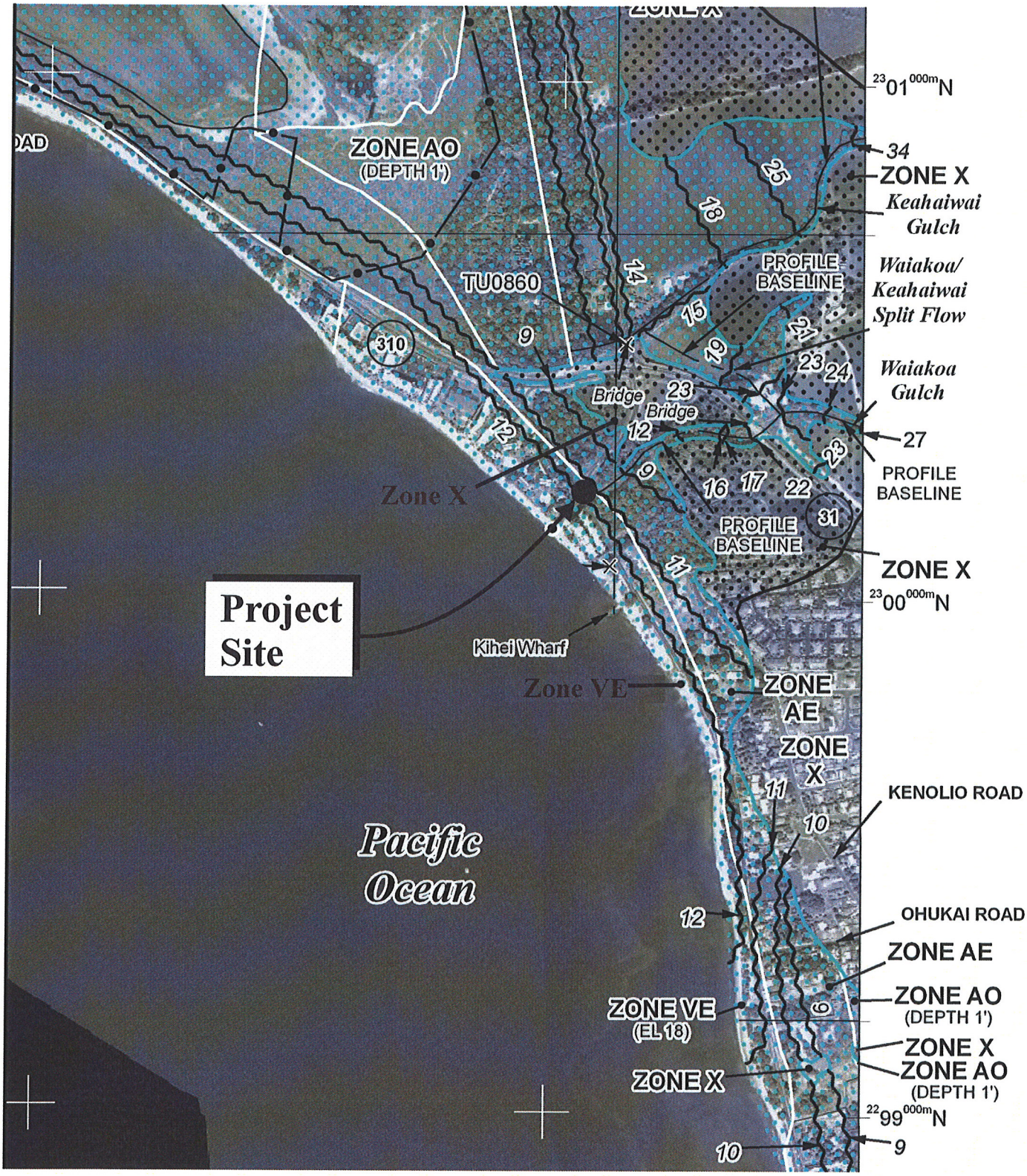
In the recent past, three (3) major flooding events between 2007 and 2012 brought flood waters from the reaches of Waiakoa Gulch, and the accumulated debris in the flood waters blocked the existing culverts causing major flooding to South Kihei Road and surrounding condominiums.

The project site is also situated within the tsunami inundation zone (Pacific Disaster Center, 1998).

b. Potential Impacts and Proposed Mitigation Measures

The proposed project will increase the capacity of stormwater runoff to flow through the culverts and under South Kihei Road, repairing the deteriorating condition of South Kihei Road from storm events. The South Kihei Road will be resurfaced after installation of the replacement culverts to include a ford crossing allowing for stormwater to flow across the roadway. The proposed project will reduce the frequency of road closures due to overtopping of stormwater runoff and flooding of South Kihei Road.

Due to portions of the project site being located in Flood Zones VE and AE, a special flood hazard area, a Flood Hazard Area Development Permit will be required for project implementation. Development of the project site will



Source: FEMA Flood Insurance Rate Map Community Panel 1500030560E

Figure 8

South Kihei Road Waiakoa Culvert Replacement

Flood Insurance Rate Map

NOT TO SCALE

MUNEKIYO & HIRAGA, INC.

Prepared for: County of Maui, Department of Public Works

COM\DPW SKiheiRd Culvert\FIRM

be in accordance with the standards for development set forth by Section 19.62.060, Maui County Code.

Because the project is located within the tsunami inundation area, there are threats anticipated from coastal wave action.

South Kihei Road is part of an evacuation route for the South Maui coastal area which connects to roadways leading to higher ground and out of the tsunami inundation area. As mentioned above, the proposed culverts replacement will reduce the frequency of road closures and flooding in the area during heavy rains and help maintain the evacuation routes out of the tsunami inundation area.

6. Flora and Fauna

a. Existing Conditions

According to U.S. Fish and Wildlife Service (USFWS) early consultation letter dated August 17, 2012, which is included in Chapter XIII of this Draft EA, data compiled by the Hawaii Biodiversity and Mapping Program indicates there is no designated critical habitat within the proposed project area that is protected by the Endangered Species Act of 1973 (ESA). However, there are five (5) species protected by the ESA including one (1) specie protected by the Migratory Bird Treaty Act (MBTA) that may occur and transit through the proposed project area. They are the Hawaiian hoary bat, Hawaiian petrel, Newell's shear water, wedge-tail shear water, and hawksbill turtle. The threatened green sea turtle may also occur and transit through the proposed project area.

Species of fauna generally found in and around the South Kihei area are limited to axis deer, rats, mice, mongoose, and feral cats.

Waiakoa Gulch originates on the eastern slopes of Haleakala at an approximate elevation of 4,900 feet amsl and extends westward to the Pacific Ocean. Downslope from Piilani Highway to the east, the gulch receives a constant supply of brackish groundwater and surface water is always present at the South Kihei Road project site. The gulch outlet is usually blocked by

a sand deposit at the ocean and forms a muliwai (brackish water pond) around the South Kihei Road culvert site. Refer to **Figure 3**. An assessment of the marine biological resources was carried out in January 2012 around the project site by AECOS, Inc. See **Appendix "C"**.

According to the assessment, the aquatic biota at Waiakoa Gulch is comprised of a mix of native and naturalized (non-native) species. Mixed schools of mosquitofish (*Gambusia affinis*) and mollies (*Poecilia spp.*) swim just beneath the water surface. Blackchin tilapia (*Sarotherodon melanotheran*), *aholehole* (*Kuhlia xenura*) and mullet (*Mugil cephalus*) are also present in lesser numbers. Shore crabs (*Metopograpsus thuhukar*) crawl among the pickleweed (*Batis maritma*) along the muliwai margin and on the existing culverts. All these species are common inhabitants of estuarine waters in the main Hawaiian Islands. Rambur's forktail (*Ischnura ramburi*), a naturalized damselfly typically common in low elevations, was also observed during the field survey. Refer to **Appendix "C"**.

The marine biota observed during the survey identified pallid ghost crabs (*Ocyode pallidula*) at the sand beach at the mouth of the gulch, Hawaiian mussel (*Brachidontes crebstriatus*), coralline algae (*Hydrolithon onkodes*), and bryozoan (possibly *Schizoporella unicornis*) encrusting cobbles and boulders around the seafloor in front of the project site. Along the shoreline further to the south, the boulder rip-rap of Kihei Wharf is covered with limu *akiaki* (*Ahnfeltiopsis concinna*) and limu *palahalahala* (*Ulva fasciata*) in the littoral zone, with *Grateloupia hawaiiana* growing in the lower littoral and sublittoral zones. A few black-foot *opihi* (*Cellana exarta*) and helmet urchins (*Colobocentratus atratus*) colonize the seaward end of the wharf. Refer to **Appendix "C"**.

Two (2) tree tobacco plants (*Nicotiana glauca*) were observed near the culvert crossing to the northeast of the project site, which may be used as a staging area for construction. Although the plant itself is not endangered, the plant is sometimes host to the endangered Blackburn's Sphinx Moth (*Manduca blackburni*). On close inspection of the tree tobacco plants by the field biologists, no Blackburn's Sphinx Moth larvae or eggs were observed. Refer to **Appendix "C"**.

b. Potential Impacts and Proposed Mitigation Measures

There were no marine or aquatic species observed in the project area during the January 2012 field inspection that are listed as threatened or endangered by State or Federal agencies. The project is not anticipated to result in modification to any Federally designated Critical Habitat, as there are none present on or adjacent to the project site.

In regards to the occurrence of the tree tobacco plant near the project site, current protocol recommended by the U.S. Fish and Wildlife Service (USFWS) is to have the trees inspected by a qualified entomologist, if removal of the tree tobacco plants from the project area is necessary. However, as recommended by USFWS, every attempt will be taken to not remove or trim woody plants more than 15 feet tall during the Hawaiian hoary bat breeding season of June 1 to September 15. It is recommended that a Best Management Practices Plan (BMP) be designed to protect aquatic biota in the vicinity of the project site during construction, such as, phasing demolition and construction of the replacement culverts in order to maintain a constant water source in the channel to allow marine species to migrate from the downstream and upstream side of the roadway. Additionally, BMPs will be implemented to reduce sediment load impacts into the adjacent marine environment.

Since this is a culvert replacement project, the long-term impact from the proposed action is not anticipated to adversely impact marine resources in and around the project site.

The threatened Newell's shear water (*Puffinus auricularis newelli*), the endangered Hawaiian petrel (*Pterodroma phaeopygia sandwichensis)* and the protected wedge-tail shear water (*Puffinus pacificus*) are known to traverse the project area. Artificial lights can adversely impact these birds, leaving them vulnerable to crashes and injuries. Currently, the project is anticipated to relocate one (1) or two (2) utility poles. The utility poles have street lights that are shielded and downward facing. Additionally, construction activities are anticipated to be conducted during the day time hours. However, if construction activities become necessary to be conducted during the night time hours, construction lighting will be shielded and downward facing to

spot light the construction area as suggested by the USFWS and required by Chapter 205A, HRS.

In regards to the threatened green turtle, the DPW will not be installing artificial lighting as part of the proposed project as noted above. As recommended, prior to construction, a qualified marine biologist will conduct a survey to determine if sea turtles are nesting or basking in the vicinity of the proposed project and appropriate endangered species construction protocols will be established for the project.

7. Streams and Wetlands

a. Existing Conditions

The proposed project crosses Waiakoa Gulch. Waiakoa Gulch starts at approximately 4,900 feet elevation on the East Maui mountains. The gulch extends west-southwest approximately 12 miles from its origin above Kula Highway to its coastal outlet into Maalaea Bay. Though water flow is only intermittent through the gulch upslope of Piilani Highway, the gulch is well-defined with a distinct bed of exposed bedrock and boulders. East of the project site at Waiakoa Uka Bridge, the stormwater capacity for a 100-year storm is estimated to be approximately 8,209 cfs. As noted in the previous section, the sand deposits where the Waiakoa Gulch meets the ocean traps the water in the gulch and forms a muliwai or brackish inland pond at the project site. Refer to **Appendix "C"**. Natural flood events associated with Waiakoa Gulch have been recorded since the 1990s. More recently three (3) major flood events between 2007 and 2012, brought flood waters through the project area and the accumulated debris blocked the culverts causing major flooding of the South Kihei Road and surrounding areas. The U.S. Department of Army (DA) has determined that the proposed project will affect navigable waters of the U.S.

The closest notable wetland to the project site is Kealia Pond located approximately 0.2 mile to the northwest of the project site. A wetland assessment survey was completed on February 13, 2013 by AECOS, Inc. The survey found a one (1) meter by one (1) meter area downstream of the culverts would qualify as a wetland. See **Appendix "C-1"**.

b. Potential Impacts and Proposed Mitigation Measures

The proposed project is to replace existing culverts. Since the U.S. Army Corps of Engineers (USACE) has determined that the proposed project affects navigable waters of the U.S., a Department of Army (DA) permit pursuant to Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act will be submitted for review and approval by the USACE. In addition, a Department of Health (DOH) Water Quality Certification permit will be submitted for review and approval by the DOH. As noted previously, there is a one (1) by one (1) meter wetland area downstream of the culverts. The USACE is currently reviewing the wetland assessment survey to determine the significance of this wetland. Nevertheless, the project plans call out water pollution, temporary and permanent erosion control measures, and best management practices such as installing silt fencing, watering of exposed areas, and construction of a track out area for construction vehicles. In addition, a water quality monitoring and assessment plan has been prepared and will be implemented during construction. See **Appendix "C-2"**. The purpose of this plan is to conduct water sampling and analysis to monitor the effects of the proposed construction and BMPs on water quality. This ensures that the BMPs are effective in mitigating impacts to the quality of the nearshore waters. As a result of these measures, the proposed project is not anticipated to adversely impact any of the region's wetlands or streams.

8. Archaeological and Historical Resources

a. Existing Conditions

An archaeological literature review and field inspection report was completed for the project site in June 2012 by Cultural Surveys Hawaii, Inc. (CSH). Fieldwork was conducted in May 2012. See **Appendix "D"**. Fieldwork involved a 100 percent pedestrian survey. Literature review involved a review of mythological and historical accounts and previous archaeological work conducted in the surrounding region.

According to CSH, the historic information revealed that many important cultural events occurred in the vicinity of the project site that are important

to the history of Maui. It was at Kiheipukoa, the shoreline fronting Kealia Pond to the northwest, that the great chief, Kalaniopuu, of Hawaii Island, landed on Maui to engage in warfare with the Maui chiefs. Kalaniopuu landed his army of elite soldiers at Kiheipukoa and fought the famous battle in the sandhills of Kalua where he met his demise. Historic information also revealed as a result of the sheltered coast along this portion of Maui, plentiful fishing resources were available and the area became sites for the development of a number of fishing ponds. After the arrival of Captain Vancouver in 1792, activities revolved around Kalepolepo, located to the south of Waiakoa Gulch, which became a major hub for Kihei and Kula. The South Kihei coast also became a regular port for visiting whaling ships. Later in the 1890s, the area was part of the large sugar plantations that were developed on Maui. The Kihei Sugar Plantation camp was located just to the east of the project site.

In addition to the early human events and activities that characterized the land uses around the project area, natural flooding events associated with Waiakoa Gulch also impacted the lands. Major damage to the area has been recorded from Kona storms since the 1900s.

b. <u>Potential Impacts and Proposed Mitigation Measures</u>

No cultural or historic resources, nor burials were encountered during the archaeological field survey. In addition, the survey indicated that the project area has experienced 100 plus years of sugarcane cultivation and the effects of periodic flood events. Flood events require dredging and clearing of debris and heavy sedimentation of Waiakoa Gulch further disturbing soils in the area. As a result, the project area has been heavily disturbed and the likelihood of locating intact cultural deposits or archeological remains would be low. However, because the project site is located within the sand deposits, archaeological monitoring was recommended. As such, an archaeological monitoring plan was prepared in accordance with Section 13-13-279, Hawaii Administrative Rules. Refer to **Appendix "E"**.

The archaeological field investigation report and monitoring plan were submitted to the State Historic Preservation Division (SHPD) for review.

Lastly, in accordance with Section 6E-43.6, Hawaii Revised Statutes and Chapter 13-300, HAR, if any significant cultural deposits or human skeletal remains are encountered, work will stop in the immediate vicinity of the find and the SHPD and the Office of Hawaiian Affairs (OHA) will be contacted.

9. Cultural Resources

a. Existing Conditions

According to a Cultural Impact Assessment (CIA) prepared by Hana Pono, LLC in June 2009, historically speaking, the island of Maui was divided into 12 *moku*, traditional land districts, each of which in turn were divided into a number of *ahupuaa*. *Ahupuaa* generally stretched from mountaintop into the outer reef, and each contained all the natural resources necessary to sustain a community. The project site lies in the *moku* of Kula and the *ahupuaa* of Pulehunui. Kula refers to a broad, open expanse of land, and the lands within the *moku* of Kula were known to be vast and arid. On the coast, however, fishing was plentiful, and it was during the era of the long voyages, between 1100AD and 1400AD, that this leeward area of the island was settled.

The Hana Pono CIA mentioned, settlements in the coastal areas of Waiakoa and neighboring *ahupuaa* were sustained by the bountiful ocean resources. Along the shoreline to the north and south of the project site a number of fishponds were built, most notably Koieie at Kalepolepo Beach, Waiohuli-kai, and Keokea-kai, These ponds were some of the most important royal fishponds on Maui and were reportedly rebuilt at least three (3) times over the centuries by various ruling chiefs.

The Hana Pono CIA continued on stating that in addition to fish, various types of *limu* (seaweed), octopus, lobster and other shellfish were gathered from the ocean, and this diet of seafood was likely supplemented by food crops grown in other regions of the island. *Kalo* (taro) was possibly obtained from Waikapu while *uala* (sweet potato) and *ulu* (breadfruit) were likely acquired through trade with other villages in the Kula district.

The Hana Pono CIA pointed out that to facilitate trade and communication, a number of trails like the Kalepolepo Trail linked coastal and upland

settlements, while Ke Alaloa o Maui, built by King Piilani and his son Kihapiilani, was effectively a highway that circled the entire island. South Kihei Road follows the path of the Alaloa.

The Hana Pono CIA discussed that with the arrival of foreign settlers and the creation of the Hawaiian Kingdom came new industry and economy. As early as 1828, sugar cane was introduced to Maui, and by 1899, the Kihei Plantation Company was growing sugar cane in the plains above Kihei. The Kihei Plantation Company was later absorbed by the Hawaiian Commercial & Sugar Company (HC&S) in 1908. HC&S continued to cultivate in sugar what had been the Kihei Plantation Company fields into the 1960s.

The Kihei pier, near the project site to the southwest, was used for fishing vessels for loading sugar onto ships.

According to the Hana Pono CIA, the Kihei area has transitioned from a historically agrarian and marine-based community to a sugarcane plantation to a tourism hub in the present day. More recently, a dependable water supply was brought to the area, which spurred overseas investment in the development of residential housing and vacation properties. Since that time, tourism has increased, and as a consequence, the South Maui area has recently been touted as one of the fastest growing regions in the state.

In order to obtain local information to assess potential cultural impacts, interviews with knowledgeable residents were carried out and are included below. See **Appendix "F"**.

Paula Kalanikau

Paula Kalanikau was born on June 17, 1938 on the Big Island of Hawaii, and grew up in Kukaiau, a town so small that if you blinked your eyes while driving past it, chances are you would miss it.

Daughter to Mary Keliipahulio Kauahipaula and Gilbert Manuhoa Travis Sr., Paula is three quarters Native Hawaiian. Her mother, Mary, was pure Hawaiian and her father, Gilbert, *hapa*. Paula is one of seven children.

Paula often came to Maui to visit her sister, who had moved to Maui from the Big Island to marry a Maui man. Paula met her own husband in the early 1960's on one of her trips to Maui, Moses Kalanikau, better known as "Moki" whom she married in 1961 when she was 25 years old. Together, Moki and Paula would have four children.

After a few years living in Wailuku, Moki and Paula bought a home in Kihei in 1964, known as The Kalanikau Estate, near the Maui Lu hotel, not very far from the project site of the Proposed South Kihei Road Waiakoa Culvert Replacement. Paula explained that her children were excited about the move as they would be closer to the ocean. The ocean, Paula described, was much more pristine back then with its glassy surface and beautiful beaches.

Moki and Paula were both very active in the community, staying involved and giving back in the best ways they knew how. For Moki, it seemed his passion rested with helping the children in the community. Co-founding the Kihei Canoe Club, Paula explained that, in part, Moki founded the club in 1973 to give the keiki in the area something to do, as there was not much offered to the youth from a community standpoint at that time.

Sadly, Moki passed away in 1986, and Paula, true to her soul mate, never remarried and raised her children as a single parent. Paula credits this to the help of her mother-in-law to whom she expressed her gratitude and appreciation. In Moki's memory, the Kihei Canoe Club holds an annual canoe race in his name: The Moki Kalanikau Regatta. This regatta, Paula shared, started as a request from the keiki to the board of the club. With the board's approval, the club held the first regatta in Moki's name in 1987.

Today, the Kihei Canoe Club is enjoyed with much popularity by the community with over 300 members and about two dozen canoes. The club is located at the beach not far from the project site in North Kihei, at South Kihei Road's intersection with Uwapo Road. But the club goes beyond just paddling, Paula explained, the club has a mission to revive and perpetuate the Hawaiian culture.

In speaking of the proposed project, Paula noted that flooding has always been a problem in the area. She explained that the culvert is currently too

small and that water often overtops the road. Paula is concerned with the runoff that flows into the ocean. Remembering the pristine waters from several decades ago and the changes that have been brought with a short period of time, Paula questioned what kind of ocean are we to have in the future. Recognizing the larger picture, Paula expressed her wish for the County to work together with the State to protect our waters from pollution.

For this project, Paula asked that the County maintain the new culvert regularly. Paula explained that growing up she was taught by her parents to never throw anything in the ocean, to always bring your trash home to recycle as best you could, and to always say thank you and a word of prayer before you leave. Today, some kids are still learning this, Paula concludes.

Leonard Kimokeo Kapahulehua

Kimokeo is a native Hawaiian and a Hawaiian cultural practitioner. He is very active in the community paying most of his attention perpetuating the native Hawaiian culture. He is also the president of the Kihei Canoe Club (Club), whose Club is nearby the proposed project site. Since he spends a lot of time at the Club, he has witnessed several flood events at the South Kihei Road culvert crossing of Waiakoa Gulch.

Focusing on Hawaiian cultural practices, Kimokeo explained the importance of water flowing from Kula through the Waiakoa Stream from mauka to makai for fishing. He described that the floods attract the ocean fish such as papio, awa, and sharks to the mouth of Waiakoa Gulch to eat the brackish water fish like tilapia. This in turn brought fishermen to catch the ocean fish. Fishing methods in this area included pole fishing, nets, and throw nets predominantly for akule. He added that fishermen also gather limu and hee.

Kimokeo also made clear that the place name of the beach at the mouth of Waiakoa Gulch is called "kalaepohaku" because stones similar to az stones would be found and gather at the mouth. These stones were used to make implements.

Naturally, canoeing is an important native Hawaiian cultural practice happening near the project site because of the location of the nearby Club.

However, Kimokeo does not see that the proposed replacement of the culverts will affect canoe activities or the Club.

In speaking about cultural practices at the site or nearby the site, besides fishing and canoeing, Kimokeo did not know of any other cultural practices. He explained that there are no native and/or endangered plants or birds. He had seen barn yard owls but not the native Hawaiian owls. On occasions, he had seen hoary bats at the shoreline but not at the culvert area itself. Kimokeo recognized introduced plants in the area such as akulikuli and aki aki.

Kimokeo surmised that replacing the culvert is a smart management project versus continually flooding of the area. He concluded that there would be no impact to cultural practices and, in fact, could promote more fishing in the area.

b. <u>Potential Impacts and Proposed Mitigation Measures</u>

As noted above, canoe activities occur in the immediate area of the proposed project. Canoe activities help to carry on the Hawaiian culture. The concern of the cultural interviewees is to protect the coastal waters from stormwater runoff contaminates and sediments.

The purpose of the proposed project is to repair the culverts allowing less frequent flooding of South Kihei Road. Although the proposed project will not address regional stormwater runoff issues, the DPW is working on a regional stormwater management plan for South Maui. The regional stormwater management plan for South Maui will address runoff contaminates and sediments that will help to protect coastal waters for canoe activities and other coastal cultural practices such as fishing and gathering. In regards to the proposed project protecting coastal waters, the interviewees requested that the new culverts be regularly maintained. Following their recommendation and standard best management practices, the DPW will maintain the new culverts as part of the long-term maintenance plan.

Based on the foregoing, the proposed project is not anticipated to generate any significant negative impacts on the cultural resources of the region.

10. Water Quality

a. Existing Conditions

Waiakoa Gulch originates at approximately 4,900 feet amsl on the eastern slope of Haleakala. The water flow is intermittent through the gulch upslope of Piilani Highway. Downslope of Piilani Highway, the gulch receives a constant supply of brackish groundwater. The gulch is also blocked by a sand berm at the ocean outlet which causes the muliwai (brackish pond) within the gulch in and around the South Kihei Road crossing. AECOS, Inc. carried out a water quality assessment for the proposed project in January 2012. Refer to **Appendix "B"**. Three (3) sample stations were established for the water quality sampling: one (1) station upslope of the culvert, one (1) station within the muliwai downstream of the culverts near the sand berm, and one (1) station in the ocean just offshore of the Waiakoa Gulch. The results of the water quality samples are presented in **Appendix "B"**.

The results of the water test analysis indicate the mulawai water near the project site were nutrient-, sediment- and Chlorophyll-laden with elevated pH levels and slightly depressed dissolved oxygen concentrations relative to the State of Hawaii, Department of Health (DOH) water quality criteria for estuaries, meaning that the existing water quality is poor and in some instances exceeding the State DOH levels for nutrients, turbidity, chlorophyll, and phosphorus. Refer to **Appendix "B"**.

b. Potential Impacts and Proposed Mitigation Measures

The proposed project may, in the short term during construction, increase the turbidity plumes in the project area. However, Best Management Practices (BMPs) such as silt curtains in the water to contain turbidity to the construction site and dewatering the construction zone as much as possible would mitigate potential increase in turbidity. In the long term, the proposed project is not anticipated to adversely impact water quality in the muliwai or the nearshore marine environment.

As indicated previously, the USACE has determined that the proposed project affects navigable waters of the U.S. Therefore, a DA permit will be

required. In addition, a Section 401, Water Quality Certification approval will be required from DOH. Furthermore, a water quality monitoring and assessment plan will be completed and implemented to ensure construction and BMPs will mitigate impacts to near shore waters. The listed permitting approvals will address water quality requirements and mitigation during construction.

11. Air and Noise Quality

a. Existing Conditions

The air quality of the Kihei area is considered good with existing airborne pollutants attributed primarily to automobile exhaust from the region's roadways. There are no point sources of airborne emissions in the immediate vicinity of the project site. Other sources of airborne emissions may include construction activities around Kihei and smoke produced from sugarcane burning which takes place in the Central Maui isthmus. These sources are intermittent, however, and prevailing trade winds quickly disperse any particulates which are generated.

There are no significant noise generators in the vicinity of the project site. The predominant background noise source in the area is attributed to vehicular traffic along South Kihei Road and Mokulele Highway.

b. Potential Impacts and Proposed Mitigation Measures

Air quality impacts attributed to the proposed project will include dust generated by short-term construction-related activities. Site work, such as clearing, excavating and grading, and roadwork and construction will generate airborne particulates. Dust control measures such as dust fences and regular watering and sprinkling will be implemented to minimize wind-blown emissions. Graded and grubbed areas will be covered to mitigate dust-generated impacts. In the long term, the proposed project is not expected to adversely impact local and regional ambient air quality.

Ambient noise conditions will be temporarily impacted by construction activities. Heavy construction equipment, such as backhoes, front-end

loaders, and material-transport vehicles will likely be the dominant sources of noise during the construction period. As such, the DPW will comply with DOH Community Noise regulations, as applicable. In the long term, no significant adverse impacts to ambient noise conditions are anticipated.

12. Scenic and Open Space Resources

a. Existing Conditions

The slopes of Haleakala are visible to the east of the project site, with the West Maui Mountains visible to the north. The ocean to the west is visible from South Kihei Road. Urban development surrounds the project site to the north and south.

b. Potential Impacts and Proposed Mitigation Measures

The proposed project will replace two (2) existing culverts under South Kihei Road at Waiakoa Gulch. The proposed improvements will be at grade or below the existing roadway. Thus, mountain and ocean views from the project site will not be impacted as a result of the proposed project.

The culvert replacement will also not adversely impact open space resources in the area.

B. SOCIO-ECONOMIC ENVIRONMENT

1. Regional Setting

a. Existing Conditions

From a regional standpoint, the project site is located within the Kihei-Makena Community Plan region, which stretches from Maalaea in the north down to La Perouse Bay in the south. The region contains a diverse range of physical and socio-economic environments. With its dry and mild climate and proximity to recreation-oriented shoreline resources, the visitor-based economy has grown steadily over the years. The town of Kihei serves as the commercial and residential center of the region, with the master-planned

communities of Wailea and Makena serving as the focal points for the majority of visitor activities. A number of multi-family resort condominiums are located along South Kihei Road.

b. Potential Impacts and Proposed Mitigation Measures

The proposed project is a replacement of two (2) existing culverts under South Kihei Road to improve safety and flooding conditions. In this respect, adverse impacts to the regional character of the Kihei area are not anticipated.

2. Population and Demography

a. Existing Conditions

The population of the County of Maui has exhibited relatively strong growth over the past decade. The County's resident population grew by 20.9 percent between 2000 and 2010, compared to a 12.3 percent increase in the State of Hawaii as a whole during the same time period. Maui County's population increased from 128,094 residents in 2000 to 154,834 residents in 2010. Population on the island of Maui exhibited even stronger growth than the County as a whole, with a 22.8 percent population increase over the decade. Approximately 144,444 residents lived on the island of Maui in 2010 (U.S. Census Bureau, 2000 and 2010). Maui County's resident population is projected to rise to 178,912 people in 2020 and to 200,584 people in 2030 (County of Maui, 2006).

The proposed project is located on South Kihei Road within the Kihei-Makena Community Plan region. Just as Maui County and Maui Island's populations have grown, the resident population of the Kihei-Makena region has also increased. The estimated population of the Kihei-Makena region in 2000 was 22,870, which comprised 19.4 percent of the island's population (County of Maui, 2006). According to the 2010 Census, the resident population for the region was approximately 27,200, an increase of 19.1 percent over 10 years (U.S. Census Bureau, 2010). The population of the Kihei-Makena region is projected to increase to 31,492 people in 2020 and to 35,307 people in 2030.

b. Potential Impacts and Proposed Mitigation Measures

The proposed project is being planned to improve safety of the roadway and improve flooding conditions during periods of moderate to heavy rain. The proposed project does not increase roadway capacity nor promote growth. As such, the proposed project will not have an adverse impact on population or demography.

3. Economy and Labor Force

a. Existing Conditions

The economy of Maui is heavily dependent upon the visitor industry, and in turn, this industry fosters the retail and service industries. According to the 2011 Maui County Data Book, the top three (3) most common occupations in Maui County in 2010 were waiters and waitresses, retail salespersons, and cashiers. The dependency on the visitor industry is especially evident in the Kihei-Makena region, which is one of the State's major tourist destination areas. The foundation for the region's visitor strength lies in the availability of vacation rentals, hotel-condominiums, world-class resorts, and recreational facilities throughout Kihei, Wailea, and Makena. Since the 2008 economic downturn, the average daily visitor census has increased from 44,433 visitors in 2008 to 46,263 visitors in 2010 for Maui Island (County of Maui, Office of Economic Development, 2012).

Alongside visitor accommodations, service support for the visitor industry is found in Kihei, where numerous retail commercial centers are located. South Kihei Road is a major collector roadway for mixed retail, office and warehouses, retail, and single- and multi-family residences and visitor accommodations.

Despite the recent economic downturn, there are signs of recovery on the local level. As of January 2013, Maui County's not-seasonally adjusted unemployment rate stood at 5.2 percent, a reduction of just over one (1) percent from January 2012. Similarly, Maui Island's not-seasonally adjusted unemployment rate for January 2013 stood at 5.4 percent, a reduction of over one (1) percent from January 2012 (State of Hawaii, Department of Labor

and Industrial Relations, March 2013).

b. Potential Impacts and Proposed Mitigation Measures

On a short-term basis, the proposed project will support construction and construction-related industries. The proposed project will have a beneficial impact on the local economy during the period of construction. In the long term, the proposed project will have a beneficial impact on the economy by maintaining safe access along South Kihei Road and reducing flooding conditions.

4. Housing

a. Existing Conditions

The project site is located in Kihei, the commercial and residential center of South Maui. In the vicinity of the proposed project, there are a mix of affordable and market priced single- and multi-family residential neighborhoods, and resort accommodations. The update to the Maui County General Plan anticipates continued residential growth in the Kihei-Makena region with a number of new residential and in-fill developments being captured within the proposed Urban Growth Boundary of the Draft Maui Island Plan.

b. Potential Impacts and Proposed Mitigation Measures

The proposed project will not increase the carrying capacity of South Kihei Road. As such, the proposed project will not have an adverse impact on the housing inventory or existing conditions.

C. PUBLIC SERVICES

1. Police and Fire Protection

a. Existing Conditions

The headquarters of the County of Maui Police Department (MPD) are

located at its Wailuku Station. The department consists of several patrol, support, administrative, and investigative divisions that service the Hana, Lanai, Lahaina, Molokai, and Wailuku regions.

The MPD's Kihei Patrol, which covers the Kihei-Makena region, currently operates from a substation located at the Kihei Town Center, about 1.5 miles south of the project site. However, the MPD has initiated the construction of a new Kihei Police Station, which will be located on the mauka (east) side of Piilani Highway, approximately 2.5 miles south of the project site. Construction of this facility commenced in December 2011, and the project is anticipated to reach completion in the next five (5) years.

Fire prevention, protection, and suppression services are provided by the County of Maui, Department of Fire and Public Safety. The Kihei Fire Station, which services the Kihei-Makena region, is situated on South Kihei Road near Kalama Park, approximately 2 miles south of the project site. Meanwhile, the Wailea Fire Station is located about 4.5 miles to the south of the project site. The Wailea Station services the area from Kamaole Beach Park II to Makena and provides back-up support for the Kihei Station when required.

b. Potential Impacts and Proposed Mitigation Measures

The proposed project will improve road safety and reduce the occurrence of road closures from flooding and will result in beneficial impacts to emergency service providers. During construction, the project area will be closed and a detour route is identified on the traffic management plan using Uwapo Road, Mokulele Highway and North Kihei Road.

2. Medical Facilities

a. Existing Conditions

The only major medical facility on the island is Maui Memorial Medical Center, which is located in Wailuku about ten (10) miles from the project area. The 231-bed facility provides general, acute, and emergency care services.

Clinics and medical offices offering services of a lesser scale are situated throughout Kihei and Wailea. Such clinics include Kihei Clinic and Wailea Medical Services, Kihei Pediatric Clinic, Kihei Physicians, Maui Medical Group, and Kaiser Permanente.

b. Potential Impacts and Proposed Mitigation Measures

The proposed project is anticipated to have a beneficial effect on accessibility to service capabilities of emergency medical or general care operations. As noted above, numerous medical services are located along the South Kihei Road corridor. The proposed project will improve roadway safety and reduce road closures, due to flooding and thereby, enhance access to medical facilities during inclement weather conditions.

3. Educational Facilities

a. Existing Conditions

The State Department of Education (DOE) operates three (3) schools in the Kihei area which are part of the Central Maui School complex. Kihei Elementary School and Kamalii Elementary School each cover grades Kindergarten to 5 and Lokelani Intermediate School covers grades 6 to 8. Maui High School, which covers grades 9 to 12 and is located in Kahului, is the designated public high school for Kihei residents.

The Kihei Public Charter School for grades Kindergarten to 12 is also located in the region, with an enrollment of 507 students in the 2010-2011 school year (State of Hawaii, Department of Education, 2011).

The University of Hawaii-Maui College (UHMC), located in Kahului, is the primary higher education institution serving Maui County.

b. Potential Impacts and Proposed Mitigation Measures

The proposed project is not considered a population generator. As such, adverse impacts to educational facilities are not anticipated.

4. Recreational Facilities

a. Existing Conditions

Diverse recreational opportunities are available in the Kihei-Makena Community Plan region. Shoreline activities, such as fishing, surfing, jogging, camping, picnicking, snorkeling, swimming, and windsurfing, are by far the predominant forms of recreation in the area. Numerous public park facilities exist within a relatively short driving distance of the project site, including Waipuilani and Sugar Beach Parks. Other recreational resources available in Kihei include the Kihei Community Center and Aquatic Center, as well as Kealia Pond Wildlife Sanctuary. In the immediate vicinity of the project area, canoe activities from Kihei Canoe Club are a normal occurrence.

b. Potential Impacts and Proposed Mitigation Measures

The proposed project will improve road safety conditions. The proposed project is not considered a population generator and will not adversely impact beach access. Therefore, the proposed project is not anticipated to have an adverse impact on recreational facilities or canoe activities in the region.

5. Solid Waste Disposal

a. Existing Conditions

Single-family residential solid waste collection service is provided by the County of Maui. Residential solid waste collected by County crews is disposed of at the County's Central Maui Landfill facility, located 4.0 miles southeast of the Kahului Airport. In addition to County-collected refuse, the Central Maui Landfill also accepts commercial waste from private collection companies. A County supported green waste recycling facility is located at the Central Maui Landfill. A new expansion to the Central Maui solid-waste landfill facility is planned to ensure continuing service capacity for island residents and visitors.

Privately owned facilities, such as the Maui Demolition and Construction Landfill and the Pohakulepo Concrete Recycling Facility, accept solid waste

and concrete from demolition and construction activities. These facilities are located at Maalaea, near Honoapiilani Highway's junctions with North Kihei Road and with Kuihelani Highway.

b. Potential Impacts and Proposed Mitigation Measures

A construction waste recycling, reuse, and disposal plan will be developed prior to the initiation of construction and coordinated with the County of Maui, Department of Environmental Management. On a long-term basis, the proposed project will not generate solid waste. The proposed project is not anticipated to affect the service capabilities of the County's residential solid waste collection system.

D. INFRASTRUCTURE

1. Roadways

a. Existing Conditions

Access to the Kihei region is provided via North Kihei and South Kihei Road from the West Maui and the Wailuku areas and via Mokulele Highway from the Kahului and the Upcountry areas. The following is a summary of major roadways in the vicinity of the project site.

(1) Piilani Highway

Piilani Highway is a four-lane, State arterial highway providing access between Kihei and Wailea and runs parallel to and mauka of South Kihei Road. Piilani Highway is the main arterial road in the area. In addition to paved shoulders, Piilani Highway has traffic signals and right- and left-turn lanes at major intersections. Piilani Highway narrows to two (2) lanes near the Maui Meadows subdivision south of Kilohana Drive and ends at Wailea Ike Drive in the Wailea Resort. The posted speed limit is 40 miles per hour (mph).

(2) Mokulele Highway

Mokulele Highway connects Kihei and Kahului. Mokulele Highway is a four-lane, divided State arterial highway. The Hawaiian Commercial & Sugar Company Mill, the Maui Humane Society, the Hawaii Army National Guard Puunene Armory, and various industrial facilities are located along Mokulele Highway. The posted speed limit is 45 mph.

(3) North Kihei Road

This two-lane, undivided State roadway runs along the coastline and adjacent to the Kealia Pond National Wildlife Refuge. At the Mokulele Highway intersection, near the southern end, there are a number of multi-family resort residential complexes at Sugar Beach. In the north, North Kihei Road intersects Honoapiilani Highway at Maalaea. North Kihei Road is used primarily by vehicles traveling between West Maui, Central Maui, and Kihei.

(4) South Kihei Road

This two-lane, undivided County collector roadway runs in a north-south direction along the Kihei coastline from its intersection with North Kihei Road to Okolani Drive in Wailea. At its northern terminus, near the Mokulele Highway intersection, South Kihei Road turns into North Kihei Road, which continues north to Maalaea. South Kihei Road provides local access to residences, visitor accommodations, shopping areas, and parks along the Kihei coastline. The posted speed limit is 20 mph.

b. Potential Impacts and Proposed Mitigation Measures

The proposed project will improve roadway conditions along the Waiakoa Gulch segment of South Kihei Road. The proposed project will also improve the capacity of the culverts and reduce flooding during rainy conditions that will allow for less frequent closures of the South Kihei Road. As such, the proposed project will have a beneficial impact on the local transportation

infrastructure. During construction, the County Department of Transportation will be notified when the proposed project will detour South Kihei Road. The detour route follows Uwapo Road, Mokulele Highway and North Kihei Road. A traffic mitigation plan will be submitted to the DPW, Highways Division at the time of Grading Permit processing. The construction period for the proposed project is estimated to be six (6) months.

The configuration of the roadway will not change and be similar to the existing condition with two (2) lanes and a shoulder on each side. Bike lanes will not be addressed as part of this repair project.

2. Water System

a. Existing Conditions

The Kihei area is served by the County of Maui, Department of Water Supply's (DWS) Central Maui System. The main sources of water for the Central Maui System are the designated Iao aquifer, Waihee aquifer, the Iao tunnel and the Iao-Waikapu Ditch. According to the DWS there is no additional source available in the Central Maui System until new sources are developed.

A 6-inch waterline runs approximately 27 feet to the east of the eastern travel lane. As per the existing construction plans, this waterline is outside the area of construction and will not be impacted by the proposed project.

b. Potential Impacts and Proposed Mitigation Measures

The proposed project is not anticipated to impact the existing 6-inch waterline to the east of the road right-of-way. Nevertheless, coordination with DWS will be carried out if the waterline will need to be relocated or replaced. The proposed project is not anticipated to adversely impact water system. The DPW will consult with the DWS regarding construction to ensure proper coordination with DWS on waterlines.

In addition, the DPW will use brackish or reclaimed water, as practical, for dust control during construction and demolition.

3. Wastewater System

a. Existing Conditions

The Kihei region is currently serviced by a wastewater collection, treatment, and disposal system owned and operated by the County of Maui, Department of Environmental Management Wastewater Reclamation Division (WWRD). The system consists of a number of pump stations and force mains which convey wastewater through the County's transmission lines. The Kihei Wastewater Reclamation Facility (KWRF) processes the wastewater for the South Maui area.

The KWRF is located mauka (east) of Piilani Highway and approximately 2.5 miles southeast of the project site. The KWRF provides treatment for the South Maui region to produce recycled water at the R-1 level, according to State Department of Health standards. R-1 recycled water is the highest quality of recycled water for irrigation use. The wastewater capacity of the KWRF is approximately 8.0 million gallons per day (mgd) and the current dry weather flow into the plant is approximately 4.0 mgd. Therefore, the KWRF is currently operating at approximately 50 percent of its capacity.

The sewerline is located on the upstream side of the culvert crossing and beyond the limits of the project area.

b. Potential Impacts and Proposed Mitigation Measures

The proposed project will not have an adverse impact on wastewater systems.

4. Drainage System

a. Existing Conditions

Maui receives varying levels of rainfall in a given year depending on location. The annual rainfall of the Kihei area in 2010 was 4.68 inches (County of Maui, Office of Economic Development, 2012). The majority of the project site is located within Flood Zone VE and AE. Flood Zone VE is a coastal flood zone with velocity hazard (wave action); while Zone AE is a special

flood hazard area with base flood elevation of 12 feet.

Waiakoa Gulch is a major drainageway in Kihei, originating on the eastern slope of Haleakala at an approximate elevation of 4,900 feet amsl and running in a east-west direction to the ocean outlet in Kihei. It crosses the Piilani Highway at the Waiakoa Uka Bridge. The capacity of the drainageway at the Waiakoa Uka Bridge for the 100-year storm is approximately 8,209 cubic feet per second (cfs). Refer to **Appendix "B"**. After crossing the Waiakoa Uka Bridge, stormwater flows overland through a flat and shallow earth channel towards the South Kihei Road crossing. The ground cover between Piilani Highway and South Kihei Road consists of dense vegetation of Keawe trees and brush. Sand deposits and debris accumulate along the gulch. The existing culverts (48-inch and 24-inch) have a total capacity of approximately 89 cfs, which is inadequate to handle the runoff from a 100-year storm and the road is overtopped during large storm events. The channel outlet to the west of the South Kihei Road culverts is normally blocked by a sand berm. The above factors contribute to the flooding problems at the South Kihei Road crossing.

b. Potential Impacts and Proposed Mitigation Measures

The proposed project will replace the existing culverts with two (2) 3-feet by 10-feet box culverts. The new culverts will have a capacity of approximately 410 cfs. The project was designed to replace the existing culverts and provide some additional capacity, but was not designed to handle a 100-year storm. Road overtopping will still occur during a 100-year storm event. Due to the physical constraints at the project site, such as the elevation of South Kihei Road, the downstream channel configuration and the sand berm at the shoreline, large stormwater events cannot be accommodated through culverts below South Kihei Road. However, the resurfacing of the roadway will include a ford crossing allowing for stormwater to flow across the roadway accommodating vehicular passage. In addition, DPW maintenance crews will clear the sand at the gulch outlet during extreme flooding so that the stormwater runoff can flow unrestricted to the ocean. The larger culverts and road maintenance actions during the storm events will help reduce the impact from flooding during the shorter interval storms. However, because of the large stormwater runoff volumes during a 100-year storm, the new culverts

at South Kihei Road will not accommodate all the flow and flooding will still occur during major storm events.

Although the proposed project will not address regional stormwater capacity issues, the DPW is working on a regional stormwater management plan for South Maui. The regional stormwater management plan for South Maui will address a master drainage plan that will handle a 100-year storm.

Onsite drainage and soil erosion control measures and conformance with "Rules for the Design of Storm Drainage Facilities in the County of Maui" will reduce the potential of sediments contained in the runoff from entering the muliwai and eventually the ocean.

5. Electrical, Telephone, and Cable Television Services

a. Existing Conditions

There are overhead utility lines along South Kihei Road servicing the commercial and residential and resort facilities located along this corridor.

b. Potential Impacts and Proposed Mitigation Measures

One (1) or two (2) utility poles will need to be relocated. The relocation of the electrical, telephone, and cable television services for the project area will be coordinated with Maui Electric Company, Hawaiian Telcom, and Oceanic Time Warner Cable, respectively. It is anticipated that service capacity will not be adversely impacted. The new poles will be relocated within the South Kihei Road right-of-way.

E. CUMULATIVE AND SECONDARY IMPACTS

Cumulative impacts are defined as the impact on the environment which results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions.

With respect to larger and foreseeable future actions, the County of Maui is currently in the process of updating the County of Maui Master Drainage Plan and also reviewing the County

General Plan through the planning horizon of 2030. In 1974, the Master Drainage Plan proposed to divert the majority of the Waiakoa drainage flows upslope of the Piilani Highway towards Kealia Pond. It was estimated that approximately 8,209 cfs of stormwater runoff would be diverted away from the section of Waiakoa Gulch between Piilani Highway and the ocean. Although the Drainage update has not been finalized, it is anticipated that the update to overall drainage plan for the Waiakoa Gulch will be similar to 1974 plans. Cumulatively, this would reduce the flooding at Waiakoa Gulch.

Among the components of the General Plan Update is the formulation of a Maui Island Plan which will delineate urban and rural growth boundaries (UGBs and RGBs, respectively). The purpose of the UGBs and RGBs is to direct future urban and rural growth to select areas of Maui Island, taking into account population projections and future demands for housing infrastructure, services, and public facilities. The proposed project is a repair and maintenance project located within the existing urban area of the Kihei-Makena region and is not a population generator. The capacity of the roadway will not change, therefore, the project will not have a cumulative impact.

Secondary impacts are those which have the potential to occur later in time or farther in distance, but are still reasonably foreseeable. They can be viewed as actions of others that are taken because of the presence of the project. Secondary impacts from highway projects, for example, can occur because they can induce development by removing one of the impediments to growth, transportation access.

The project will replace existing culverts and is not anticipated to have significant secondary impacts. The project is part of an existing infrastructure system and extensions of the infrastructure systems resulting from the project will not be required.

III. RELATIONSHIP TO LAND USE PLANS, POLICIES, AND CONTROLS

III. RELATIONSHIP TO LAND USE PLANS, POLICIES, AND CONTROLS

A. STATE LAND USE DISTRICT

Chapter 205, Hawaii Revised Statutes (HRS), relating to the Land Use Commission, establishes four (4) major land use districts in which all lands in the state are placed. These districts are designated as "Urban", "Rural", "Agricultural", and "Conservation". The project site is located within the "Urban" district. See **Figure 9**. The proposed project is consistent with the permitted land uses for the "Urban" district, as defined by Chapter 205, HRS.

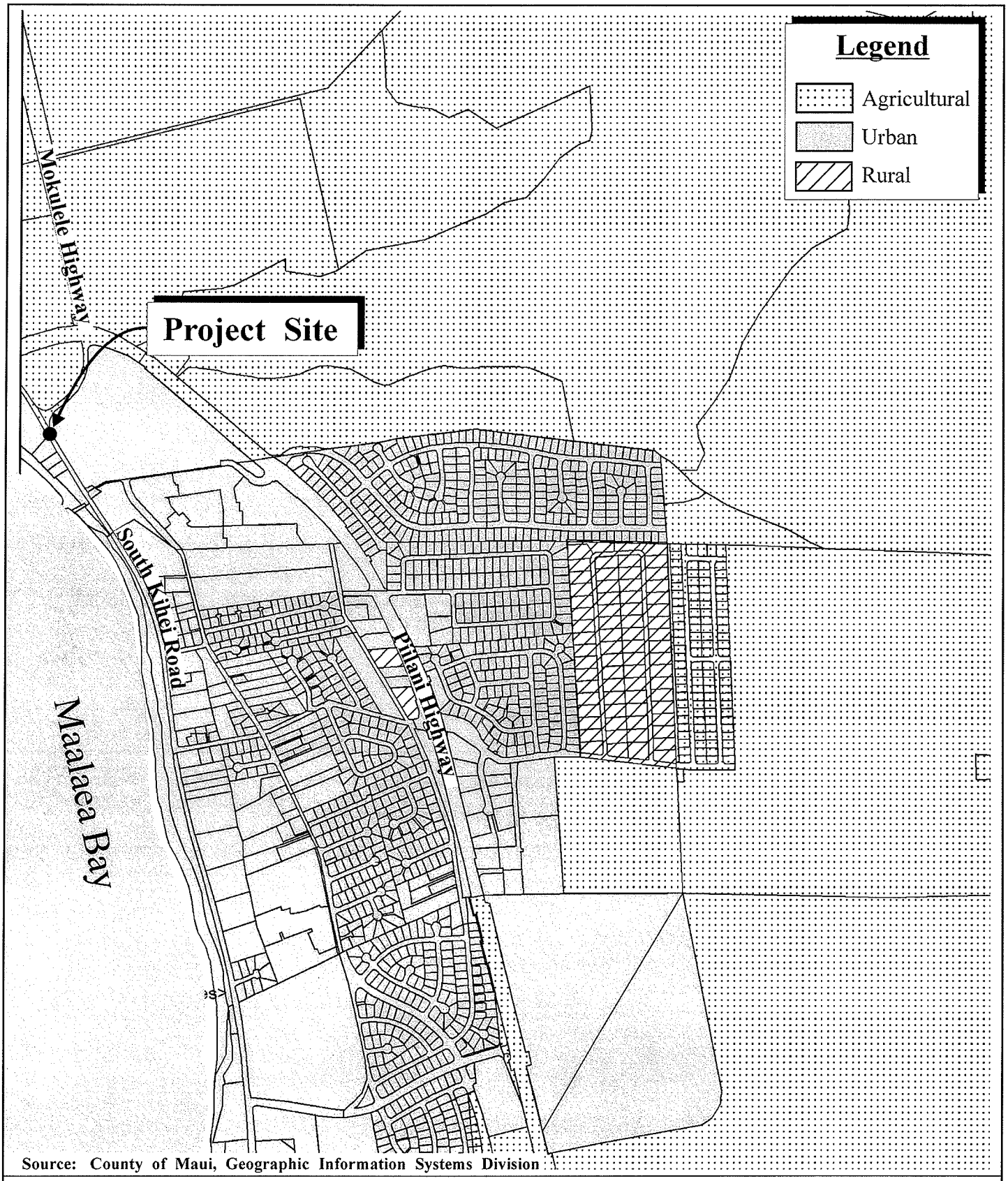
B. HAWAII STATE PLAN

Chapter 226, HRS, also known as the Hawaii State Plan, is a long-range comprehensive plan which serves as a guide for the future long-term development of the State by identifying goals, objectives, policies, and priorities, as well as implementation mechanisms.

More specifically, the State objectives include the maintenance and pursuit of improved quality in Hawaii's land, air, and water resources. To achieve this objective, it shall be the State's policy to:

> *Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters (Hawaii State Plan, Section 226-13(b)(5)).*

In keeping with the State's policy, the project is consistent with the Hawaii State Plan.



Source: County of Maui, Geographic Information Systems Division

Figure 9

South Kihei Road
Waiakoa Culvert Replacement
State Land Use District Map

NOT TO SCALE

Prepared for: County of Maui, Department of Public Works

MUNEKIYO & HIRAGA, INC.

COM\DPW SKiheiRd Culvert\SLUD

C. GENERAL PLAN OF THE COUNTY OF MAUI

As indicated by the Maui County Charter, the purpose of the general plan shall be to:

> *... indicate desired population and physical development patterns for each island and region within the county; shall address the unique problems and needs of each island and region; shall explain opportunities and the social, economic, and environmental consequences related to potential developments; and shall set forth the desired sequence, patterns and characteristics of future developments. The general plan shall identify objectives to be achieved, and priorities, policies, and implementing actions to be pursued with respect to population density; land use maps, land use regulations, transportation systems, public and community facility locations, water and sewage systems, visitor destinations, urban design, and other matters related to development.*

Chapter 2.80B of the Maui County Code, relating to the General Plan and Community Plans, implements the foregoing Charter provision through enabling legislation which calls for a Countywide Policy Plan and a Maui Island Plan. The Countywide Policy Plan was adopted as Ordinance No. 3732 on March 24, 2010, while the Maui Island Plan, which delineates areas for future urban and rural growth as part of a Directed Growth Strategy, was adopted as Ordinance No. 4004 on December 28, 2012.

The following sections identify pertinent objectives, policies, implementing actions and related provisions set forth in the Countywide Policy Plan and the Maui Island Plan. It is recognized that both documents are comprehensive in nature and address a number of functional planning areas which apply to all programs, plans, and projects. However, for purposes of addressing General Plan compliance requirements, policy considerations which are deemed most relevant in terms of compatibility and consistency are addressed in this report section.

1. Countywide Policy Plan

With regard to the Countywide Policy Plan, Section 2.80B.030 of the Maui County Code states the following.

> *The countywide policy plan shall provide broad policies and objectives which portray the desired direction of the County's future. The countywide policy plan shall include:*

1. *A vision for the County;*

2. *A statement of core themes or principles for the County; and*

3. *A list of countywide objectives and policies for population, land use, the environment, the economy, and housing.*

Core principles set forth in the Countywide Policy Plan are listed as follows:

1. *Excellence in the stewardship of the natural environment and cultural resources;*

2. *Compassion for and understanding of others;*

3. *Respect for diversity;*

4. *Engagement and empowerment of Maui County residents;*

5. *Honor for all cultural traditions and histories;*

6. *Consideration of the contributions of past generations as well as the needs of future generations;*

7. *Commitment to self-sufficiency;*

8. *Wisdom and balance in decision making;*

9. *Thoughtful, island appropriate innovation; and*

10. *Nurturance of the health and well-being of our families and our communities.*

Congruent with these core principles, the Countywide Policy Plan identifies goals objectives, policies and implementing actions for pertinent functional planning categories, which are identified as follows:

1. *Natural environment*

2. *Local cultures and traditions*

3. *Education*

4. *Social and healthcare services*

5. *Housing opportunities for residents*

6. *Local economy*

7. *Parks and public facilities*

8. *Transportation options*

9. *Physical infrastructure*

10. *Sustainable land use and growth management*

11. *Good governance*

With respect to the Waiakoa Culvert Replacement Project, the following goal, objective and policy are illustrative of the project's compliance with the Countywide Policy Plan.

IMPROVE PHYSICAL INFRASTRUCTURE

Goal:

Maui County's physical infrastructure will be maintained in optimum condition and will provide for and effectively serve the needs of the County through clean and sustainable technologies.

Objective:

- *Direct growth in a way that makes efficient use of existing infrastructure and to areas where there is available infrastructure capacity.*

Policy:

- *Promote land use patterns that can be provided with infrastructure and public facilities in a cost-effective manner.*

In summary, the proposed project is consistent with the themes and principles of the Countywide Policy Plan.

2. Maui Island Plan

The Maui Island Plan (MIP), is applicable to the island of Maui only, providing more specific policy-based strategies for population, land use, transportation, public and community facilities, water and sewage systems, visitor destinations, urban design, and other matters related to future growth.

As provided by Chapter 2.80B, the MIP shall include the following components:

1. *An island-wide land use strategy, including a managed and directed growth plan*

2. *A water element assessing supply, demand and quality parameters*

3. *A nearshore ecosystem element assessing nearshore waters and requirements for preservation and restoration*

4. *An implementation program which addresses the County's 20-year capital improvement requirements, financial program for implementation, and action implementation schedule*

5. *Milestone indicators designed to measure implementation progress of the MIP*

It is noted the Ordinance No. 4004 does not address the component relating to the implementation program. Chapter 2.80B of the Maui County Code, relating to the General Plan, was amended via Ordinance No. 3979, October 5, 2012, to provide that the implementation program component be adopted no later than one (1) year following the effective date of Ordinance No. 4004. As such, the implementation program component of the MIP will require adoption prior to December 28, 2013.

The MIP addresses a number of planning categories with detailed policy analysis and recommendations which are framed in terms of goals, objectives, policies and implementing actions. These planning categories address the following areas:

1. *Population*

2. *Heritage Resources*

3. *Natural Hazards*

4. *Economic Development*

5. *Housing*

6. *Infrastructure and Public Facilities*

7. *Land Use*

Additionally, an essential element of the MIP is its directed growth plan which provides a management framework for future growth in a manner that is fiscally, environmentally, and culturally prudent. Among the directed growth management tools developed through the MIP process are maps delineating urban growth boundaries (UGB), small town boundaries (SRB) and rural growth boundaries (RGB). The respective boundaries identify areas appropriate for future growth and their corresponding intent with respect to development character.

The Waiakoa Culvert Replacement project is limited to replacing a deteriorating culvert and does not represent future growth in the context of the directed growth plan. Nonetheless, the proposed project is within the UGB.

In addition, the proposed project has been reviewed with respect to pertinent goals, objectives, policies, and implementing actions of the MIP. A summary of these statements are provided below:

Goal:

6.4 *An interconnected, efficient, and well-maintained, multimodal transportation system.*

Objective:

6.4.2 *Safe, interconnected transit, roadway, bicycle, equestrian, and pedestrian network.*

Policy:

6.4.2.d *Identify and improve hazardous and substandard sections of roadways, drainage infrastructure, and bridges, provided that the historical integrity of the roads and bridges are protected.*

In conclusion, the Waiakoa Culvert Replacement project is consistent with the MIP.

D. KIHEI-MAKENA COMMUNITY PLAN

Within Maui County, there are nine (9) community plan regions. From a General Plan implementation standpoint, each region is governed by a community plan which sets forth desired land use patterns, as well as goals, objectives, policies, and implementing actions for a number of functional areas including infrastructure-related parameters.

South Kihei Road is undesignated by land use in the Kihei-Makena Community Plan Map. See **Figure 10**.

The proposed project is in conformance with the following, goals, objectives, and policies of the Kihei-Makena Community Plan:

PHYSICAL AND SOCIAL INFRASTRUCTURE

Goal:

Provision of facility systems, public services, and capital improvement projects in an efficient, reliable, cost effective, and environmentally sensitive manner which accommodates the needs of the Kihei-Makena community, and fully support present and planned land uses, especially in the case of project district implementation. Allow no development for which infrastructure may not be available concurrent with the development's impacts.

TRANSPORTATION

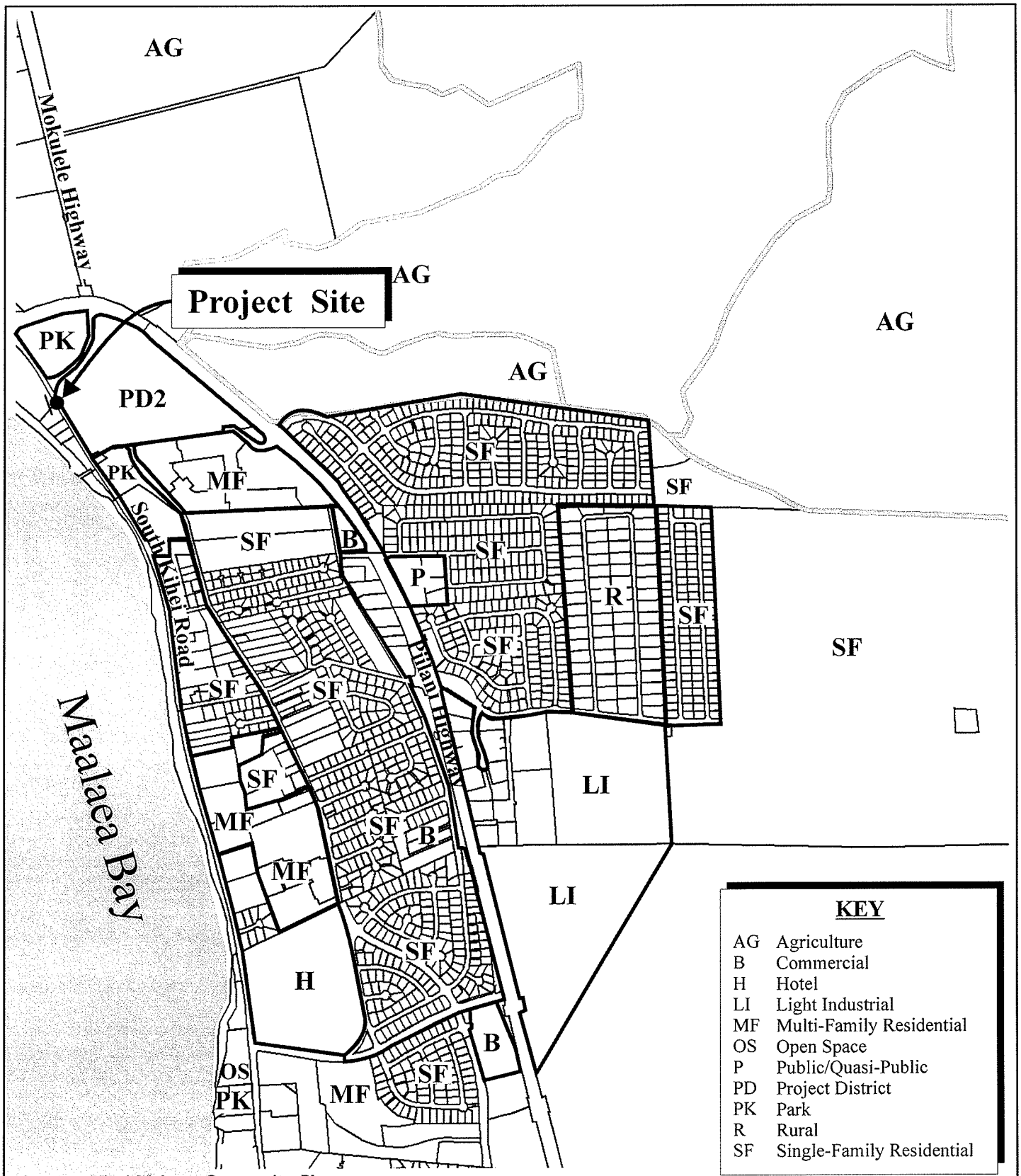
Objectives and Policies:

c. Strengthen the coordination of land use planning and transportation planning to promote sustainable development and to reduce dependence on automobiles. New residential communities should provide convenient pedestrian and bicycle access between residences and neighborhood commercial areas, parks and public facilities.

DRAINAGE

Objectives and Policies

a. Design drainage systems that protect coastal water quality by



Source: Kihei-Makena Community Plan

Figure 10

South Kihei Road
Waiakoa Culvert Replacement
Existing Community Plan Land Use Designations

NOT TO SCALE

Prepared for: County of Maui, Department of Public Works

MUNEKIYO & HIRAGA, INC.

COM\DPW SKiheiRd Culvert\CPLUD

incorporating best management practices to remove pollutants from runoff. Construct and maintain, as needed, sediment retention basins and other best management practices to remove sediments and other pollutants from runoff.

b. *Construct necessary drainage improvements in flood prone areas. Where replacement drainage are required for flood protection, these systems shall be designed, constructed, and maintained using structural controls and best management practices to preserve the functions of the natural system that are beneficial to water quality. These functions include infiltration, moderation of flow velocity, reduced erosion, uptake of nutrients and pollutants by plants, filtering, and settlement of sediment particles. The use of landscaped swales and unlined channels shall be urged.*

d. *Minimize the increase in discharge of stormwater runoff to coastal waters by preserving flood storage capacity in low-lying areas, and encouraging infiltration of runoff.*

E. MAUI COUNTY ZONING

The project site is a roadway corridor and does not have a zoning designation by the County of Maui.

F. COASTAL ZONE MANAGEMENT/SPECIAL MANAGEMENT AREA

The Hawaii Coastal Zone Management Program (HCZMP), as formalized in Chapter 205A, HRS, establishes objectives and policies for the preservation, protection, and restoration of natural resources of Hawaii's coastal zone. The project site is situated within the County of Maui's Special Management Area (SMA). Chapter 205A, HRS and the Special Management Area Rules of the Maui Planning Commission provide criteria and objectives for establishing limits on development within coastal areas, as discussed below.

SECTION 205A-2, HRS COASTAL ZONE MANAGEMENT PROGRAM OBJECTIVES AND POLICIES

This section addresses the project's relationship to applicable Coastal Zone Management considerations set forth by Chapter 205A, HRS.

1. Recreational Resources

Objective

Provide coastal recreational opportunities accessible to the public.

Policies

a. *Improve coordination and funding of coastal recreational planning and management; and*

b. *Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:*

   i. *Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;*

   ii. *Requiring replacement of coastal resources having significant recreational value including, but not limited to, surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the State for recreation when replacement is not feasible or desirable;*

   iii. *Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;*

   iv. *Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;*

   v. *Ensuring public recreational uses of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;*

   vi. *Adopting water quality standards and regulating point and nonpoint sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;*

   vii. *Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and*

viii. Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, and county authorities; and crediting such dedication against the requirements of section 46-6.

Response: Based on the project's development parameters and regular maintenance of the replacement culverts, the project is not anticipated to adversely impact shoreline resources, public parks, access to the shoreline, or canoe activities.

2. Historic Resources

Objective

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.

Policies

a. Identify and analyze significant archaeological resources;

b. Maximize information retention through preservation of remains and artifacts or salvage operations; and

c. Support state goals for protection, restoration, interpretation, and display of historic resources.

Response: As noted previously, no significant impacts to historic or cultural resources are anticipated to occur as a result of the proposed action. Nevertheless, as recommended by the archaeological field inspection report, ground-altering activities during construction will be monitored as a precautionary measure by a professional archaeologist, as per the archaeological monitoring plan. Refer to **Appendix "D"** and **Appendix "E"**. Should human remains be inadvertently discovered during ground-altering activities, work will promptly cease in the immediate area of the find, and the find will be further protected from damage. The State Historic Preservation Division (SHPD) and the Maui/Lanai Islands Burial Council will be notified immediately and procedures for the treatment of inadvertently discovered human remains will be followed pursuant to Chapter 6E, HRS, including stoppage of work in the immediate vicinity of the burial.

3. Scenic and Open Space Resources

Objective:

Protect, preserve, and, where desirable, restore, or improve the quality of coastal scenic and open space resources.

Policies:

a. *Identify valued scenic resources in the coastal zone management area;*

b. *Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;*

c. *Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and*

d. *Encourage those developments that are not coastal dependent to locate in inland areas.*

Response: All improvements will be at or below the roadway grade. View corridors will not be adversely affected by the proposed project. The project will also not impact open space resources in the area.

4. Coastal Ecosystems

Objective:

Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.

Policies:

a. *Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;*

b. *Improve the technical basis for natural resource management;*

c. *Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;*

d. *Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and*

e. *Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.*

Response: With implementation of Best Management Practices (BMPs), the proposed project is anticipated to have minimal long-term adverse effects on the nearby coastal ecosystems. Appropriate BMPs and erosion-control measures will be implemented to mitigate potential adverse impacts from construction activities. Project-related drainage system improvements will be designed in accordance with applicable regulatory standards to mitigate potential adverse impacts to surrounding properties.

5. Coastal Hazards

Objective:

Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution.

Policies:

a. *Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards;*

b. *Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint source pollution hazards;*

c. *Ensure that developments comply with requirements of the Federal Flood Insurance Program; and*

d. *Prevent coastal flooding from inland projects.*

Response: Project-related drainage system improvements will be designed in accordance with applicable regulatory standards to mitigate potential adverse impacts to surrounding properties and near-shore waters. A flood development permit will be obtained for project implementation and development of the proposed project will be in accordance with the standards for development in flood hazard areas as set forth by Section 19.62.060, Maui County Code. The project site is located within the tsunami inundation zone. The South Kihei Road corridor is part of an evacuation route to connect with roadways leading outside and beyond the tsunami inundation

zone. As such, the replacement of the culverts under the roadway is essential for public health and safety during times of heavy rains and coastal tsunami warnings and emergencies.

6. Managing Development

Objective:

Improve the development review process, communication, and public participation in the management of coastal resources and hazards.

Policies:

a. *Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;*

b. *Facilitate timely processing of applications for development permits and resolve overlapping or conflicting permit requirements; and*

c. *Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life cycle and in terms understandable to the public to facilitate public participation in the planning and review process.*

Response: Pursuant to Chapter 343, HRS and Chapter 11-200, HAR, this EA is being prepared and processed to communicate the potential short- and long-term impacts of the proposed project, along with proposed mitigation measures. Further, opportunities for review of the proposed action are also offered through the Department of Army Permit and Section 401 Water Quality Certification approval process. All aspects of development will be conducted in accordance with applicable Federal, State, and County standards.

7. Public Participation

Objective:

Stimulate public awareness, education, and participation in coastal management.

Policies:

a. *Promote public involvement in coastal zone management processes;*

b. *Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal issues, developments, and government activities; and*

c. *Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.*

Response: This EA is being processed in accordance with the provisions of Chapter 343, HRS. The EA will be published in the Office of Environmental Quality Control Environmental Notice, and a copy will be sent to the Kihei Public Library whereby opportunity for comment by agencies and the public will be provided.

8. Beach Protection

Objective:

Protect beaches for public use and recreation.

Policies:

a. *Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion;*

b. *Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities; and*

c. *Minimize the construction of public erosion-protection structures seaward of the shoreline.*

Response: Appropriate Best Management Practices (BMPs) will be implemented to mitigate stormwater runoff associated with the project and to ensure that the downstream shoreline will not be adversely affected.

9. Marine Resources

Objective:

Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

Policies:

a. *Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;*

b. *Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency;*

c. *Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;*

d. *Promote research, study, and understanding of ocean processes, marine life, and other ocean resources in order to acquire and inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and*

e. *Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.*

Response: No adverse effect on marine or coastal resources is anticipated. Turbidity plumes due to construction is anticipated to occur. Appropriate BMPs and erosion control measures will be implemented to ensure that coastal resources are implemented to mitigate potential adverse impacts from construction activities.

In addition to the foregoing objectives and policies, Chapter 205A-30.5, Prohibitions, provides that:

§205A-30.5 Prohibitions. (a) No special management area use permit or special management area minor permit shall be granted for structures that allow artificial light from floodlights, uplights, or spotlights used for decorative or aesthetic purposes when the light:

(1) Directly illuminates the shoreline and ocean waters; or

(2) Is directed to travel across property boundaries toward the shoreline and ocean waters.

Response: The proposed project will not involve new or additional street lighting. Construction is anticipated to be completed during daylight hours. If night work is required, construction lighting will consist of downward-facing, fully shielded

fixtures to ensure that no lighting is directed across property boundaries.

G. RULES AND REGULATIONS OF THE MAUI PLANNING COMMISSION SPECIAL MANAGEMENT AREA RULES

The Rules and Regulations of the Maui Planning Commission, Chapter 202 were established in order to implement Hawaii Revised Statues, Chapter 205A relating to Coastal Zone Management and Special Management Areas. In addition to establishing procedures for processing of Special Management Area applications and procurement of related permits, the rules assist the Commission in giving consideration to state policy regarding coastal zones.

This section addresses the project's relationship to applicable coastal zone management considerations as set forth in the Maui Planning Commission Rules and Regulations, Chapter 202, "Special Management Area Permit Procedures," which are provided for considering the significance of potential environmental and ecological effects of a proposed action. The criteria have been reviewed and analyzed with respect to the proposed project as follows.

1. Involves an irrevocable commitment to loss or destruction of any natural or cultural resources.

As mentioned in Chapter II of this document, a cultural impact assessment of the project area concluded that no significant impacts to cultural practices were anticipated. Refer to **Appendix "F"**. The archaeological field inspection report concluded that no historic properties would be affected. Nevertheless, as recommended by the archaeological inventory survey report, ground altering activities during construction will be monitored as a precautionary measure by a professional archaeologist, as per the archaeological monitoring plan. Refer to **Appendix "D"** and **Appendix "E"**.

Flora and fauna observed within the project site were generally limited to non-native species. Two (2) tree tobacco plants, the non-native host plant of the endangered Blackburn's Sphinx moth were documented in the vicinity of the project site. The USFW's protocol for the removal of the tree tobacco plant will be implemented to ensure that there will be no adverse impacts on the Blackburn's Sphinx moth. The proposed project is not anticipated to have significant adverse impact on the biological resources in the area. Refer to **Appendix "C"**.

2. **Significantly curtails the range of beneficial uses of the environment.**

The proposed project will not curtail the range of beneficial uses of the environment. Rather, as a repair and maintenance of an existing drainage facility, the project will not curtail the range of beneficial uses of the environment. Applicable Best Management Practices (BMPs) will be implemented to minimize any construction-related impacts.

3. **Conflicts with the county's or the state's long-term environmental policies or goals.**

The proposed project does not conflict with the State's Environmental Policy and Guidelines as set forth in Chapter 344, Hawaii Revised Statutes (HRS).

4. **Substantially affects the economic or social welfare and activities of the community, county, or state.**

On a short-term basis, the project will support construction and construction-related employment and have a beneficial impact on the local economy during the period of construction. From a long-term perspective, area residents, business owners, and visitors will benefit from the roadway safety improvement gained by the proposed project.

5. **Involves substantial secondary impacts, such as population changes and increased effects on public facilities, streets, drainage, sewage, and water systems, and pedestrian walkways.**

The current update to the Maui County General Plan indicates that the population of South Maui, and Maui County in general is projected to increase through the year 2030. The proposed project is not a population generator. The proposed project is anticipated to have beneficial impacts for emergency services. Roadway improvements will be provided as part of the proposed action to facilitate safe vehicular travel along South Kihei Road.

6. **In itself has no significant adverse effects but cumulatively has considerable effect upon the environment or involves a commitment for larger actions.**

The proposed project is not anticipated to have a cumulative adverse impact on the environment, nor involve a commitment to larger actions. The proposed project is a replacement of existing culverts and is considered to be a necessary repair and

maintenance project.

7. **Substantially affects a rare, threatened, or endangered species of animal or plant, or its habitat.**

Flora and fauna observed within the project site were generally limited to non-native species. The proposed project is not anticipated to adversely impact any rare, threatened or endangered species or their habitats. Refer to **Appendix "C"**. Two (2) tree tobacco plants, the non-native host plant of the endangered Blackburn's Sphinx moth were documented in the vicinity of the project site. The USFWs' protocol for the removal of the tree tobacco plant will be implemented to ensure no adverse impacts on the Blackburn's Sphinx moth.

8. **Is contrary to the state plan, county's general plan, appropriate community plans, zoning and subdivision ordinances.**

Lands underlying the project site were previously committed for development with the establishment of the State "Urban" District designation and construction of South Kihei Road. The proposed project is in compliance with State and County plans and zoning ordinances.

9. **Detrimentally affects air or water quality or ambient noise levels.**

Short-term air quality and noise impacts caused by construction activity will be mitigated through the implementation of Best Management Practices (BMPs). Dust control measures, such as regular watering and sprinkling, and installation of dust screens will be implemented to minimize wind-blown emissions. In the short term, noise impacts will occur primarily from construction equipment, site work, and building construction. Equipment mufflers or other noise attenuating equipment, as well as proper equipment and vehicle maintenance, will be used during construction. Construction noise impacts will be mitigated through compliance with the provisions of the State of Hawaii, Department of Health Administrative Rules Title 11, Chapter 46, "Community Noise Control". These rules require a noise permit if the noise levels from construction activities are expected to exceed the allowable levels set forth in the Chapter 46 rules. In the long term, adverse impacts to ambient noise conditions are not anticipated.

Potential water quality impacts associated with construction activity will be mitigated through use of BMPs for erosion and sediment control. Temporary detention basins

and filtration systems will be incorporated into the project's construction drainage plan.

10. **Affects an environmentally sensitive area, such as flood plains, shoreline, tsunami zone, erosion-prone area, geologically hazardous land, estuary, fresh waters, or coastal waters.**

The proposed project is not anticipated to have long-term adverse impacts upon coastal waters or resources. A flood development permit will be acquired, and the proposed project will be designed in accordance with the standards for development set forth by Section 19.62.060, Maui County Code.

The use of temporary construction detention and retention basins are expected to mitigate offsite drainage runoff and adverse impacts to coastal waters during construction.

11. **Substantially alters natural land forms and existing public views to and along the shoreline.**

The proposed project is located at approximate elevation of 3 feet amsl. The proposed project will be constructed at grade and under the roadway, therefore, not substantially altering any natural land forms. The proposed project is not anticipated to substantially affect views to or along the shoreline.

12. **Is contrary to the objectives and policies of chapter 205A, HRS**

A review of the objectives and policies of Chapter 205A, HRS, is provided in its entirety in the previous part of this section. It addresses the project's relationship to the Coastal Zone Management considerations. Based on the foregoing analysis, the project will appropriately and adequately mitigate impacts to SMA-relevant areas of interest. Accordingly, there are no anticipated significant environmental and ecological effects attributed to the proposed action.

IV. ALTERNATIVES TO THE PROPOSED ACTION

IV. ALTERNATIVES TO THE PROPOSED ACTION

Due to the nature of the project, alternatives in consideration of the proposed project were limited to the Preferred Alternative, No Action Alternative, the Deferred Action Alternative, and a Design Alternative as discussed below.

A. PREFERRED ALTERNATIVE

The proposed project plan, outlined in Chapter I, Project Overview, represents the preferred alternative. The preferred alternative is to replace the existing culverts with two (2) 3-feet by 10-feet concrete box culverts, install new wing walls to maintain the roadway shoulder and re-surfacing South Kihei Road over the culvert to include a ford crossing. The preferred alternative represents a timely cost-effective scope of work to address the erosion along the roadway shoulder and replacement of the undersized culverts. Although the culverts will not be sized to handle a 100-year storm, the preferred alternative will allow for less frequent road closures due to flooding of South Kihei Road.

B. NO ACTION ALTERNATIVE

Under the "no action" alternative, the project site would maintain the existing conditions of the roadway and drainage capabilities. Under the no action alternative, the shoulder on the upslope side of the roadway will continue to erode and eventually undermine the roadway.

C. DEFERRED ALTERNATIVE

The deferred alternative would delay replacement of the culverts under South Kihei Road until some future date and also delay repairs to the roadway. The deferred alternative will have similar results as the no action alternative. The deferred alternative may also increase the construction costs of the project due to inflation.

D. BRIDGE DESIGN ALTERNATIVE

In response to the early consultation request, the National Oceanic and Atmospheric Administration requested that the applicant consider a bridge to provide a continuous uninterrupted permeable stream bed. This alternative would entail construction of a new bridge structure with concrete abutments to replace the existing 24-inch and 48-inch diameter culverts.

Per current design standards, the underside of a new bridge is required to be at least one (1) foot above the 100-year flood elevation or eight (8) feet minimum from the existing grade for maintenance purposes (whichever is greater). New bridge approaches at this height would block the existing entryways to adjacent condominiums on both the north and south side of the stream. Thus, land acquisition would be required in order to develop alternate access points to these parcels. Additionally, significant build up of the roadway would be needed for the approaches that may create a dam-like barrier, which could adversely influence flooding in a tsunami event since properties located mauka (east) of South Kihei Road would be lower in elevation.

The new bridge would need to be designed to meet current American Association of State Highway and Transportation Officials and State bridge design standards. This would involve a larger footprint and major relocation of existing utilities, including water, sewer, and electrical lines. Altogether, this alternative was not deemed feasible due to potential adverse flooding impacts from wave action, funding and time constraints.

E. OPEN BOTTOM CULVERT

In response to the early consultation request, the National Oceanic and Atmospheric Administration requested that the DPW consider an open bottom culvert design alternative to provide a continuous uninterrupted permeable stream bed.

The DPW reviewed this design alternative and determined that an open bottom culvert design does not provide appropriate erosion and scour protection during large storm water events. Without the proper channel bottom protection, washout and erosion can undermine the foundation and ultimately cause structural failures similar to the current undermining situation that exists today. Additionally, box culverts in comparison to an open bottom culvert provide hard, smooth culvert bottoms with the least resistance to storm water flow, thereby reducing the bottom roughness and providing the largest flow capacity through the

culvert section. And finally, the culverts will be partially submerged which significantly complicates access and maintenance of the structure. Box culverts in comparison to an open bottom culvert provide the lowest long-term maintenance requirements.

Given the reasons stated above, the open bottom culvert design alternative was not deemed the preferred alternative.

V. SUMMARY OF UNAVOIDABLE IMPACTS AND COMMITMENTS OF RESOURCES

V. SUMMARY OF UNAVOIDABLE IMPACTS AND COMMITMENTS OF RESOURCES

The development of the project will result in certain unavoidable construction-related impacts as outlined in Chapter II.

In the short term, construction associated with the proposed development will generate short-term noise impacts. These impacts will be limited to the immediate vicinity of the project construction areas. Best Management Practices (BMPs), such as the use of sound attenuating construction equipment, will be used, where practicable, to mitigate noise impacts caused by construction. In the long term, ambient noise conditions would not be adversely impacted by the proposed project.

Unavoidable air and water quality impacts will also arise as a result of construction activities, such as the generation of dust and other airborne pollutants and the increase in turbidity. To mitigate adverse impacts, appropriate BMPs including frequent watering of exposed surfaces and regular maintenance of construction equipment will be implemented during the construction period to minimize air quality construction-related impacts. Appropriate BMPs to contain silt plumes during construction, such as silt curtains around the construction zone, will be implemented to mitigate potential adverse water quality impacts.

Development of the proposed project will use existing land, energy and fiscal resources. The proposed project will increase roadway safety and reduce flooding. The commitment of land, energy, and fuel resources is justified by the public safety benefits of the project.

VI. SIGNIFICANCE CRITERIA ASSESSMENT

VI. SIGNIFICANCE CRITERIA ASSESSMENT

The "Significance Criteria", Section 12 of the Administrative Rules, Title 11, Chapter 200, "Environmental Impact Statement Rules", were reviewed and analyzed to determine whether the proposed project will have significant impacts on the environment. The following significance criteria and preliminary analysis are provided.

1. **Involves an irrevocable commitment to loss or destruction of any natural or cultural resource.**

   As mentioned in Chapter II of this document, a cultural impact assessment of the project area concluded that no significant impacts to cultural practices were anticipated. The archaeological field inspection report concluded it is unlikely that no historic properties would be affected. As recommended by the archaeological field inspection report, ground-altering activities during construction will be monitored as a precautionary measure by a professional archaeologist, as per the archaeological monitoring plan. An Archaeological Monitoring Plan has been prepared for the project and has been submitted to SHPD. Refer to **Exhibit "E"**.

   Flora and fauna observed within the project site were generally limited to non-native species. Two (2) tree tobacco plants, the non-native host plant of the endangered Blackburn's Sphinx moth were documented near the project site. The USFWS' protocol for the removal of the tree tobacco plants will be implemented, if necessary, to ensure that there will be no adverse impacts on the Blackburn's Sphinx moth. With these mitigation measures in place, the proposed project is not anticipated to have significant adverse impact on the biological resources in the area.

2. **Curtails the range of beneficial uses of the environment.**

   The proposed project will replace existing culverts and improve road safety conditions and will not curtail the range of beneficial uses of the environment.

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 proposed project does not conflict with the State's Environmental Policy and Guidelines as set forth in Chapter 344, Hawaii Revised Statutes (HRS). This environmental assessment identifies potential environmental impacts and mitigation measures to avoid or minimize environmental impacts.

4. **Substantially affects the economic welfare, social welfare, and cultural practices of the community or State.**

On a short-term basis, the project will support construction and construction-related employment and have a beneficial impact on the local economy during the period of construction. From a long-term perspective, area residents, business owners, and visitors will benefit from the safety improvements to the roadway and reduction of flooding. The cultural impact assessment of the project site concluded that no significant impacts to cultural practices are anticipated.

5. **Substantially affects public health.**

The proposed project is not anticipated to have any significant adverse impacts to public health.

6. **Involves substantial secondary impacts, such as population changes or effects on public facilities.**

The proposed project is designed to improve safety of the roadway and replace existing deteriorating culverts under South Kihei Road. Substantive secondary impacts from the project are not anticipated.

7. **Involves a substantial degradation of environmental quality.**

The project is not anticipated to have a significant adverse impact upon the natural environment. During construction, recommended Best Management Practices (BMPs) will be implemented for erosion and sedimentation control. Other appropriate mitigation measures will be developed in consultation with the applicable governmental agencies during the project permitting process such as Department of Army Corps of Engineers and Department of Health Clean Water Branch during the Section 401 Water Quality Certification approval process.

8. **Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions. Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions.**

The proposed project is not anticipated to have a cumulative adverse impact on the environment, nor involve a commitment to larger actions. As previously noted, the project site is to improve the roadway safety conditions and drainage facilities. The roadway capacity will not increase as a result of the project.

9. **Substantially affects a rare, threatened, or endangered species, or its habitat.**

Flora and fauna observed within the project site were generally limited to non-native species. Two (2) tree tobacco plants, the non-native host plant of the endangered Blackburn's Sphinx moth, were documented near the project site. As previously stated, USFW's protocol for removal of the tree tobacco plants will be implemented, if required, to ensure that the Blackburn's Sphinx moth is not adversely impacted. In effect, the proposed project is not anticipated to have significant negative impact on the biological resources in the area.

10. **Detrimentally affects air or water quality or ambient noise levels.**

Short-term air quality and noise impacts caused by construction activity will be mitigated through the implementation of Best Management Practices. Dust control measures, such as regular watering and sprinkling, and installation of dust screens will be implemented to minimize wind-blown emissions. In the short term, noise impacts will occur primarily from construction equipment, site work, and building construction. Equipment mufflers or other noise attenuating equipment, as well as proper equipment and vehicle maintenance, will be used during construction. Construction noise impacts will be mitigated through compliance with the provisions of the State of Hawaii, Department of Health Administrative Rules Title 11, Chapter 46, "Community Noise Control". These rules require a noise permit if the noise levels from construction activities are expected to exceed the allowable levels set forth in the Chapter 46 rules. In the long term, adverse impacts to ambient noise conditions are not anticipated, considering the scope of the project.

Potential water quality impacts associated with construction activity will be mitigated through use of BMPs for erosion and sediment control, such as containing silt plumes by silt curtain around the construction zone.

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 Waiakoa Gulch is a natural drainageway. The existing culverts under South Kihei Road allow the stormwater in the gulch to pass under the roadway. The proposed project will replace the culverts. The proposed project is not anticipated to have long-term adverse impacts upon coastal waters or resources from existing conditions. The project site is located within Flood Zone VE and AE, which are flood hazard areas with a base elevation of 12 feet amsl. A flood development permit will be acquired, and structures built in these areas will be designed in accordance with the standards for development set forth by Section 19.62.060, Maui County Code. The site is situated within a tsunami inundation zone. South Kihei Road is part of a tsunami evacuation route leading to roadways and areas outside the tsunami inundation area. Improvements to South Kihei Road will benefit future evacuation plans and routes.

The use of onsite temporary drainage detention and retention basins are expected to mitigate drainage runoff and impacts to coastal waters during construction. Further, appropriate mitigation measures will be developed in consultation with the applicable governmental agencies during the permitting process.

12. **Substantially affects scenic vistas and viewplanes identified in county or state plans or studies.**

The proposed project improvements will be carried out at existing grade and below existing grade of the roadway. Adverse impacts to scenic or open space resources resulting from the project are not anticipated.

13. **Requires substantial energy consumption.**

The proposed project will involve the commitment of fuel for construction equipment, vehicles, and machinery during construction and maintenance activities. Given the benefits to public safety, the commitment of fuel and energy resources appears to be justified.

In summary, based on the foregoing analysis, it is anticipated that the EA for the proposed action will result in a Finding of No Significant Impact (FONSI).

VII. LIST OF PERMITS AND APPROVALS

VII. LIST OF PERMITS AND APPROVALS

The following list of permits and approvals are anticipated to be needed for project implementation.

1. **Federal**

   A. Department of Army Nationwide Permits pursuant to Section 10 of the Rivers and Harbors Act and Section 404 Clean Water Act

   B. National Flood Insurance Program, as applicable

   C. Federal Coastal Zone Management Consistency

2. **State of Hawaii**

   A. National Pollutant Discharge Elimination System (NPDES) Permit, as applicable.

   B. Department of Health Community Noise Permit, as applicable.

   C. Department of Health 401 Water Quality Certification

3. **County of Maui**

   A. Special Management Area Assessment

   B. Special Flood Hazard Development Permit, as applicable

   C. Work to Perform in County Right-of-Way Permit

   D. Construction Permits (Building, Grading, Grubbing)

VIII. PARTIES CONSULTED DURING THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT; LETTERS RECEIVED; AND RESPONSES TO SUBSTANTIVE COMMENTS

VIII. PARTIES CONSULTED DURING THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT; LETTERS RECEIVED; AND RESPONSES TO SUBSTANTIVE COMMENTS

The following agencies were consulted during preparation of the Draft Environmental Assessment (EA). Agency comments and responses to substantive comments are included herein.

1. Larry Yamamoto, State Conservationist
   U.S. Department of Agriculture
   Natural Resources Conservation Service
   P.O. Box 50004
   Honolulu, Hawaii 96850-0001

2. Ranae Ganske-Cerizo, Soil Conservationist
   Natural Resources Conservation Service
   U.S. Department of Agriculture
   77 Hookele Street, Suite 202
   Kahului, Hawaii 96732

3. George Young, Chief, Regulatory Branch
   U.S. Department of the Army
   U.S. Army Engineer District, Honolulu
   Regulatory Branch, Building 230
   Fort Shafter, Hawaii 96858-5440

4. Loyal A. Mehrhoff, Field Supervisor
   U. S. Fish and Wildlife Service
   300 Ala Moana Blvd., Rm. 3-122
   Box 50088
   Honolulu, Hawaii 96813

5. Kay Zukeram, Habitat National Marine Fisheries Service
   Pacific Islands Regional Office
   1601 Kapiolani Boulevard, Suite 1100
   Honolulu, Hawaii 96814-4700

6. Jobie Masagatani, Chairperson
   Department of Hawaiian Home Lands
   P.O. Box 1879
   Honolulu, Hawaii 96805

7. Loretta J. Fuddy, Chairperson
   State of Hawaii
   Department of Health
   919 Ala Moana Blvd., Room 300
   Honolulu, Hawaii 96814

8. Alec Wong, P.E., Chief
   Clean Water Branch
   State of Hawaii
   Department of Health
   919 Ala Moana Blvd., Room 300
   Honolulu, Hawaii 96814

9. Patti Kitkowski, District Environmental Health Program Chief
   State of Hawaii
   Department of Health
   54 High Street
   Wailuku, Hawaii 96793

10. William J. Aila, Jr., Chairperson
    State of Hawaii
    Department of Land and Natural Resources
    P. O. Box 621
    Honolulu, Hawaii 96809

11. Puaalaokalani Aiu, Administrator
State of Hawaii
Department of Land and Natural Resources
State Historic Preservation Division
601 Kamokila Blvd., Room 555
Kapolei, Hawaii 96707

12. Jenny Pickett, Maui Archaeologist
State of Hawaii
Department of Land and Natural Resources
State Historic Preservation Division
130 Mahalani Street
Wailuku, Hawaii 96793

13. Glenn Okimoto, Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

14. Major General Darryll Wong, Director
Hawaii State Civil Defense
3949 Diamond Head Road
Honolulu, Hawaii 96813-4495

15. Gary Hooser, Director
Office of Environmental Quality Control
235 S. Beretania Street, Suite 702
Honolulu, Hawaii 96813

16. Dr. Kamana`opono Crabbe, Chief Executive Officer
Office of Hawaiian Affairs711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813

17. Teena Rasmussen, Coordinator
County of Maui
Office of Economic Development
2200 Main Street, Suite 305
Wailuku, Hawaii 96793

18. Anna Foust, Officer Management Officer
Maui Civil Defense Agency
200 South High Street
Wailuku, Hawaii 96793

19. Jeffrey A. Murray, Fire Chief
County of Maui
Department of Fire and Public Safety
200 Dairy Road
Kahului, Hawaii 96732

20. Jo-Ann Ridao, Director
County of Maui
Department of Housing and Human Concerns
One Main Plaza
2200 Main Street, Suite 546
Wailuku, Hawaii 96793

21. Glenn Correa, Director
County of Maui
Department of Parks and Recreation
700 Halia Nakoa Street, Unit 2
Wailuku, Hawaii 96793

22. William Spence, Director
County of Maui
Department of Planning
250 South High Street
Wailuku, Hawaii 96793

23. Gary Yabuta, Chief
County of Maui
Police Department
55 Mahalani Street
Wailuku, Hawaii 96793

24. David Goode, Director
County of Maui
Department of Public Works
200 South High Street
Wailuku, Hawaii 96793

25. Kyle Ginoza, Director
County of Maui
Department of Environmental Management
One Main Plaza
2200 Main Street, Suite 100
Wailuku, Hawaii 96793

26. Jo Anne Johnson Winer, Director
County of Maui
Department of Transportation
200 South High Street
Wailuku, Hawaii 96793

27. David Taylor, Director
County of Maui
Department of Water Supply
200 South High Street
Wailuku, Hawaii 96793

28. Dan Takahata, Manager – Engineering
Maui Electric Company, Ltd.
P.O. Box 398
Kahului, Hawaii 96733

29. Hawaiian Telcom
60 South Church Street
Wailuku, Hawaii 96793

30. Jon Miller, President
Kihei Community Association
P.O. Box 662
Kihei, Hawaii 96753

AUG 27 2012

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, HONOLULU DISTRICT
FORT SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF:

August 22, 2012

Regulatory Branch

File Number **POH-2012-00036**

Munekiyo & Hiraga, Inc.
Attention: Leilani Pulmano
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Pulmano:

This responds to your July 13, 2012 letter requesting early consultation comments for the proposed South Kihei Road culvert replacement project at the Waiakoa Gulch stream crossing located at coordinates 22.782740 °N and 159.463562 °W in Kihei, Maui Island, Hawaii. We have assigned the project the reference number **POH-2012-00036**. Please cite the reference number in any future correspondence concerning this project.

We have reviewed the information you submitted for the proposed project pursuant to Section 10 of the Rivers and Harbors Act of 1899 (Section 10) and Section 404 of the Clean Water Act (Section 404). For your information, Section 10 requires that a Department of the Army (DA) permit be obtained from the U.S. Army Corps of Engineers (Corps) prior to undertaking any construction, dredging, or other activity occurring in, over, or under or affecting navigable waters of the U.S. For tidal waters, the shoreward limit of the Corps' jurisdiction extends to the Mean High Water (MHW) mark. Section 404 requires that a DA permit be obtained for the discharge (placement) of dredged and/or fill material into waters of the U.S., including wetlands. For tidally influenced waters, in the absence of adjacent wetlands, the shoreward limit of the Corps' jurisdiction extends to the High Tide Line (HTL), which in Hawai'i may be approximated by reference to the Mean Higher-High Water (MHHW) mark. For non-tidal waters, the lateral limits of the Corps' jurisdiction extend to the Ordinary High Water Mark (OHWM) or the approved delineated boundary of any adjacent wetlands.

In Kihei, the area bounded by Mokulele Highway, Kilohana Drive, Piilani Highway, and the Pacific Ocean is known to contain wetlands. The Corps' defines "wetlands" as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Accordingly, we recommend the your client submit a complete a wetlands delineation performed in accordance with the 1987 Corps Wetland Delineation Manual and the 2011 Regional Supplement to the Corps Wetland Manual: Hawaii and Pacific Islands Region, which will aid in developing project plans, best management plans (BMPs), and mitigation, if necessary, to protect aquatic resources.

This information does not relieve you of the responsibility to obtain any other permits, licenses, or approvals that may be required under County, State, or Federal law for your proposed work.

Thank you for providing us with the opportunity to comment on this project. Should you have any questions, please contact Ms. Joy Anamizu at (808) 835-4308 or via e-mail at *Joy.N.Anamizu@usace.army.mil*. You are encouraged to provide comments on your experience with the Honolulu District Regulatory Branch by accessing our web-based customer survey form at *http://per2.nwp.usace.army.mil/survey.html*.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
PRESIDENT

KARLYNN FUJIOKA
EXECUTIVE VICE PRESIDENT

OWEN CHASHI HIRAGA
SENIOR VICE PRESIDENT

MITSURU "MUGGY" HIRAGA
SENIOR VICE PRESIDENT

MARK ALEXANDER ROY
VICE PRESIDENT

September 25, 2012

George Young, P.E., Chief
Department of the Army
U.S. Army Corps of Engineers, Honolulu District
Fort Shafter, Hawaii 96858-5440

SUBJECT: Response to Early Consultation Request For the Waiakoa Culvert Replacement Project, Kihei, Maui, Hawaii
File No. POH-2012-00036

Dear Mr. Young:

Thank for your letter of August 22, 2012 in response to the request for early consultation in preparation of a Draft Environmental Assessment (EA) for the proposed Waiakoa Culvert Replacement Project. On behalf of the County of Maui, Department of Public Works (DPW), we offer the follow responses to your department's comments, in the same order as your letter.

1. We understand that the proposed project will affect navigable waters of the U.S. as indicated by your Jurisdictional Determination dated March 7, 2012; and as such, a Department of Army (DA) permit will be submitted. Additionally, a State Department of Health, Section 401 Water Quality Certification, will also be submitted.

2. As recommended, wetland delineation for the proposed project will be submitted for your review.

MAUI
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OAHU
735 Bishop St., Suite 238 Honolulu, Hawaii 96813 | PH: (808)983-1233
WWW.MHPLANNING.COM

process management

3

Thank you again for your participation in the Chapter 343, Hawaii Revised Statues review process. A copy of your letter will be included in the Draft EA. If there are any questions or if additional information is needed, please feel free to contact me at (808) 244-2015.

Very truly yours,

Leilani Pulmano, Program Manager

LP:la
cc: John Smith, County of Maui, Department of Public Works
Michael Ishikawa, Sato & Associates, Inc.
Snooky Mello, AECOS, Inc.
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AUG 20 2012

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

AUG 17 2012

In Reply Refer To:
2012-TA-0371

Ms. Leilani Pulmano
Program Manager
Munekiyo and Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Subject: Technical Assistance for the Proposed South Kihei Road, Waiakoa Culvert Replacement Project, Maui

Dear Ms. Pulmano:

The U.S. Fish and Wildlife Service (Service) received your letter on July 16, 2012, requesting our comments on the proposed Waiakoa Stream culvert replacement project for the preparation of a draft Environmental Assessment (EA). The project site is located within the South Kihei Road right-of-way, just south of the intersection with the Mokulele Highway in Kihei, Maui. The existing culverts under South Kihei Road are comprised of a 48-inch and adjacent 24-inch concrete culverts approximately 40 feet in length. The County of Maui, Department of Public Works (DPW) proposes to replace the existing culverts with two box culverts measuring approximately 3 feet high by 10 feet wide and 24 feet in length. Additional improvements include new wingwalls to support the road embankment and resurfacing South Kihei Road. The proposed project will also relocate two existing utility poles at the project site.

Based on information you provided and pertinent information in our files, including data compiled by the Hawaii Biodiversity and Mapping Program, there is no designated critical habitat within the proposed project's construction footprint protected by the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 *et seq.*). However, five species protected by the ESA and one species protected by the Migratory Bird Treaty Act (MBTA) (16 U.S.C. §§ 703–712) may occur in and transit through the proposed action area.

The Hawaiian hoary bat (*Lasiurus cinereus semotus*) roosts in both exotic and native woody vegetation and, while foraging, leaves young unattended in "nursery" trees and shrubs. If trees or shrubs suitable for bat roosting are cleared during the breeding season, there is a risk that young bats could inadvertently be harmed or killed. To avoid potential impacts to the Hawaiian

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hoary bat, the Service recommends that no woody plants more than 15 feet tall be removed or trimmed during the Hawaiian hoary bat breeding season of June 1 through September 15.

The endangered Hawaiian petrel (*Pterodroma sandwichensis*), threatened Newell's shearwater (*Puffinus auricularis newelli*), and the MBTA protected wedge-tailed shearwater (*Puffinus pacificus*), collectively known as seabirds, may traverse the project area when flying between the ocean and nesting sites in the mountains during their breeding season (March through December). Artificial lighting, such as street lights and flood lighting for nighttime construction and security, can adversely impact seabirds by causing disorientation resulting in collision with utility lines, buildings, fences, and vehicles. Furthermore, fledging seabirds attracted to artificial lighting have a tendency to exhaust themselves while circling the light source and become grounded. Too weak to fly, these birds become vulnerable to depredation by feral predators, such as dogs, cats, and mongoose. The Service recommends that no new appurtenances extending above the existing vegetation, for lighting purposes or otherwise, be installed as part of the proposed project. Furthermore, it is the Service's recommendation that all construction activities be conducted during day time hours between sunrise and sunset.

The threatened green turtle (*Chelonia mydas*) may utilize both beaches and upland vegetated areas in the proposed action area for nesting and basking. The endangered hawksbill turtle (*Eretmochelys imbricata*) may use these same areas for nesting but not for basking. Artificial lighting, such as flood lighting for security and roadway illumination, can adversely impact turtle hatchlings by causing disorientation resulting in depredation by feral predators as well as fatal interactions with vehicles travelling on nearby highways. The Service recommends that a qualified turtle biologist conduct surveys to determine if sea turtles nest or bask in the vicinity of the proposed project

Finally, the draft EA should outline the Best Management Practices (BMPs) that will be implemented to reduce sediment load impacts into the adjacent marine environment. If you have any questions concerning the comments included in this letter, please contact Ian Bordenave, Fish and Wildlife Biologist, at (808) 792-9400 for further assistance.

Sincerely,

for Loyal Mehrhoff
Field Supervisor

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
PRESIDENT

KARLYNN FUKUDA
EXECUTIVE VICE PRESIDENT

GWEN OHASHI HIRAGA
SENIOR VICE PRESIDENT

MITSURU "MICH" HIRANO
SENIOR VICE PRESIDENT

MARK ALEXANDER ROY
VICE PRESIDENT

November 27, 2012

Loyal Mehrhoff, Field Supervisor
U.S. Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

SUBJECT: Response to Early Consultation Request For the Waiakoa Culvert Replacement Project, Kihei, Maui, Hawaii
2012-TA-0371

Dear Mr. Mehrhoff:

Thank for your letter of August 17, 2012 in response to the request for early consultation in preparation of a Draft Environmental Assessment (EA) for the proposed Waiakoa Culvert Replacement Project. On behalf of the County of Maui, Department of Public Works (DPW), we offer the follow responses to your department's comments, in the same order as your letter.

1. Thank you for the data compiled by the Hawaii Biodiversity and Mapping Program that indicates there is no designated critical habitat within the proposed project area protected by the Endangered Species Act of 1973 (ESA). However, as you noted, there are five (5) species protected by the ESA and one (1) species protected by the Migratory Bird Treaty Act (MBTA) that may occur in and transit through the proposed project area.

2. We understand the U.S. Fish and Wildlife Service (USFWS) recommends that no woody plants more than 15 feet tall be removed or trimmed during the Hawaiian hoary bat breeding season of June 1 through September 15 to avoid potential impacts to the Hawaiian hoary bats. The DPW will implement this recommendation as practicable at the time of construction. And, if woody plants taller than 15 feet are required to be removed or trimmed, the appropriate USFWS methodology will be utilized in order to avoid potential impacts during

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the Hawaiian hoary bat breeding season. Consultation with the USFWS will be initiated if this situation occurs.

3. We understand that the endangered Hawaiian petrel, threatened Newell's shearwater, and the Migratory Bird Treaty Act protected wedge-tail shearwater, collectively seabirds, may traverse the project area during their breeding season (March through December). Currently, the project is anticipated to relocate one (1) or two (2) street lights that are shielded. Additionally, construction activities are anticipated to be conducted during the day time hours. However, if construction activities become necessary to be conducted during the night time hours, construction lighting will be shielded and downward facing to spot light the construction area.

4. In regards to the threatened green turtle and endangered hawksbill turtle, the DPW will not be installing artificial lighting as part of the proposed project as noted above. A marine biological assessment was carried out by AECOS, Inc. for the EA and project permitting requirements. None of the marine or aquatic species observed in the project area is listed as threatened or endangered. This information will be provided in the Draft EA, which will be sent to the USFWS for review and comment. As recommended, a qualified turtle biologist will conduct a survey to determine if sea turtles nest or bask in the vicinity of the proposed project prior to construction. If threatened or endangered species are observed in the project area, an impact/avoidance protocol to marine species will be established prior to construction.

5. The Draft EA will outline the Best Management Practices (BMPs) that will be implemented as part of the proposed project to reduce sediment load impacts into the adjacent marine environment.

Thank you again for your participation in the Chapter 343, Hawaii Revised Statues review process. A copy of your letter will be included in the Draft EA. If there are any questions or if additional information is needed, please feel free to contact me at (808) 244-2015.

Very truly yours,

Leilani Pulmano, Program Manager

LP:la
cc: John Smith, County of Maui, Department of Public Works
Michael Ishikawa, Sato & Associates, Inc.
Snooky Mello, AECOS, Inc.
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Mich Hirano

From: Aydee Zielke [aydee.zielke@noaa.gov]
Sent: Monday, August 06, 2012 11:59 AM
To: Mich Hirano
Subject: Fwd: Replacement of Waiakoa culvert on South Kihei Road early consultation

Aloha!

Thanks for calling to clear up the mix up regarding two projects that were recently sent to us. The following comments are for the Replacement of Waiakoa culvert on South Kihei Road early consultation (pre-EA).

We will be sending comment on the Draft EA for Haiku Road later this week. Thanks for your understanding.

Mahalo,
Aydee Zielke
808-944-2146
aydee.zielke@noaa.gov
Scientist (Ocean Associates Inc. Contractor)
NOAA, National Marine Fisheries Service
Pacific Islands Regional Office, Habitat Conservation Division

---------- Forwarded message ----------
From: **Aydee Zielke** <aydee.zielke@noaa.gov>
Date: Thu, Aug 2, 2012 at 5:18 PM
Subject: Replacement of Waiakoa culvert on South Kihei Road early consultation
To: Colleen Suyama <Colleen@mhplanning.com>
Cc: nmfs.pir.hcd.efh.consult@noaa.gov

Aloha Colleen,

The NOAA National Marine Fisheries Service has reviewed the information provided for the proposed replacement of Waiakoa culvert on South Kihei Road near the intersection with Mokulele Highway and provides the following pre-consultation comments pursuant to the Magnuson-Stevens Fisheries Conservation and Management Act; Essential Fish Habitat (EFH). This early consultation is in preparation of an Environmental Assessment (EA).

The existing culverts under South Kihei Road are made up of a 4 ft. and 2 ft. concrete culvert approximately 40 ft. in length. The County of Maui, Department of Public Works (DPW) proposes to replace the existing culverts with two (2) box culverts measuring approximately 3 ft. high and 10 ft. wide and approximately 24 ft. in length. Additional improvements include wingwalls to support the road embankment and resurfacing of South Kihei Road over the culverts and relocation of two (2) utility poles. The DPW concludes that the proposed improvements will not significantly alter the banks of the existing drainage channel upstream or downstream.

The project is located approximately 300 ft. from the shoreline and the Pacific Ocean in Maalaea

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Bay. Waiakoa Stream will occasionally breach into the bay. The Maalaea Bay is characterized as having nearshore aggregate reef, individual reef patches, aggregate patch reef, and pavement with sand channels. The bay is EFH for coral reef ecosystems, crustaceans, and bottomfish.

We suggest that the EA discuss design alternatives for the purpose of building a stream crossing across Kihei Road.
1) Consider building a bridge with abutments constructed above the stream or an open bottom culvert that would create a continuous uninterrupted permeable stream bed.
2) Consider drainage designs such as bioswales (if space along South Kihei Road allows) with native riparian plants that would infiltrate non-point source pollution/stormwater before the water reaches the stream (and potentially the marine environment).
3) In addition, provide a description of the riparian, wetland, and marine resources that are in or near the project site.

Thank you for the opportunity to comment. Please do not hesitate to contact the NMFS should you have further questions or comments.

Mahalo,
Aydee Zielke
808-944-2146
aydee.zielke@noaa.gov
Scientist (Ocean Associates Inc. Contractor)
NOAA, National Marine Fisheries Service
Pacific Islands Regional Office, Habitat Conservation Division

11

MUNEKIYO & HIRAGA, INC.

MICHAEL J. MUNEKIYO
PRESIDENT

CARLYN FUJIOKA
EXECUTIVE VICE PRESIDENT

OWEN CHASE HIRAGA
SENIOR VICE PRESIDENT

MITSURU "MUTSU" FUJIOKA
SENIOR VICE PRESIDENT

MARK ALEXANDER ROY
VICE PRESIDENT

December 3, 2012

Aydee Zielke, Scientist
National Marine Fisheries Services
Pacific Islands Regional Office
Habitat Conservation Division
1601 Kapiolani Boulevard, Suite 1100
Honolulu, Hawaii 96814

SUBJECT: Response to Early Consultation Request for the Waiakoa Culvert Replacement Project, Kihei, Maui, Hawaii

Dear Ms. Zielke:

Thank you for your email of August 2, 2012 on the request for early consultation in preparation for a Draft Environmental Assessment (EA) for the proposed Waiakoa Culvert Replacement Project. On behalf of the County of Maui, Department of Public Works (DPW), we offer the follow responses to your department's comments, in the same order of your letter.

Response to Comment No. 1

The DPW will consider in the EA, as you suggested, a design alternative for a bridge with abutments constructed above the Waiakoa Gulch or an open bottom culvert that would create a continuous uninterrupted permeable stream bed.

Response to Comment No. 2

Given the proposed action of replacing culverts, bioswales with native riparian plants that would infiltrate non-point source pollution and stormwater before the water reaches the stream is not appropriate for the project.

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Response to Comment No. 3

The EA will include a description of riparian, wetland, and marine resources that are in or near the project site, as applicable.

Thank you again for your participation in the Chapter 343, HRS review process. A copy of your letter will be included in the Draft EA. If there are any questions or if additional information is needed, please feel free to contact me at (808) 244-2015.

Very truly yours,

Leilani Pulmano
Program Manager

LP:la
cc: Wendy Kobashigawa, County of Maui, Department of Public Works
Michael Ishikawa, Sato & Associates, Inc.
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SEP 07 2012

NEIL ABERCROMBIE
GOVERNOR
STATE OF HAWAI'I

JOBIE M.K. MASAGATANI
CHAIRMAN DESIGNATE
HAWAIIAN HOMES COMMISSION

MICHELLE K. KAUHANE
DEPUTY TO THE CHAIRMAN

STATE OF HAWAI'I
DEPARTMENT OF HAWAIIAN HOME LANDS
P. O. BOX 1879
HONOLULU, HAWAI'I 96805

July 25, 2012

Munekiyo & Hiraga, Inc.
Suite 104
305 High Street
Attn: Leilani Pulmano, Program Manager
Wailuku, Hawaii 96793

Dear Ms. Leilani Pulmano:

Subject: Early Consultation Request for South Kihei Road Waiakoa Culvert Replacement Project, Kihei, Maui, Hawaii

Thank you for the opportunity to review the Early Consultation Request. The Department of Hawaiian Home Lands has no comment to offer at this time. If you have any questions, please contact our Planning Office at 620-9480.

Aloha,

Jobie M.K. Masagatani, Chairman Designate

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JUL 19 2012

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

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

In reply, please refer to:
File:

12-128
Kihei Culvert Project

July 16, 2012

Munekiyo & Hiraga, Inc.
Attention: Leilani Pulmano, Program Manager
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Pulmano:

SUBJECT: Early Consultation Request for South Kihei Road Waiakoa Culvert Replacement Project, Kihei, Maui, Hawaii

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your letter, dated **July 13, 2012.** Thank you for allowing us to review and comment on the subject document. The document was routed to the various branches of the Environmental Health Administration. We have no comments at this time, but reserve the right to future comments. We strongly recommend that you review all of the Standard Comments on our website: www.hawaii.gov/health/environmental/env-planning/landuse/landuse.html. Any comments specifically applicable to this application should be adhered to.

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

Sincerely,

Laura Leialoha Phillips McIntyre, AICP
Environmental Planning Office Manager
Environmental Health Administration
Department of Heath
919 Ala Moana Blvd., Ste. 312
Honolulu, Hawaii 96814
Phone: 586-4337
Fax: 586-4370
laura.mcintyre@doh.hawaii.gov

MUNEKIYO HIRAGA, INC.

EXECUTIVE VICE PRESIDENT
SENIOR VICE PRESIDENT
SENIOR VICE PRESIDENT
VICE PRESIDENT

September 28, 2012

Laura Leialoha Phillips McIntyre, AICP
Environmental Planning Office Manager
State of Hawaii
Department of Health, Environmental Health Administration
919 Ala Moana Boulevard, Suite 312
Honolulu, Hawaii 96814

SUBJECT: Response to Early Consultation Request for the Waiakoa Culvert Replacement Project, Kihei, Maui, Hawaii

Dear Ms. McIntyre:

Thank you for your letter of July 16, 2012 on the request for early consultation in preparation for a Draft Environmental Assessment (EA) for the proposed Waiakoa Culvert Replacement Project. On behalf of the County of Maui, Department of Public Works, we note that your department has no comments at this time.

Response to Standard Comments

We have reviewed the Standard Comments at the Department's website. Applicable standard comments will be adhered to.

Response to the U.S. Environmental Protection Agency (EPA) Website

We thank you for the information regarding EPA's website on strategies to protect the natural environment and build sustainable communities.

MAUI
305 High St., Suite 104 Wailuku, Hawaii 96793
PH: (808)244-2015 FAX: (808)244-8729
OAHU
735 Bishop St., Suite 238 Honolulu, Hawaii 96813 | PH: (808)983-1233
WWW.MHPLANNING.COM

16

Thank you again for your participation in the Chapter 343, Hawaii Revised Statutes review process. A copy of your letter will be included in the Draft EA. If there are any questions or if additional information is needed, please feel free to contact me at (808) 244-2015.

Very truly yours,

Mich Hirano, AICP
Senior Vice President

MH:lh
cc: John Smith, County of Maui, Department of Public Works
K:\DATA\COM\DPW SKiheiRd Culvert\DEA EC Res\DOH Honolulu.res.doc

JUL 23 2012

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

LORRIN W. PANG, M.D., M.P.H.
DISTRICT HEALTH OFFICER

STATE OF HAWAII
DEPARTMENT OF HEALTH
MAUI DISTRICT HEALTH OFFICE
54 HIGH STREET
WAILUKU, HAWAII 96793

July 20, 2012

Ms. Leilani Pulmano
Program Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Pulmano:

Subject: Early Consultation Request for South Kihei Road, Waiakoa Culvert Replacement Project, Kihei, Maui, Hawaii

Thank you for the opportunity to review this project. We have the following comments to offer:

1. National Pollutant Discharge Elimination System (NPDES) permit coverage maybe required for this project. The Clean Water Branch should be contacted at 808 586-4309.

2. The noise created during the construction phase of the project may exceed the maximum allowable levels as set forth in Hawaii Administrative Rules (HAR), Chapter 11-46, "Community Noise Control." A noise permit may be required and should be obtained before the commencement of work. The Indoor & Radiological Health Branch should be contacted at 808 586-4700.

It is strongly recommended that the Standard Comments found at the Department's website: http://hawaii.gov/health/environmental/env-planning/landuse/landuse.html be reviewed, and any comments specifically applicable to this project should be adhered to.

Should you have any questions, please call me at 808 984-8230 or E-mail me at patricia.kitkowski@doh.hawaii.gov.

Sincerely,

Patti Kitkowski

Patti Kitkowski
District Environmental Health Program Chief

c EPO

18

MUNEKIYO HIRAGA, INC.

September 28, 2012

Patti Kitkowski
District Environmental Health Program Chief
State of Hawaii
Department of Health, Maui District Office
54 High Street
Wailuku, Hawaii 96793

SUBJECT: Response to Early Consultation Request for the Waiakoa Culvert Replacement Project, Kihei, Maui, Hawaii

Dear Ms. Kitkowski:

Thank you for your letter of July 20, 2012 on the request for early consultation in preparation for a Draft Environmental Assessment (EA) for the proposed Waiakoa Culvert Replacement Project. On behalf of the County of Maui, Department of Public Works, we offer the follow responses to your department's comments, in the same order of your letter.

Response to Comment No. 1

A NPDES permit will be obtained, if it is determined that a National Pollutant Discharge Elimination System (NPDES) permit is required.

Response to Comment No. 2

A noise permit will be obtained as applicable.

Response to Standard Comments

We have reviewed the Standard Comments at the Department's website. Applicable standard comments will be adhered to.

MAUI
305 High St., Suite 104 Wailuku, Hawaii 96793
PH: (808)244-2015 FAX: (808)244-8729
OAHU
735 Bishop St., Suite 238 Honolulu, Hawaii 96813 | PH: (808)983-1233
WWW.MHPLANNING.COM

Thank you again for your participation in the Chapter 343, Hawaii Revised Statutes review process. A copy of your letter will be included in the Draft EA. If there are any questions or if additional information is needed, please feel free to contact me at 244-2015.

Very truly yours,

Mich Hirano, AICP
Senior Vice President

LP:la
cc: John Smith, County of Maui, Department of Public Works
Michael Ishikawa, Sato & Associates, Inc.
K:\DATA\COM\DPW SKiheiRd Culvert\DEA EC Res\DOH Maui.res.doc

AUG 03 2012

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

August 2, 2012

Munekiyo & Hiraga, Inc.
Attention: Leilani Pulmano, Program Manager
305 High Street, Suite 104
Wailuku, Hawaii 96793

SUBJECT: Early Consultation Request for South Kihei Road Waiakoa Culvert Replacement Project

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

At this time, enclosed are comments from the (a) Division of Boating & Ocean Recreation, (b) Engineering Division, and (c) Commission of Water Resources Management on the subject matter. Should you have any questions, please feel free to call Lydia Morikawa at 587-0410. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosure(s)
cc: Central Files

21

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

July 20, 2012

MEMORANDUM

TO: **DLNR Agencies:**
___Div. of Aquatic Resources
_X_Div. of Boating & Ocean Recreation
_X_Engineering Division
___Div. of Forestry & Wildlife
___Div. of State Parks
_X_Commission on Water Resource Management
_X_Office of Conservation & Coastal Lands
_X_Land Division – Maui District
_X_Historic Preservation

RECEIVED
LAND DIVISION
2012 JUL 25 P 3:05
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Early Consultation Request for South Kihei Road Waiakoa Culvert Replacement Project
LOCATION: Kihei, Island of Maui; in the vicinity of TMK: (2) 3-8-013:006
APPLICANT: County for Maui, Department of Public Works

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by August 1, 2012.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Lydia Morikawa at 587-0410. Thank you.

Attachments

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

Signed:
Print Name: Edward R. Underwood
Date: 7/24/12

cc: Central Files

22

JUL 25 12 PM 12:02 DOBOR

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

July 20, 2012

MEMORANDUM

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

RECEIVED
LAND DIVISION
2012 JUL 25 P 3:04
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Early Consultation Request for South Kihei Road Waiakoa Culvert Replacement Project
LOCATION: Kihei, Island of Maui; in the vicinity of TMK: (2) 3-8-013:006
APPLICANT: County for Maui, Department of Public Works

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by August 1, 2012.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Lydia Morikawa at 587-0410. Thank you.

Attachments

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

Signed: _____
Print Name: CARTY CHANG, CHIEF ENGINEER
Date: 7/25/12

cc: Central Files

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/LydiaMorikawa
Ref: EarlyConsultationWaiakoaCulvertReplacement
Maui.589

COMMENTS

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

(X) **Please take note that according to the Flood Insurance Rate Map (FIRM), the project site is located in Zone VE. The National Flood Insurance Program regulates developments within Zone VE as indicated in bold letters below.**

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

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

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

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

( ) Mr.Carter Romero at (808) 961-8943 of the County of Hawaii, Department of Public Works.

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

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

( ) The applicant should include project water demands and infrastructure required to meet water demands. Please note that the implementation of any State-sponsored projects requiring water service from the Honolulu Board of Water Supply system must first obtain water allocation credits from the Engineering Division before it can receive a building permit and/or water meter.

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

( ) Additional Comments: _____

( ) Other: _____

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

Signed: _____
CARTY S. CHANG, CHIEF ENGINEER

Date: 7/25/12

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

RECEIVED
LAND DIVISION

2012 JUL 27 P 3:31

DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

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

July 20, 2012

2012 JUL 23 PM 1:31

MEMORANDUM

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

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Early Consultation Request for South Kihei Road Waiakoa Culvert Replacement Project
LOCATION: Kihei, Island of Maui; in the vicinity of TMK: (2) 3-8-013:006
APPLICANT: County for Maui, Department of Public Works

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by August 1, 2012.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Lydia Morikawa at 587-0410. Thank you.

Attachments

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

Signed: RKChang
Print Name: R.K. CHANG
Date: 7/26/12

cc: Central Files

25

FILE ID: RFD.3629.6
DOC ID: 9687V

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
PRESIDENT

KARLYNN FUKUDA
EXECUTIVE VICE PRESIDENT

GWEN OHASHI HIRAGA
SENIOR VICE PRESIDENT

MITSURU "MICH" HIRANO
SENIOR VICE PRESIDENT

MARK ALEXANDER ROY
VICE PRESIDENT

September 26, 2012

Russell Y. Tsuji, Land Administrator
State of Hawaii
Department of Land and Natural Resources
Land Division
P.O. Box 621
Honolulu, Hawaii 96809

SUBJECT: Response to Early Consultation Request for the Waiakoa Culvert Replacement Project, Kihei, Maui, Hawaii

Dear Mr. Tsuji:

Thank you for your letter of August 2, 2012 on the request for early consultation in preparation for a Draft Environmental Assessment (EA) for the proposed Waiakoa Culvert Replacement Project. On behalf of the County of Maui, Department of Public Works, we offer the follow responses to comments from Engineering Division. We note that the Division of Boating & Ocean Recreation has no comments and Commission of Water Resource Management has no objections to the project.

Response to Comment No. 1

Thank you for confirming that the project site is located within Zone VE of the Flood Insurance Rate Map (FIRM).

Response to Comment No. 2

The Department of Public Works acknowledges that the project must comply with rules and regulations of the National Flood Insurance Program as presented in Title 44 of the Code of Federal Regulations (44CFR), as applicable. Additionally, the Department of Public Works will coordinate with the Department of Planning on regulations for a flood development permit, if applicable.

MAUI
305 High St., Suite 104 Wailuku, Hawaii 96793
PH: (808)244-2015 FAX: (808)244-8729
OAHU
735 Bishop St., Suite 238 Honolulu, Hawaii 96813 | PH: (808)983-1233
WWW.MHPLANNING.COM

excellence in process management

Thank you again for your participation in the Chapter 343, HRS review process. A copy of your letter will be included in the Draft EA. If there are any questions or if additional information is needed, please feel free to contact me at 244-2015.

Very truly yours,

Leilani Pulmano
Program Manager

LP:la
cc: Wendy Kobashigawa, County of Maui, Department of Public Works
Michael Ishikawa, Sato & Associates, Inc.
K:\DATA\COM\DPW SKiheiRd Culvert\DEA EC Res\DLNR.res.doc

AUG 03 2012

NEIL ABERCROMBIE
GOVERNOR

MAJOR GENERAL DARRYLL D. M. WONG
DIRECTOR OF CIVIL DEFENSE

DOUG MAYNE
VICE DIRECTOR OF CIVIL DEFENSE

PHONE (808) 733-4300
FAX (808) 733-4287

STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE DIRECTOR OF CIVIL DEFENSE
3949 DIAMOND HEAD ROAD
HONOLULU, HAWAII 96816-4495

July 30, 2012

Ms. Leilani Pulmano
Program Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Pulmano:

Early Consultation Request
For South Kihei Road Waiakoa Culvert
Replacement Project, Kihei, Maui, Hawaii

Thank you for the opportunity to comment on this proposed project.

The culvert proposed for replacement falls within coverage arcs of existing warning sirens. No additional sirens are needed at this time.

We defer to the appropriate state and federal agencies as to the protection of coastal and marine environment as well as any cultural, historical, and archeological elements of the property.

If you have any questions, please call Ms. Havinne Okamura, Hazard Mitigation Planner, at (808) 733-4300, extension 556.

Sincerely,

DOUG MAYNE
Vice Director of Civil Defense

28

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
PRESIDENT

KARLYNN FUKUDA
EXECUTIVE VICE PRESIDENT

GWEN OHASHI HIRAGA
SENIOR VICE PRESIDENT

MITSURU "MICH" HIRANO
SENIOR VICE PRESIDENT

MARK ALEXANDER ROY
VICE PRESIDENT

August 10, 2012

Doug Mayne, Vice Director
Department of Defense
Office of the Director of Civil Defense
3949 Diamond Head Road
Honolulu, Hawaii 96816-4495

SUBJECT: Response to Early Consultation Request for the Waiakoa Culvert Replacement Project, Kihei, Maui, Hawaii

Dear Mr. Mayne:

Thank you for your letter of July 30, 2012 on the request for early consultation in preparation for a Draft Environmental Assessment (EA) for the proposed Waiakoa Culvert Replacement Project. On behalf of the County of Maui, Department of Public Works, we acknowledge that the proposed project falls within the coverage area of existing warning sirens and that no additional sirens are needed at this time.

Thank you again for your participation in the Chapter 343, Hawaii Revised Statutes review process. A copy of your letter will be included in the Draft EA. If there are any questions or if additional information is needed, please feel free to contact me at (808) 244-2015

Very truly yours,

Leilani Pulmano
Program Manager

LP:tn
Cc: Wendy Kobashigawa, County of Maui, Department of Public Works
K:\DATA\COM\DPW SKiheiRd Culvert\CivilDefenseresponse.ltr.doc

29

305 High Street, Suite 104 • Wailuku, Hawaii 96793 • ph: (808)244-2015 • fax: (808)244-8729 • planning@mhplanning.com • www.mhplanning.com

ALAN M. ARAKAWA
MAYOR

JUL 27 2012

JEFFREY A. MURRAY
CHIEF

ROBERT M. SHIMADA
DEPUTY CHIEF

COUNTY OF MAUI
DEPARTMENT OF FIRE AND PUBLIC SAFETY
FIRE PREVENTION BUREAU

313 MANEA PLACE • WAILUKU, HAWAII 96793
(808) 244-9161 • FAX (808) 244-1363

July 25, 2012

Leilani Pulmano
Munekiyo & Hiraga, Inc.
305 High St. Ste. 104
Wailuku, HI 96793

Re: Early Consultation r Request
South Kihei Waiakoa Culvert Replacement Project
Kihei, Maui

Dear Leilani:

Thank for the allowing the Department of Fire and Public Safety the opportunity to comment on the proposed project. At this time, our office provides the following comments:

> Our office requests that the minimum clear width of the road after repair be at least 20 feet (the minimum width for fire apparatus access) to allow for fire apparatus access.
>
> The project must be able to support the weight of the heaviest fire apparatus in district; which would be the ladder truck at the Wailea Station with a GVW of 70,000 #.

If there are any questions or comments, please feel free to contact me at 244-9161 ext. 23.

Sincerely,

Paul Haake
Captain, Fire Prevention Bureau
Department of Fire and Public Safety, Maui County

30

MUNEKIYO HIRAGA, INC.

MICHAEL T. MUNEKIYO
PRESIDENT

KARLYNN FUKUNAGA
EXECUTIVE VICE PRESIDENT

GWEN OHASHI HIRAGA
SENIOR VICE PRESIDENT

MITSURU "MICH" HIRAGA
SENIOR VICE PRESIDENT

MARK ALEXANDER ROS
VICE PRESIDENT

December 3, 2012

Paul Haake, Captain,
County of Maui
Department of Fire and Public Safety
Fire Prevention Bureau
313 Manea Place
Wailuku, Hawaii 96793

SUBJECT: Response to Early Consultation Request for the Waiakoa Culvert Replacement Project, Kihei, Maui, Hawaii

Dear Captain Haake:

Thank you for your letter of July 25, 2012 on the request for early consultation in preparation for a Draft Environmental Assessment (EA) for the proposed Waiakoa Culvert Replacement Project. On behalf of the County of Maui, Department of Public Works, we offer the follow responses to your department's comments, in the same order as in your letter.

Response to Comment No. 1

The width of the roadway after the culverts are replaced will be two (2) 11-ft. travel lanes and five (5) ft. wide paved shoulders on both sides of the travel lanes allowing for fire apparatus access.

Response to Comment No. 2

The culverts will be built to accommodate gross vehicle weight (GVW) of 72,000 pounds for a HS20 truck with 14 feet axle spacing and GVW of 50,000 pounds for a tandem vehicle with 4 feet axle spacing per requirements of American Association of State Highway and Transportation Officials.

MAUI
305 High St., Suite 104 Wailuku, Hawaii 96793
PH: (808)244-2015 FAX: (808)244-8729
OAHU
735 Bishop St., Suite 238 Honolulu, Hawaii 96813 | PH: (808)983-1233
WWW.MHPLANNING.COM

executive process management

Thank you again for your participation in the Chapter 343, Hawaii Revised Statutes review process. A copy of your letter will be included in the Draft EA. If there are any questions or if additional information is needed, please feel free to contact me at (808) 244-2015.

Very truly yours,

LP

Leilani Pulmano
Program Manager

LP:la
cc: Wendy Kobashigawa, County of Maui, Department of Public Works
Michael Ishikawa, Sato & Associates, Inc.
K:\DATA\COM\DPW SKiheiRd Culvert\DEA EC Res\DF&PS.res.doc

DEPARTMENT OF
HOUSING AND HUMAN CONCERNS
HOUSING DIVISION
COUNTY OF MAUI

ALAN M. ARAKAWA
Mayor
JO-ANN T. RIDAO
Director
JAN SHISHIDO
Deputy Director

35 LUNALILO STREET, SUITE 102 • WAILUKU, HAWAII 96793 • PHONE (808) 270-7351 • FAX (808) 270-6284

JUL 23 2012

July 18, 2012

Ms. Leilani Pulmano
Program Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Pulmano:

Subject: Early Consultation Request for South Kihei Road Waiakoa Culvert Replacement Project, Kihei, Maui, Hawaii

The Department has reviewed the request for Early Consultation for the above subject project. Based on our review, we have determined that the subject project is not subject to Chapter 2.96, Maui County Code. At the present time, the Department has no additional comments to offer.

Please call Mr. Veranio Tongson Jr. of our Housing Division at (808) 270-1741 if you have any questions.

Sincerely,

for WAYDE T. OSHIRO
Housing Administrator

cc: Director of Housing and Human Concerns

33

MUNEKIYO HIRAGA, INC.

October 1, 2012

Wayde T. Oshiro, Housing Administrator
County of Maui
Department of Housing and Human Concerns
36 Lunalilo Street, Suite 102
Wailuku, Hawaii 96793

SUBJECT: Response to Early Consultation Request for the Waiakoa Culvert Replacement Project, Kihei, Maui, Hawaii

Dear Mr. Oshiro:

Thank you for your letter of July 18, 2012 on the request for early consultation in preparation for a Draft Environmental Assessment (EA) for the proposed Waiakoa Culvert Replacement Project. On behalf of the County of Maui, Department of Public Works, we note that your department has determined that the project is not subject to Chapter 2.96, Maui County Code; and that you do not have any additional comments.

Thank you again for your participation in the Chapter 343, Hawaii Revised Statutes review process. A copy of your letter will be included in the Draft EA. If there are any questions or if additional information is needed, please feel free to contact me at (808) 244-2015.

Very truly yours,

Mich Hirano, AICP
Senior Vice President

MH:lh
cc: John Smith, County of Maui, Department of Public Works
K:\DATA\COM\DPW SKiheiRd Culvert\DEA EC Res\DHHC.res.doc

34

MAUI
305 High St., Suite 104 Wailuku, Hawaii 96793
PH: (808)244-2015 FAX: (808)244-8729
OAHU
735 Bishop St., Suite 238 Honolulu, Hawaii 96813 | PH: (808)983-1233
WWW.MHPLANNING.COM

ALAN M. ARAKAWA
Mayor

JUL 30 2012

GLENN T. CORREA
Director

PATRICK T. MATSUI
Deputy Director

(808) 270-7230
FAX (808) 270-7934

DEPARTMENT OF PARKS & RECREATION

700 Hali'a Nakoa Street, Unit 2, Wailuku, Hawaii 96793

July 23, 2012

Munekiyo & Hiraga, Inc.
Attn: Leilani Pulmano, Program Manager
350 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Pulmano:

SUBJECT: Early Consultation Request for South Kihei Road Waiakoa Culvert Replacement Project, Kihei, Maui, Hawaii

Thank you for the opportunity to review and comment on the subject project. The Department of Parks and Recreation has no comments at this time, and looks forward to reviewing the Environmental Assessment when it is available.

Please feel free to contact me or Karla Peters, CIP Coordinator, at 270-7981, should you have any questions.

Sincerely,

GLENN T. CORREA
Director of Parks and Recreation

c: Robert Halvorson, Chief of Planning and Development

GTC:RH:kp

ALAN M. ARAKAWA
Mayor

WILLIAM R. SPENCE
Director

MICHELE CHOUTEAU McLEAN
Deputy Director

AUG 16 2012

COUNTY OF MAUI

DEPARTMENT OF PLANNING

August 16, 2012

Ms. Leilani Pulmano, Program Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Pulmano:

SUBJECT: REQUEST FOR COMMENT (RFC) REGARDING PROPOSED WAIAKOA CULVERT REPLACEMENT PROJECT, LOCATED AT KIHEI, MAUI, HAWAII; TMK(S): (2) 3-8-013:006 AND (2) 3-8-013:005 (RFC 2012/0107)

The Department of Planning (Department) is in receipt of your RFC dated July 13, 2012. At this time, the Department has the following comments to offer:

1. A current Department of Land and Natural Resources (DLNR) State Certified Shoreline Survey will be required to be submitted with the Special Management Area permit application for the proposed project;

2. A Flood Development Permit will be required for the proposed project; and

3. Additionally, please find the attached Zoning and Flood Confirmation Forms describing the Zoning and Flood properties for the subject parcels.

Thank you for your cooperation. If you have any questions or need more information, please contact Staff Planner Anna Benesovska at anna.benesovska@mauicounty.gov or at (808) 463-3867.

Sincerely,

CLAYTON I. YOSHIDA, AICP
Planning Program Administrator

for WILLIAM SPENCE
Planning Director

36

250 SOUTH HIGH STREET, WAILUKU, MAUI, HAWAII 96793
MAIN LINE (808) 270-7735; FACSIMILE (808) 270-7634
CURRENT DIVISION (808) 270-8205; LONG RANGE DIVISION (808) 270-7214; ZONING DIVISION (808) 270-7253

Attachments
xc: Aaron H. Shinmoto, PE, Planning Program Administrator (PDF)
Anna Benesovska, Staff Planner (PDF)
Wendy Kobashigawa, Department of Public Works, Engineering Division
Project File
General File
WRS:CIY:AB:vb
K:\WP_DOCS\PLANNING\RFC\2012\0107_WaiakoaCulvert\comment.doc

COUNTY OF MAUI
DEPARTMENT OF PLANNING
Kalana Pakui Building
250 South High Street
Wailuku, Hawaii 96793

Zoning Administration and
Enforcement Division (ZAED)
Telephone: (808) 270-7253
Facsimile: (808) 270-7634
E-mail: planning@mauicounty.gov

DEPT. OF PLANNING
COUNTY OF MAUI
AUG - 7 2012
RECEIVED

ZONING AND FLOOD CONFIRMATION FORM

(To be completed by Applicant)

APPLICANT NAME Proposed enlargement of (DPW) TELEPHONE

PROJECT NAME Waiakoa Culvert (2) E-MAIL

ADDRESS/LOCATION TAX MAP KEY 2380130005

☐ Yes ☐ No Will this *Zoning & Flood Confirmation* Form be used with a Subdivision Application that is NOT processed under one of the consistency exemptions in *Section 18.04.030(B), Maui County Code*? IF YES, LIST THE PROPOSED LAND USES HERE:

NOTE: 1) Use a separate *Zoning & Flood Confirmation Form* for each Tax Map Key (TMK) number.
2) If the above "Yes" box is checked AND if the zoning information for the subject property contains multiple State Land Use Districts, Community Plan Designations, or County Zoning, a signed and dated Land Use Designations (LUD) Map, prepared by a licensed surveyor showing all the various districts, designations, zonings, and any subdistricts, shall be submitted for review and approval.
3) If the above "Yes" box is checked AND if there are multiple State Land Use District designations, the applicant shall procure a District Boundary Interpretation from the State Land Use Commission.

FOR COUNTY USE ONLY *(To be completed by ZAED)*

ZONING INFORMATION

STATE LAND USE DISTRICT(S) Urban

COMMUNITY PLAN DESIGNATION(S) MF - Multi Family

COUNTY ZONING(S) H-M Hana District (6 stories)

OTHER DESIGNATION(S)

☐ Yes ☐ No See Additional Comments On Page Two

☐ Yes ☐ No See The Attached Land Use Designation Map

☑ Yes ☐ No SPECIAL MANAGEMENT AREA (SMA)

☐ Yes ☑ No PLANNED DEVELOPMENT

☐ Yes ☑ No PROJECT DISTRICT

FLOOD INFORMATION

FLOOD HAZARD AREA ZONE(S) VE For Flood Zone AO, FLOOD DEPTH

BASE FLOOD ELEVATION(S) 12' feet mean sea level, Local Tidal Datum.

*FLOODWAY ☐ Yes ☑ No *FLOOD DEVELOPMENT PERMIT REQUIRED ☑ Yes ☐ No

* For flood hazard area zones X or XS, a flood development permit would be required if any work is done in any drainage facility or stream area that would reduce the capacity of the drainage facility, river, or stream, or adversely affect downstream property.

* For subdivisions in ALL FLOOD HAZARD AREA ZONES (including zones X or XS) that involve streams, gulches, low areas, or any type of draingeway, a designation of the 100 year flood inundation limits or a drainage reserve may be required.

SUBDIVISION CONSISTENCY ☐ N/A (Not Applicable)

(Signature) ☐ **The proposed land uses appear to be consistent with/without a unilateral agreement.

Except as permitted in Section 18.04.030(B) MCC, property containing Interim Zoning shall NOT be subdivided.

Comments:

☐ **The proposed land uses appear to NOT be consistent.

Comments:

** All proposed subdivisions will be further reviewed during the subdivision application process to verify consistency, unilateral agreement requirements, and the conditions associated with a unilateral agreement [Section 18.04.030(D), Maui County Code].

REVIEWED & CONFIRMED BY: (Signature) 8/14/12 (Date)

For: AARON SHINMOTO, Planning Program Administrator, Zoning Administration and Enforcement Division

38

10 funds

COUNTY OF MAUI
DEPARTMENT OF PLANNING
Kalana Pakui Building
250 South High Street
Wailuku, Hawaii 96793

Zoning Administration and
Enforcement Division (ZAED)
Telephone: (808) 270-7253
Facsimile: (808) 270-7634
E-mail: planning@mauicounty.gov

DEPT. OF PLANNING COUNTY OF MAUI
AUG - 7 2012
RECEIVED

ZONING AND FLOOD CONFIRMATION FORM

(To be completed by Applicant)

APPLICANT NAME Proposed enlargement of (DPW) TELEPHONE

PROJECT NAME Kaiakoa Culvert (1) E-MAIL

ADDRESS/LOCATION TAX MAP KEY 2380130006

☐ Yes ☐ No Will this *Zoning & Flood Confirmation* Form be used with a Subdivision Application that is **NOT** processed under one of the consistency exemptions in *Section 18.04.030(B), Maui County Code*? **IF YES, LIST THE PROPOSED LAND USES HERE:**

NOTE: 1) Use a separate *Zoning & Flood Confirmation Form* for each Tax Map Key (TMK) number.
2) **If the above "Yes" box is checked** AND if the zoning information for the subject property contains multiple State Land Use Districts, Community Plan Designations, or County Zoning, a signed and dated Land Use Designations (LUD) Map, prepared by a licensed surveyor showing all the various districts, designations, zonings, and any subdistricts, shall be submitted for review and approval.
3) **If the above "Yes" box is checked** AND if there are multiple State Land Use District designations, the applicant shall procure a District Boundary Interpretation from the State Land Use Commission.

FOR COUNTY USE ONLY *(To be completed by ZAED)*

ZONING INFORMATION

STATE LAND USE DISTRICT(S) Urban

COMMUNITY PLAN DESIGNATION(S) MF - Multi Family

COUNTY ZONING(S) H-M - Hotel District (6 stories) + Drainage

OTHER DESIGNATION(S)

☐ Yes ☐ No See Additional Comments On Page Two

☐ Yes ☐ No See The Attached Land Use Designation Map

☑ Yes ☐ No SPECIAL MANAGEMENT AREA (SMA)

☐ Yes ☑ No PLANNED DEVELOPMENT

☐ Yes ☑ No PROJECT DISTRICT

FLOOD INFORMATION

FLOOD HAZARD AREA ZONE(S) VE For Flood Zone AO, FLOOD DEPTH

BASE FLOOD ELEVATION(S) 12' feet mean sea level, Local Tidal Datum.

*FLOODWAY ☐ Yes ☑ No *FLOOD DEVELOPMENT PERMIT REQUIRED ☑ Yes ☐ No

* For flood hazard area zones X or XS, a flood development permit would be required if any work is done in any drainage facility or stream area that would reduce the capacity of the drainage facility, river, or stream, or adversely affect downstream property.

* For subdivisions in ALL FLOOD HAZARD AREA ZONES (including zones X or XS) that involve streams, gulches, low areas, or any type of draingeway, a designation of the 100 year flood inundation limits or a drainage reserve may be required.

SUBDIVISION CONSISTENCY ☐ N/A (Not Applicable)

(Signature) ☐ **The proposed land uses appear to be consistent with/without a unilateral agreement.

Except as permitted in Section 18.04.030(B) MCC, property containing Interim Zoning shall NOT be subdivided.

Comments:

☐ **The proposed land uses appear to NOT be consistent.

Comments:

** All proposed subdivisions will be further reviewed during the subdivision application process to verify consistency, unilateral agreement requirements, and the conditions associated with a unilateral agreement [Section 18.04.030(D), Maui County Code].

REVIEWED & CONFIRMED BY:

(Signature) 8/14/12 (Date)

For: AARON SHINMOTO, Planning Program Administrator, Zoning Administration and Enforcement Division

39

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
PRESIDENT

KARLYNN FUKUDA
EXECUTIVE VICE PRESIDENT

GWEN OHASHI HIRAGA
SENIOR VICE PRESIDENT

MITSURU "MICH" HIRANO
SENIOR VICE PRESIDENT

MARK ALEXANDER ROY
VICE PRESIDENT

December 5, 2012

William Spence, Director
County of Maui
Department of Planning
250 South High Street
Wailuku, Hawaii 96793

SUBJECT: Response to Early Consultation Request for the Waiakoa Culvert Replacement Project, Kihei, Maui, Hawaii

Dear Mr. Spence:

Thank for your letter of August 16, 2012 in response to the request for early consultation in preparation of a Draft Environmental Assessment (EA) for the proposed Waiakoa Culvert Replacement Project. On behalf of the County of Maui, Department of Public Works (DPW), we offer the follow responses to your department's comments, in the same order as your letter.

1. The DPW will meet the applicable requirements of a State Certified Shoreline Survey. To note, the proposed project involves repair and maintenance of a roadway and replacement of two (2) existing culverts and may qualify as an exempt action within the Special Management Area. The DPW is coordinating with your department regarding a determination.

2. A Flood Development Permit will be prepared for the proposed project.

3. Thank you for the Zoning and Flood Confirmation forms for the adjacent parcels (TMKs (2) 3-8-013:005 and 006). As you may be aware the County right-of-ways are not assigned TMK parcel numbers.

MAUI
305 High St., Suite 104 Wailuku, Hawaii 96793
PH: (808)244-2015 FAX: (808)244-8729
OAHU
735 Bishop St., Suite 238 Honolulu, Hawaii 96813 | PH: (808)983-1233
WWW.MHPLANNING.COM

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Thank you again for your participate in the Chapter 343, Hawaii Revised Statues review process. A copy of your letter will be included in the Draft EA. If there are any questions or if additional information is needed, please feel free to contact me at (808) 244-2015.

Very truly yours,

Leilani Pulmano, Program Manager

LP:la
Enclosure
cc: John Smith, County of Maui, Department of Public Works
Michael Ishikawa, Sato & Associates, Inc.
Snooky Mello, AECOS, Inc.
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JUL 23 2012

POLICE DEPARTMENT

COUNTY OF MAUI

ALAN M. ARAKAWA
MAYOR

OUR REFERENCE

YOUR REFERENCE

55 MAHALANI STREET
WAILUKU, HAWAII 96793
(808) 244-6400
FAX (808) 244-6411

GARY A. YABUTA
CHIEF OF POLICE

CLAYTON N.Y.W. TOM
DEPUTY CHIEF OF POLICE

July 18, 2012

Ms. Leilani Pulmano, Program Manager
Munekiyo & Hiraga, Inc.
305 High St., Ste. 104
Wailuku, HI 96793

RE: Early Consultation Request for South Kihei Road Waiakoa Culvert Replacement Project, Kihei, Maui, Hawaii

Dear Ms. Pulmano:

This is in response to your letter dated July 13, 2012, requesting our review and comments for the above-referenced proposed project on behalf of the applicant. We will review and comment requests from the Department of Public Works only and not from private firms. Please direct your request to the Department of Public Works for appropriate action.

If you have any questions or concerns, please do not hesitate to contact me.

Sincerely,

GARY A. YABUTA
Chief of Police

42

AUG 17 2012

POLICE DEPARTMENT

COUNTY OF MAUI

ALAN M. ARAKAWA
MAYOR

OUR REFERENCE

YOUR REFERENCE

55 MAHALANI STREET
WAILUKU, HAWAII 96793
(808) 244-6400
FAX (808) 244-6411

GARY A. YABUTA
CHIEF OF POLICE

CLAYTON N.Y.W. TOM
DEPUTY CHIEF OF POLICE

August 13, 2012

Ms. Leilani Pulmano
Program Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

Dear Ms. Pulmano:

SUBJECT: Early Consultation Request for South Maui Road Waiakoa Culvert Replacement Project

Thank you for your letter of July 16, 2012, requesting comments on the above subject.

We have reviewed the information submitted and have no comments or recommendations to make at this time. Thank you for giving us the opportunity to comment on this project.

Very truly yours,

Assistant Chief Victor K. Ramos
for: Gary A. Yabuta
Chief of Police

c: William Spence, Planning Department

43

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
PRESIDENT

KARLYNN FUKUDA
EXECUTIVE VICE PRESIDENT

GWEN OHASHI HIRAGA
SENIOR VICE PRESIDENT

MITSURU "MICH" HIRANO
SENIOR VICE PRESIDENT

MARK ALEXANDER ROY
VICE PRESIDENT

September 25, 2012

Gary Yabuta, Chief of Police
County of Maui
Police Department
55 Mahalani Street
Wailuku, Hawaii 96793

SUBJECT: Response to Early Consultation Request For the Waiakoa Culvert Replacement Project, Kihei, Maui, Hawaii

Dear Mr. Yabuta:

Thank for your letters of July 18, 2012 and August 13, 2012 in response to the request for early consultation in preparation of a Draft Environmental Assessment (EA) for the proposed Waiakoa Culvert Replacement Project. On behalf of the County of Maui, Department of Public Works (DPW), we acknowledge that you have no comments or recommendations at this point in time.

Thank you again for your participation in the Chapter 343, Hawaii Revised Statues review process. A copy of your letter will be included in the Draft EA. If there are any questions or if additional information is needed, please feel free to contact me at (808) 244-2015.

Very truly yours,

LP for

Mitsuru "Mich" Hirano, AICP
Senior Vice President

LP:la
cc: John Smith, County of Maui, Department of Public Works
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MAUI
305 High St., Suite 104 Wailuku, Hawaii 96793
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AUG 03 2012

ALAN M. ARAKAWA
Mayor

DAVID C. GOODE
Director

ROWENA M. DAGDAG-ANDAYA
Deputy Director

Telephone: (808) 270-7845
Fax: (808) 270-7955

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
200 SOUTH HIGH STREET, ROOM NO. 434
WAILUKU, MAUI, HAWAII 96793

RALPH NAGAMINE, L.S., P.E.
Development Services Administration

CARY YAMASHITA, P.E.
Engineering Division

BRIAN HASHIRO, P.E.
Highways Division

July 30, 2012

Ms. Leilani Pulmano, Program Manager
MUNEKIYO & HIRAGA, INC.
305 High Street, Suite 104
Wailuku, Maui, Hawaii 96793

Dear Ms. Pulmano:

SUBJECT: EARLY CONSULTATION REQUEST FOR SOUTH KIHEI ROAD WAIAKOA CULVERT REPLACEMENT

We reviewed your request for early consultation for the above-referenced project and have no comments at this time.

Please call Rowena M. Dagdag-Andaya at 270-7845 if you have any questions regarding this letter.

Sincerely,

for DAVID C. GOODE
Director of Public Works

DCG:RMDA:ls
xc: Highways Division
Engineering Division
S:\LUCA\CZM\waiakoa_culvert_replacement_s_kihei_rd_ec_ls.wpd

AUG 22 2012

ALAN M. ARAKAWA
Mayor

KYLE K. GINOZA, P.E.
Director

MICHAEL M. MIYAMOTO
Deputy Director

TRACY TAKAMINE, P.E.
Solid Waste Division

ERIC NAKAGAWA, P.E.
Wastewater Reclamation Division

COUNTY OF MAUI
DEPARTMENT OF
ENVIRONMENTAL MANAGEMENT
2200 MAIN STREET, SUITE 100
WAILUKU, MAUI, HAWAII 96793

August 15, 2012

Ms. Leilani Pulmano
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Pulmano:

SUBJECT: **SOUTH KIHEI ROAD, WAIAKOA CULVERT REPLACEMENT EARLY CONSULTATION**

We reviewed the subject application and have the following comments:

1. Solid Waste Division comments:

   a. Include a plan for construction waste.

2. Wastewater Reclamation Division (WWRD) comments:

   a. Plans shall show the County's existing sewerline improvements in the area of the subject project.

If you have any questions regarding this memorandum, please contact Michael Miyamoto at 270-8230.

Sincerely,

KYLE K. GINOZA, P.E.
Director of Environmental Management

46

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
PRESIDENT

KARLYNN FUKUDA
EXECUTIVE VICE PRESIDENT

GWEN OHASHI HIRAGA
SENIOR VICE PRESIDENT

MITSURU "MICH" HIRANO
SENIOR VICE PRESIDENT

MARK ALEXANDER ROY
VICE PRESIDENT

September 25, 2012

Kyle Ginoza, P.E., Director
County of Maui
Department of Environmental Management
2200 Main Street, Suite 100
Wailuku, Hawaii 96793

SUBJECT: Response to Early Consultation Request For the Waiakoa Culvert Replacement Project, Kihei, Maui, Hawaii

Dear Mr. Ginoza:

Thank for your letter of August 15, 2012 in response to the request for early consultation in preparation of a Draft Environmental Assessment (EA) for the proposed Waiakoa Culvert Replacement Project. On behalf of the County of Maui, Department of Public Works (DPW), we offer the follow responses to your department's comments.

Solid Waste Division Comments:

1. The DPW will prepare a construction waste plan during the building permit process.

Wastewater Reclamation Division (WWRD) Comments:

2. The construction plans will call out the County's existing sewerline in the area. The sewerline is located on the upstream side of the culvert crossing and beyond the limits of grading. As such, the existing sewerline is outside the area of potential effect.

MAUI
305 High St., Suite 104 Wailuku, Hawaii 96793
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735 Bishop St., Suite 238 Honolulu, Hawaii 96813 | PH: (808)983-1233
WWW.MHPLANNING.COM

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Thank you again for your participation in the Chapter 343, Hawaii Revised Statues review process. A copy of your letter will be included in the Draft EA. If there are any questions or if additional information is needed, please feel free to contact me at (808) 244-2015.

Very truly yours,

Leilani Pulmano, Program Manager

LP:la
cc: John Smith, County of Maui, Department of Public Works
Michael Ishikawa, Sato & Associates, Inc.
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MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
PRESIDENT

KARLYNN FUKUDA
EXECUTIVE VICE PRESIDENT

GWEN OHASHI HIRAGA
SENIOR VICE PRESIDENT

MITSURU "MICH" HIRANO
SENIOR VICE PRESIDENT

MARK ALEXANDER ROY
VICE PRESIDENT

December 3, 2012

Kyle Ginoza, P.E., Director
County of Maui
Department of Environmental Management
2200 Main Street, Suite 100
Wailuku, Hawaii 96793

SUBJECT: Response to Early Consultation Request For the Waiakoa Culvert Replacement Project, Kihei, Maui, Hawaii

Dear Mr. Ginoza:

Thank for your letter of August 15, 2012 in response to the request for early consultation in preparation of a Draft Environmental Assessment (EA) for the proposed Waiakoa Culvert Replacement Project. On behalf of the County of Maui, Department of Public Works (DPW), we offer the follow responses to your department's comments.

Solid Waste Division Comments:

1. Prior to construction, the selected contractor will be required to submit a solid waste plan.

Wastewater Reclamation Division (WWRD) Comments:

2. The construction plans will call out the County's existing sewerline in the area. The sewerline is located on the upstream side of the culvert crossing and beyond the limits of grading. As such, the existing sewerline is outside the area of potential effect.

MAUI
305 High St., Suite 104 Wailuku, Hawaii 96793
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WWW.MHPLANNING.COM

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Thank you again for your participation in the Chapter 343, Hawaii Revised Statues review process. A copy of your letter will be included in the Draft EA. If there are any questions or if additional information is needed, please feel free to contact me at (808) 244-2015.

Very truly yours,

LP

Leilani Pulmano, Program Manager

LP:la
cc: John Smith, County of Maui, Department of Public Works
Michael Ishikawa, Sato & Associates, Inc.
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ALAN M. ARAKAWA
Mayor

AUG 10 2012

JO ANNE JOHNSON-WINER
Director
MARC I. TAKAMORI
Deputy Director
Telephone (808) 270-7511

DEPARTMENT OF TRANSPORTATION

COUNTY OF MAUI
200 South High Street
Wailuku, Hawaii, USA 96793-2155

August 2, 2012

Ms. Leilani Pulmano
Munekiyo & Hiraga Inc.
305 High Street, Suite 104
Wailuku, Maui, Hawaii 96793

Subject: Early Consultations Request for South Kihei Road Waiakoa Culvert Replacement Project

Dear Ms. Pulmano,

Thank you for the opportunity to comment on this project.

We would like to request that if there is to be a road closure and/or detour to traffic, please contact our department in advance of that occurrence.

Please feel free to contact me if you have any questions.

Sincerely,

Jo Anne Johnson Winer
Director

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
PRESIDENT

KARLYNN FUKUDA
EXECUTIVE VICE PRESIDENT

GWEN OHASHI HIRAGA
SENIOR VICE PRESIDENT

MITSURU "MICHI" HIRANO
SENIOR VICE PRESIDENT

MARK ALEXANDER ROY
VICE PRESIDENT

September 25, 2012

JoAnne Johnson Winer, Director
County of Maui
Department of Transportation
200 South High Street
Wailuku, Hawaii 96793-2155

SUBJECT: Response to Early Consultation Request for the Waiakoa Culvert Replacement Project, Kihei, Maui, Hawaii

Dear Ms. Winer:

Thank you for your letter of August 2, 2012 on the request for early consultation in preparation of a Draft Environmental Assessment (EA) for the proposed Waiakoa Culvert Replacement Project. On behalf of the County of Maui, Department of Public Works (DPW), we acknowledge your request and will contact your department prior to any road closures or detours.

Thank you again for your participation in the Chapter 343, Hawaii Revised Statutes review process. A copy of your letter will be included in the Draft EA. If there are any questions or if additional information is needed, please feel free to contact me at (808) 244-2015.

Very truly yours,

Leilani Pulmano
Program Manager

LP:lh
cc: Wendy Kobashigawa, County of Maui, Department of Public Works
Michael Ishikawa, Sato & Associates, Inc.
K:\DATA\COM\DPW SKiheiRd Culvert\DEA EC Res\CountyDOTres.doc

MAUI
305 High St., Suite 104 Wailuku, Hawaii 96793
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AUG 0 6 2012

ALAN M. ARAKAWA
Mayor

DAVID TAYLOR, P.E.
Director

PAUL J. MEYER
Deputy Director

DEPARTMENT OF WATER SUPPLY
COUNTY OF MAUI
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793-2155
www.mauiwater.org

August 1, 2012

Leilani Pulmano
Program Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Project Name: South Kihei Road Waiakoa Culvert Replacement Project Early Consultation Request for an Environmental Assessment (EA)
TMK: (2) 3-8-013:999

Dear Ms. Pulmano:

Thank you for the opportunity to provide comments on this EA Early Consultation.

Will the project area include any TMKs other than (2) 3-8-013:999?

A six-inch water line runs parallel approximately 27-feet to the east of the mauka lane of South Kihei Road, in what appears to be the vicinity of the proposed project. The water line makes an abrupt 90-degree turn back toward the road approximately 30 feet south of the centerline of the stream, and continues south along South Kihei Road.

Construction plans need to be reviewed by the DWS Engineering Division. Water valve covers must be lifted to match the finished grade of the roadway, if relevant roadway work is planned.

The applicant should use brackish or reclaimed water for irrigation and dust control during construction/demolition. Reclaimed water is available at the Kihei Sewage Treatment Plant.

Should you have any questions, please contact Alex Buttaro at our Water Resources and Planning Division at 463-3103, or by email alex.buttaro@co.maui.hi.us.

Sincerely,

David Taylor, Director

c: Engineering Division

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"By Water All Things Find Life"

Printed on recycled paper

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
PRESIDENT

KARLYNN FUKUDA
EXECUTIVE VICE PRESIDENT

GWEN CHAEHI HIRAGA
SENIOR VICE PRESIDENT

MITSURU "MUTSU" HIRAGA
SENIOR VICE PRESIDENT

MARK ALEXANDER ROSS
VICE PRESIDENT

December 3, 2012

David Taylor, Director
Department of Water Supply
County of Maui
200 South High Street
Wailuku, Hawaii 96793-2155

SUBJECT: Response to Early Consultation Request for the Waiakoa Culvert Replacement Project, Kihei, Maui, Hawaii

Dear Mr. Taylor:

Thank you for your letter of August 1, 2012 on the request for early consultation in preparation for a Draft Environmental Assessment (EA) for the proposed Waiakoa Culvert Replacement Project. On behalf of the County of Maui, Department of Public Works (DPW), we offer the follow responses to your department's comments, in the same order of your letter.

Response to Comment No. 1

The majority of the project area is within TMK (2) 3-8-013:999. However, during installation there will be minor construction activities on TMKs (2)3-8-013:006, 005, and 009.

Response to Comment No. 2

Thank you for informing the DPW of the six-inch water line in the immediate vicinity of the project area. The DPW will consult with your department regarding construction plans to ensure proper coordination with your department.

Response to Comment No. 3

The DPW will consult with your department on the project's construction plans. The DPW understands that water valve covers must match finish grade of roadway.

MAUI
305 High St., Suite 104 Wailuku, Hawaii 96793
PH: (808)244-2015 FAX: (808)244-8729
OAHU
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54

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Response to Comment No. 4

The DPW will use brackish or reclaimed water, as practical, for dust control during construction and demolition. The DPW acknowledges that reclaimed water is available from the Kihei Wastewater Treatment Plant.

Thank you again for your participation in the Chapter 343, HRS review process. A copy of your letter will be included in the Draft EA. If there are any questions or if additional information is needed, please feel free to contact me at (808) 244-2015.

Very truly yours,

Leilani Pulmano
Program Manager

LP:la
cc: Wendy Kobashigawa, County of Maui, Department of Public Works
Michael Ishikawa, Sato & Associates, Inc.
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OCT 11 2012

Maui Electric Company, Ltd.•210 West Kamehameha Avenue•P. O. Box 398•Kahului, Maui, HI 96733-0698•(808) 871-8461

October 9, 2012

Munekiyo & Hiraga, Inc.
Attention: Ms. Leilani Pulmano, Program Manager
305 High Street, Suite 104
Wailuku, HI 96793

Subject: Early Consultation Request for South Kihei Road Waiakoa Culvert Replacement Project
South Kihei Road
Kihei, Maui, Hawaii

Dear Ms. Pulmano,

Thank you for allowing us to comment on the Early Consultation Request for the subject project.

In reviewing our records and the information received, Maui Electric Company (MECO) has facilities in the area. We highly encourage the customer to submit survey and civil plans to us as soon as practical to address any possible relocations or conversions of our facilities.

Should you have any questions or concerns, please feel free to call Kelcie Kawamura at 872-3246.

Sincerely,

R. Okazaki

Ray Okazaki
Supervisor, Engineering

56

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
PRESIDENT

KARLYNN FUKUDA
EXECUTIVE VICE PRESIDENT

GWEN OHASHI HIRAGA
SENIOR VICE PRESIDENT

MITSURU "MICH" HIRANO
SENIOR VICE PRESIDENT

MARK ALEXANDER ROY
VICE PRESIDENT

November 27, 2012

Ray Okazaki
Maui Electric Company, Ltd.
210 West Kamehameha Avenue
Kahului, Hawaii 96732

SUBJECT: Response to Early Consultation Request for the Waiakoa Culvert Replacement Project, Kihei, Maui, Hawaii

Dear Mr. Okazaki:

Thank you for your letter of October 9, 2012 on the request for early consultation in preparation of a Draft Environmental Assessment (EA) for the proposed Waiakoa Culvert Replacement Project. On behalf of the County of Maui, Department of Public Works (DPW), we offer the following information in response to your organization's comment.

As you requested, coordination with the DPW will be conducted at the earliest practical time to address relocation of utility pole(s) and other MECO facilities.

Thank you again for your participation in the Chapter 343, Hawaii Revised Statues review process. A copy of your letter will be included in the Draft EA. If there are any questions or if additional information is needed, please feel free to contact me at (808) 244-2015.

Very truly yours,

Leilani Pulmano, Program Manager

LP:lh
cc: John Smith, County of Maui, Department of Public Works
Michael Ishikawa, Sato & Associates, Inc.
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IX. REFERENCES

IX. REFERENCES

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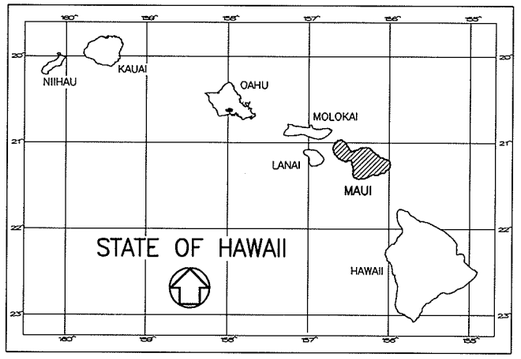
APPENDIX A.

Project Plans



DEPARTMENT OF PUBLIC WORKS

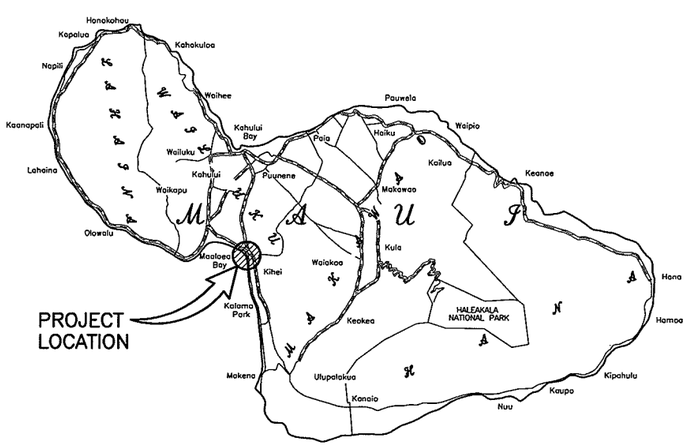
COUNTY OF MAUI
WAILUKU, MAUI, HAWAII

PLANS FOR

WAIAKOA DRAINAGEWAY REPAIR AT SOUTH KIHEI ROAD

JOB NO. 11-20
KIHEI, MAUI, HAWAII

INDEX TO DRAWINGS		
SHT NO.		DESCRIPTION
1	T1	TITLE SHEET
2	C1	CONSTRUCTION NOTES
3	C2	WATER POLLUTION & EROSION CONTROL NOTES
4	C3	OVERALL EROSION CONTROL PLAN
5	C4	EROSION CONTROL PLAN – PHASE 1 & 2
6	C5	EROSION CONTROL PLAN – PHASE 3 & DETAILS
7	C6	SCHEMATIC ROAD CLOSURE PLAN
8	C7	ROADWAY PLAN
9	C8	GRADING PLAN
10	S1	STRUCTURAL GENERAL NOTES
11	S2	BRIDGE GENERAL PLAN
12	S3	FOUNDATION PLAN
13	S4	LONGITUDINAL SECTION & CULVERT SECTION

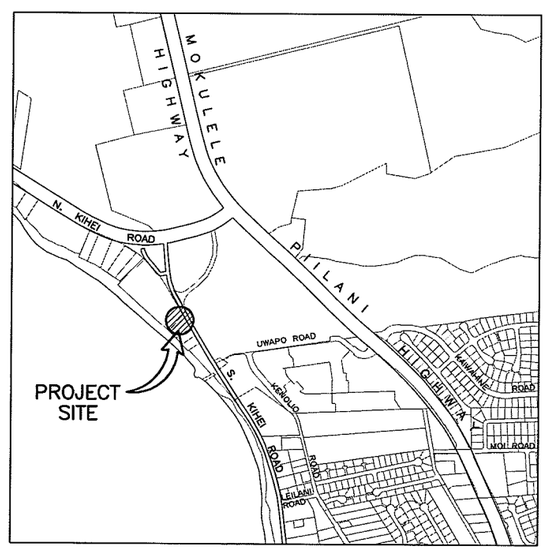


NORTH

ISLAND OF MAUI

5 0 5 10

SCALE IN MILES



NORTH

LOCATION MAP

N.T.S.

APPROVED:

DIRECTOR,
DEPARTMENT OF PUBLIC WORKS
COUNTY OF MAUI

DATE

WAIAKOA DRAINAGEWAY REPAIR AT SOUTH KIHEI ROAD JOB NO. 11-20

30% SUBMITTAL 10/12/2012

PROJ. NO.: M1205-00
Date Saved: Mon, 17 Dec 2012 – 10:05am
CAD File Name: M:\Projects\M1205-00 Waiakoa Drainageway Repair\Dwg\T1 Title.dwg

GENERAL NOTES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING SITES AS MAY BE REQUIRED FOR STORAGE, STOCKPILING, FIELD OFFICE/LABORATORY, STAGING AREA AND OTHER CONTRACTOR OPERATIONS.

2. SMOOTH RIDING CONNECTIONS SHALL BE CONSTRUCTED AT THE BEGINNING AND END OF THE PROJECT AND AT ALL CONNECTING APPROACHES, SIDE ROADS AND DRIVEWAYS AND AS DIRECTED BY THE ENGINEER.

3. ALL SAW CUTTING WORK SHALL BE CONSIDERED INCIDENTAL TO VARIOUS CONTRACT ITEMS OF WORK.

4. EXISTING DRAINAGE SYSTEMS SHALL BE FUNCTIONAL AT ALL TIMES DURING CONSTRUCTION. THE CONTRACTOR IS TO FURNISH MATERIALS, EQUIPMENT, LABOR, TOOLS AND INCIDENTALS NECESSARY TO MAINTAIN FLOW. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO VARIOUS CONTRACT ITEMS.

5. ALL CONSTRUCTION SIGNS SHALL BE LEFT IN PLACE UNTIL ALL CONSTRUCTION ITEMS HAVE BEEN COMPLETED. THE CONTRACTOR SHALL OBTAIN PRIOR APPROVAL FROM THE ENGINEER TO REMOVE CONSTRUCTION SIGNS. THIS WORK SHALL NOT BE PAID FOR SEPARATELY BUT SHALL BE CONSIDERED INCIDENTAL TO VARIOUS CONTRACT ITEMS.

6. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND DETAILS ON THE DRAWINGS BEFORE PROCEEDING WITH THE WORK AND SHALL BE RESPONSIBLE FOR PRECISELY LAYING OUT THE VARIOUS IMPROVEMENTS SHOWN ON THE DRAWINGS. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER IN ADVANCE OF CONSTRUCTION TO ALLOW THE ENGINEER TO MAKE REVISIONS WHICH WILL AVOID SUCH CONFLICTS.

7. THE CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY ALL CONDITIONS WHEN PREPARING HIS BID AND MAKE ADJUSTMENTS TO HIS BID ACCORDINGLY. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER.

8. INFORMATION ON ALL UTILITIES AND APPURTENANCES ARE APPROXIMATE ONLY AND WERE BASED ON AVAILABLE RECORDS AND AS-BUILT DRAWINGS FROM PREVIOUS CONTRACTORS. THE CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY THE EXACT LOCATION AND INVERTS OF ALL EXISTING UTILITIES AND SHALL BE RESPONSIBLE TO PROTECT SUCH UTILITIES AT ALL TIMES. ANY DAMAGES TO EXISTING IMPROVEMENTS AND UTILITIES THAT ARE TO REMAIN, WHETHER OR NOT SHOWN ON THE PLANS, SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER AND PAID FOR BY THE CONTRACTOR. ANY PORTION OF EXISTING UTILITIES, ETC. THAT MUST BE REMOVED OR OTHERWISE DISTURBED TO ACCOMPLISH THE WORK CALLED FOR ON THE PLANS SHALL BE RECONSTRUCTED, REPLACED OR RESTORED TO AN ORIGINAL OR BETTER CONDITION AT THE CONTRACTOR'S EXPENSE.

9. PRIOR TO ANY EXCAVATION OR DIGGING, THE CONTRACTOR SHALL CALL THE ONE-CALL CENTER AT 1-866-423-7287 AND PROVIDE ANY NECESSARY PROJECT INFORMATION.

10. CONTRACTOR SHALL MAKE HIS OWN ARRANGEMENTS FOR UTILITIES SUCH AS ELECTRICITY, WATER, ETC. REQUIRED FOR HIS OPERATIONS AND PAY FOR ALL COST THEREOF.

11. AS-BUILT RECORDS: CONTRACTOR SHALL KEEP AN ACCURATELY MARKED JOB SET OF PRINTS AS THE JOB PROGRESSES, WITH ALL CHANGES OR DEVIATIONS FROM THE ORIGINAL DRAWINGS COVERING THE WORK UNDER THIS CONTRACT. PRIOR TO THE COMPLETION OF THE CONTRACT HE SHALL FORWARD TO THE ENGINEER, ONE (1) COMPLETE SET OF REPRODUCIBLE QUALITY TRACINGS AND THE RED-LINED MARKED SET (COMPLETE SETS) SHOWING ALL CHANGES. ALL SETS SHALL BE SIGNED BY THE CONTRACTOR AND MARKED "AS-BUILT".

12. EXISTING GUARDRAIL APPURTENANCES AND EXISTING SIGNS AND POSTS THAT WILL BE REMOVED AND/OR REPLACED SHALL BE DELIVERED TO THE COUNTY'S WAILUKU BASEYARD IN A RE-USABLE CONDITION. PAYMENT FOR REMOVAL, STORAGE AND DELIVERY SHALL BE CONSIDERED INCIDENTAL TO VARIOUS CONTRACT ITEMS AND WILL NOT BE PAID FOR SEPARATELY.

13. THE CONTRACTOR SHALL REFERENCE TO THE SATISFACTION OF THE ENGINEER, ALL EXISTING TRAFFIC SIGNS, POSTS AND PAVEMENT MARKINGS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. THE CONTRACTOR SHALL REPLACE OR REPAIR ALL TRAFFIC SIGNS, POSTS AND PAVEMENT MARKINGS DISTURBED BY HIS ACTIVITIES TO THE SATISFACTION OF THE ENGINEER. THE COST OF WHICH SHALL BE INCIDENTAL TO THE VARIOUS CONTRACT ITEMS UNLESS OTHERWISE NOTED IN THE PROPOSAL. INSTALLATION OF PAVEMENT MARKINGS SHALL NOT COMMENCE UNTIL THE LAYOUT IS APPROVED BY THE ENGINEER.

14. TO AVOID IMPACTS TO THE ENDANGERED HAWAIIAN HOARY BAT, WOODY PLANTS GREATER THAN 15-FEET (4.6-METERS) TALL SHOULD NOT BE REMOVED OR TRIMMED DURING THE BAT BREEDING SEASON OF JUNE 1 THROUGH SEPTEMBER 15. THE CONTRACTOR SHALL SCHEDULE HIS WORK ACCORDINGLY TO AVOID CLEARING AND GRUBBING ACTIVITIES OR THE REMOVAL OF WOODY PLANTS DURING THIS TIME.

15. ALL IN-WATER WORK SHALL BE POSTPONED OR HALTED IF AN ENDANGERED SPECIES ACT (ESA) LISTED MARINE SPECIES ARE WITHIN 50 YARDS OF THE PROPOSED WORK AND SHALL ONLY RESUME AFTER THE ANIMALS HAVE VOLUNTARILY DEPARTED THE AREA. IF APPROACHED BY A MARINE MAMMAL OR TURTLE, EQUIPMENT SHALL BE PUT IN NEUTRAL AND ALLOW THE ANIMAL TO PASS. ADDITIONALLY, MARINE MAMMALS AND SEA TURTLES SHALL NOT BE ENCIRCLED OR TRAPPED BETWEEN MULTIPLE MECHANIZED EQUIPMENT.

GRADING NOTES & TRENCHING NOTES

1. THE CONTRACTOR SHALL REMOVE ALL SILT AND DEBRIS RESULTING FROM HIS WORK AND DEPOSITED IN DRAINAGE FACILITIES, ROADWAYS AND OTHER AREAS. THE COSTS INCURRED FOR ANY NECESSARY REMEDIAL ACTION BY THE CHIEF ENGINEER SHALL BE PAYABLE BY THE CONTRACTOR.

2. THE CONTRACTOR, AT HIS EXPENSE, SHALL KEEP THE PROJECT AREA AND SURROUNDING AREA FREE OF DUST NUISANCE. THE WORK SHALL BE IN CONFORMANCE WITH THE AIR POLLUTION CONTROL STANDARDS AND REGULATIONS OF THE STATE DEPARTMENT OF HEALTH.

2. ALL GRADING OPERATIONS SHALL BE PERFORMED IN CONFORMANCE WITH THE APPLICABLE PROVISIONS OF THE WATER POLLUTION CONTROL AND WATER QUALITY STANDARDS CONTAINED IN THE PUBLIC HEALTH REGULATIONS, STATE DEPARTMENT OF HEALTH, ON WATER POLLUTION CONTROL AND WATER QUALITY STANDARDS AND THE COUNTY GRADING ORDINANCE.

4. ALL SLOPES AND EXPOSED AREAS SHALL BE SODDED OR PLANTED IMMEDIATELY AFTER GRADING WORK HAS BEEN COMPLETED. CONTRACTOR SHALL GRASS AND MAINTAIN ALL EXPOSED SLOPES SUCH THAT 60% COVERAGE WILL BE ACHIEVED WITHIN 30 DAYS AND 95% COVERAGE WILL BE ACHIEVED WITHIN 60 DAYS AFTER PLANTING.

5. FILLS ON SLOPES STEEPER THAN 5:1 SHALL BE BENCHED.

6. CONSTRUCTION DEBRIS AND WASTES SHALL BE DEPOSITED AT AN APPROPRIATE SITE. THE CONTRACTOR SHALL INFORM THE ENGINEER OF THE LOCATION OF DISPOSAL SITES. THE DISPOSAL SITE MUST ALSO FULFILL THE REQUIREMENTS OF THE GRADING ORDINANCE.

7. THE CONTRACTOR SHALL PROVIDE DUST CONTROL WITH SPRINKLERS AND/OR WATER WAGONS AS NECESSARY, WEEKENDS AND HOLIDAYS INCLUDED. ALL GRADED AREAS SHALL BE THOROUGHLY WATERED AFTER CONSTRUCTION ACTIVITY HAS CEASED FOR THE DAY AND FOR THE WEEKEND.

8. ALL EXPOSED SLOPES SHALL BE PROTECTED WITH TEMPORARY DIVERSIONS, BERMS, AND SWALES AT THE TOP OF THE SLOPES.

9. EXISTING TOPOGRAPHIC INFORMATION SHOWN IS FROM A JULY 6, 2012 SURVEY MAP PREPARED BY NEWCOMER, LEE LAND SURVEYORS, INC. DUE TO THE EXTENDED LENGTH OF TIME WHICH HAS LAPSED FROM THE DATE OF SURVEY, THE CONTRACTOR SHOULD EXAMINE THE SITE AND TAKE ANY MEASURES NECESSARY TO VERIFY CONDITIONS EXISTING IN THE FIELD.

10. EARTHWORK QUANTITIES SHOWN ARE APPROXIMATE AND ARE TO BE USED FOR OBTAINING A GRADING PERMIT ONLY. NO ADJUSTMENTS HAVE BEEN MADE FOR LOSSES DUE TO GRUBBING AND SHRINKAGE NOR FOR DIFFERING TOPOGRAPHIC CONDITIONS. THE CONTRACTOR SHALL VERIFY EXISTING FIELD CONDITIONS AND PREPARE HIS OWN ESTIMATE AND BID ACCORDINGLY.

11. APPROXIMATE QUANTITIES:
    AREA TO BE GRADED: __ ACRE
    EXCAVATION: __ C.Y.
    EMBANKMENT: __ C.Y.

12. THE CONTRACTOR SHALL PERFORM ALL GRADING IN CONFORMANCE WITH THE REQUIREMENTS SPECIFIED IN THE MAUI COUNTY GRADING ORDINANCE AND THIS PROJECT'S SPECIFICATIONS.

13. THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE ADEQUATE, SAFE, NON-SKID BRIDGING MATERIAL OVER THE TRENCH, INCLUDING SHORING, WHEN TRENCHING IN PAVEMENT AREAS TO HANDLE ALL TYPES OF VEHICULAR TRAFFIC.

PUBLIC HEALTH, SAFETY AND CONVENIENCE

1. THE CONTRACTOR SHALL OBSERVE AND COMPLY WITH ALL FEDERAL, STATE, AND LOCAL LAWS REQUIRED FOR THE PROTECTION OF PUBLIC HEALTH AND SAFETY AND ENVIRONMENTAL QUALITY.

2. AS REQUIRED BY THE COUNTY, THE CONTRACTOR SHALL HIRE SPECIAL DUTY POLICE OFFICERS TO CONTROL THE FLOW OF TRAFFIC.

3. DURING NON-WORKING HOURS ALL LANES SHALL BE OPEN AND ALL EXCAVATIONS ON THE ROADWAY SHALL BE COVERED WITH A SAFE NON-SKID BRIDGING MATERIAL TO HANDLE ALL TYPES OF VEHICULAR TRAFFIC. DRIVEWAYS, SIDE ROADS AND STREETS SHALL BE KEPT OPEN UNLESS THE OWNERS TO THE PROPERTY USING THESE RIGHT-OF-WAYS ARE OTHERWISE PROVIDED FOR SATISFACTORILY.

4. DURING WORKING HOURS, THE CONTRACTOR SHALL MAINTAIN A ROADWAY SUITABLE FOR ONE LANE OF TRAFFIC WITH FLAG MEN AT BOTH ENDS, ALTERNATING DIRECTION OF TRAFFIC FLOW. THE CONTRACTOR SHALL PROVIDE SAFE ACCESS TO AND FROM ALL EXISTING SIDE ROADS, DRIVEWAYS AND STREETS.

5. AT THE END OF EACH DAY'S WORK, THE CONTRACTOR SHALL REMOVE ALL EQUIPMENT AND OTHER OBSTRUCTIONS TO PERMIT FREE AND SAFE PASSAGE OF PUBLIC TRAFFIC.

6. WHERE PEDESTRIAN WALKWAYS EXIST, THEY SHALL BE MAINTAINED IN PASSABLE CONDITION OR OTHER FACILITIES FOR PEDESTRIANS SHALL BE PROVIDED. PASSAGE BETWEEN WALKWAYS AT INTERSECTIONS SHALL LIKEWISE BE PROVIDED.

CONSTRUCTION NOTES WITHIN COUNTY RIGHT-OF-WAY REV. 11/07

1. CONTRACTOR SHALL OBTAIN A PERMIT TO PERFORM WORK ON COUNTY HIGHWAYS FROM THE DEVELOPMENTAL SERVICES ADMINISTRATION TWO WEEKS PRIOR TO THE COMMENCEMENT OF WORK.

2. STANDARD DETAIL DRAWINGS AND STANDARD SPECIFICATIONS OF THE DEPARTMENT OF PUBLIC WORKS SHALL BE INCLUDED AS PART OF THE CONSTRUCTION PLANS.

3. ALL CONSTRUCTION WORK SHALL STRICTLY CONFORM TO THE LATEST VERSION OF THE HAWAII STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, AND THE SEPTEMBER 1984 "STANDARD DETAILS" FOR PUBLIC WORKS CONSTRUCTION OF THE DEPARTMENT OF PUBLIC WORKS, AS AMENDED.

4. IF EXISTING UTILITIES, WHETHER OR NOT SHOWN ON PLANS, ARE DAMAGED DURING CONSTRUCTION, THE CONTRACTOR SHALL AT HIS OWN EXPENSE BE REQUIRED TO REPAIR SUCH UTILITIES.

5. CONTRACTOR SHALL PROVIDE, INSTALL AND MAINTAIN ALL NECESSARY SIGNS, LIGHTS, FLARES, BARRICADES, AND OTHER PROTECTIVE DEVICES FOR THE PROTECTION, SAFETY AND CONVENIENCE OF THE PUBLIC, ACCORDING TO THE 2009 OR LATEST APPROVED VERSION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICE FOR STREETS AND HIGHWAYS", AND TO THE RULES AND REGULATIONS GOVERNING THE USE OF TRAFFIC CONTROL DEVICES AT WORKSITES AND/OR ADJACENT TO PUBLIC STREETS AND HIGHWAYS ADOPTED BY THE HIGHWAY SAFETY COORDINATOR AND THE U.S. FEDERAL HIGHWAY ADMINISTRATION "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR HIGHWAY CONSTRUCTION AND MAINTENANCE OPERATIONS."

6. THE DIRECTOR PUBLIC WORKS AND/OR THE DIRECTOR OF THE DEPARTMENT OF WATER SUPPLY HAS THE RIGHT TO STOP CONSTRUCTION SHOULD ANY WORK BE FOUND CONTRARY TO THE APPROVED CONSTRUCTION PLAN OR DETRIMENTAL TO THE PUBLIC'S INTEREST.

7. THE CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING WITH THE DEVELOPMENT SERVICES ADMINISTRATION FIVE (5) DAYS PRIOR TO COMMENCEMENT OF CONSTRUCTION.

8. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, KEEP THE PROJECT AREA AND SURROUNDING AREA FREE FROM DUST NUISANCE. THE WORK SHALL BE IN CONFORMANCE WITH AIR POLLUTION CONTROL STANDARDS AND REGULATIONS OF THE STATE DEPARTMENT OF HEALTH AND COUNTY GRADING ORDINANCE.

9. 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 NECESSARY REMEDIAL ACTION ORDERED BY THE DIRECTOR OF PUBLIC WORKS SHALL BE PAID BY THE CONTRACTOR.

10. CONSTRUCTION DEBRIS AND WASTES SHALL BE DEPOSITED AT AN APPROPRIATE WORK SITES. THE CONTRACTOR SHALL INFORM THE DIRECTOR OF PUBLIC WORKS OF THE LOCATION OF THE DISPOSAL SITES. THE DISPOSAL SITE MUST FULFILL THE REQUIREMENTS OF THE GRADING ORDINANCE.

11. THE CONTRACTOR SHALL SUBMIT A TIF AND FIVE (5) COPIES OF THE "AS-BUILT" DRAWINGS PRIOR TO THE FINAL APPROVAL OF THE IMPROVEMENTS.

12. SHOULD HISTORIC SITES SUCH AS WALLS, PLATFORMS, PAVEMENTS OR MOUNDS, OR REMAIN SUCH AS ARTIFACTS, BURIALS, CONCENTRATION 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 AND/OR LANDOWNER SHALL IMMEDIATELY CONTACT THE STATE HISTORIC PRESERVATION DIVISION (692-8015), WHICH WILL ASSESS THE SIGNIFICANCE OF THE FIND AND RECOMMEND AN APPROPRIATE MITIGATION MEASURE, IF NECESSARY.

13. PURSUANT OF MAUI COUNTY CODE SECTION 3.44.015(C), THE COUNTY OF MAUI IS NOT RESPONSIBLE FOR ANY PARK, ROADWAY, EASEMENT (INCLUDING BUT NOT LIMITED TO DRAINAGE, SEWER, ACCESS, RECLAIMED WATER, OR NAVIGATION EASEMENT), OR ANY OTHER INTEREST IN REAL PROPERTY SHOWN ON THIS MAP OR SHOWN ON THESE PLANS, UNLESS THE MAUI COUNTY COUNCIL HAS ACCEPTED ITS DEDICATION BY A RESOLUTION APPROVED BY A MAJORITY OF COUNCIL'S MEMBERS AT A REGULAR OR SPECIAL MEETING OF THE MAUI COUNTY COUNCIL.

14. STEEL PLATE WARNING SIGNS ARE REQUIRED FOR ALL STEEL PLATES IN THE RIGHT-OF-WAY.

15. WHEELCHAIR RAMP INSPECTION/CERTIFICATION FORMS SHALL BE REQUIRED FOR ALL NEWLY CONSTRUCTED RAMPS.

16. ALL STRIPING AND PAVEMENT MARKINGS SHALL BE OF THERMOPLASTIC MATERIAL.

17. COMPACTION REQUIREMENTS:

    a. TESTING OF MATERIALS SHALL BE CONDUCTED BY AN APPROVED INDEPENDENT TESTING AGENCY IN ACCORDANCE WITH ASTM STANDARD METHODS OR AS SPECIFIED BY THE DEPARTMENT OF PUBLIC WORKS, ENGINEERING DIVISION, AS FOLLOWS:

        i. EMBANKMENT/SELECT BORROW AND SUBGRADE MATERIALS: ONE (1) COMPACTION TEST PER 600 SQUARE YARDS PER LIFT;

        ii. AGGREGATE SUBBASE COURSE: ONE (1) COMPACTION TEST PER 400 SQUARE YARDS; ONE (1) GRADATION AND SAND EQUIVALENT TEST PER LIFT PER PROJECT;

CONSTRUCTION WITHIN COUNTY RIGHT-OF-WAY (CONTINUED)

        iii. AGGREGATE BASE COURSE: ONE (1) COMPACTION TEST PER 300 SQUARE YARDS; ONE (1) GRADATION AND SAND EQUIVALENT TEST PER LIFT PER PROJECT;

        iv. ASPHALT CONCRETE PAVEMENT OR ASPHALT TREATED BASE COURSE; THREE (3) A.C. CORES FOR THICKNESS AND DENSITY TESTS PER PROJECT;

        v. TRENCH BACKFILL MATERIAL: ONE (1) TEST FOR EACH 300 LINEAL FEET OF TRENCH PER LIFT OF MATERIAL.

    b. CONTRACTOR SHALL SUBMIT ALL TESTING REPORTS INCLUDING RESULTS TO THE COUNTY'S INSPECTION AGENCY FOR REVIEW AND APPROVAL PRIOR TO COUNTY'S ACCEPTANCE OF WORK.

    c. THE CONTRACTOR SHALL BE REQUIRED TO NOTIFY THE COUNTY OF ANY TESTING FAILURES AND CORRECT EACH FAILURE PRIOR TO PROCEEDING TO THE NEXT PHASE OF CONSTRUCTION.

SIGNS AND MARKING NOTES

1. ALL TRAFFIC SIGNS AND PAVEMENT MARKING INSTALLATIONS SHALL BE DONE IN ACCORDANCE WITH THE 2009 "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS," AND THE 2005 "HAWAII STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION," DEPT. OF TRANSPORTATION, STATE OF HAWAII, AND AS SHOWN ON THE PLANS.

2. ALL PAVEMENT MARKINGS SHALL BE THERMOPLASTIC.

3. SIGNS SHALL BE REFLECTORIZED, UNLESS OTHERWISE SPECIFIED.

4. SIGNS SHALL BE ATTACHED TO POST WITH 5/16" ZINC PLATED STEEL BOLTS, NUTS AND WASHERS.

5. LAYOUT OF PAVEMENT MARKINGS AND SIGNS SHALL BE DONE BY THE CONTRACTOR AND APPROVED BY THE ENGINEER PRIOR TO ANY INSTALLATION WORK.

6. CONTRACTOR SHALL SUBMIT MATERIAL BROCHURES FOR ALL SIGN AND PAINT MATERIALS TO THE ENGINEER.

7. THE SIGNING AND/OR STRIPING CONTRACTOR SHALL MAINTAIN ONE (1) SET OF APPROVED PLANS AT THE PROJECT SITE AT ALL TIMES DURING CONSTRUCTION WORK.

8. CONTRACTOR SHALL REFERENCE, ALL EXISTING TRAFFIC SIGNS, POSTS AND PAVEMENT MARKINGS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION, THE CONTRACTOR SHALL REPLACE OR REPAIR ALL TRAFFIC SIGNS, POSTS AND PAVEMENT MARKINGS DISTURBED BY HIS ACTIVITIES.

9. THE CONTRACTOR SHALL PAINT TEMPORARY GUIDELINES AND OUTLINE OF ARROWS, LEGENDS AND CROSSWALKS WITH TWO INCH (2") WIDE BRUSH LINE ON THE DAY HE ROADWAY IS OPEN TO TRAFFIC. THESE MARKINGS MUST BE APPROVED BY THE ENGINEER BEFORE THE PERMANENT LINES ARE PAINTED.

10. THE CONTRACTOR SHALL PROVIDE, INSTALL AND MAINTAIN ALL NECESSARY SIGNS AND OTHER PROTECTIVE FACILITIES, WHICH SHALL CONFORM WITH THE "HAWAII ADMINISTRATION RULES GOVERNING THE USE OF TRAFFIC CONTROL DEVICES AT WORK SITES ON OR ADJACENT TO PUBLIC STREET AND HIGHWAYS" AND THE CURRENT FEDERAL HIGHWAYS ADMINISTRATION'S "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREET AND HIGHWAYS. PART IV - TRAFFIC CONTROLS FOR STREETS AND HIGHWAY CONSTRUCTION AND MAINTENANCE OPERATIONS.

11. EXISTING SIGNS NOT SHOWN ON THESE PLANS TO BE REMOVED SHALL REMAIN POSTED UNLESS OTHERWISE DIRECTED BY THE ENGINEER. REMOVAL AND DISPOSAL OF EXISTING SIGNS AND POSTS AS DESIGNATED ON THESE PLANS SHALL BE INCIDENTAL.

12. PRIOR TO CONSTRUCTION, EXISTING STRIPING AND MARKINGS MUST BE REFERENCED BY THE CONTRACTOR FOR FUTURE USE. INSTALLATION OF PAVEMENT MARKINGS SHALL NOT COMMENCE UNTIL THE LAYOUT IS APPROVED BY THE ENGINEER.

13. CONTRACTOR SHALL ALSO MAKE REFERENCE TO THE STATE OF HAWAII, DEPARTMENT OF TRANSPORTATION, HIGHWAY'S DIVISION STANDARD PLANS AND THE COUNTY OF MAUI'S STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION FOR DIMENSIONS AND OTHER DETAILS.

MICHAEL T. ISHIKAWA
LICENSED PROFESSIONAL ENGINEER
No. 7601-C
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THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION
04/30/14
EXPIRATION DATE OF THE LICENSE

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
WAILUKU, MAUI, HAWAII

WAIAKOA DRAINAGEWAY REPAIR
AT SOUTH KIHEI ROAD
JOB NO. 11-20

CONSTRUCTION NOTES

Date:
Date: 10/12/12
Design By:
Drawn By:
SHEET C1
of 13 Sheets

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PROJ. NO.: M1205-00
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CAD File Name: M:\Projects\M1205-00 Waiakoa Drainageway Repair\Dwg\C1 & C2 Notes.dwg

WATER POLLUTION & EROSION CONTROL

A. GENERAL:

1. SEE SECTION 209 – WATER POLLUTION AND EROSION CONTROL. SECTION 209 DESCRIBES BUT IS NOT LIMITED TO: SUBMITTAL REQUIREMENTS; SCHEDULING OF A WATER POLLUTION AND EROSION CONTROL CONFERENCE WITH THE ENGINEER; CONSTRUCTION REQUIREMENTS; METHOD OF MEASUREMENT; AND BASIS OF PAYMENT.

2. EFFECTIVE OCTOBER 1, 2008, FOLLOW THE GUIDELINES IN THE "CONSTRUCTION BEST MANAGEMENT PRACTICES FIELD MANUAL", DATED JANUARY 2008 IN DEVELOPING, INSTALLING AND MAINTAINING THE BEST MANAGEMENT PRACTICES (BMP) FOR THE PROJECT.

3. FOLLOW THE GUIDELINES IN THE HONOLULU'S CITY & COUNTY "RULES RELATING TO SOIL EROSION STANDARDS AND GUIDELINES" ALONG WITH APPLICABLE SOIL EROSION GUIDELINES FOR PROJECTS ON MAUI, MOLOKAI, KAUAI, AND HAWAII.

4. THE ENGINEER MAY ASSESS LIQUIDATED DAMAGES OF UP TO $27,500 FOR NON-COMPLIANCE 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.

5. THE ENGINEER WILL DEDUCT THE COST FROM THE PROGRESS PAYMENT FOR ALL CITATIONS RECEIVED BY THE DEPARTMENT FOR NON-COMPLIANCE, OR THE CONTRACTOR SHALL REIMBURSE THE COUNTY FOR THE FULL AMOUNT OF THE OUTSTANDING COST INCURRED BY THE COUNTY.

6. FOR PROJECTS THAT REQUIRE AN NPDES PERMIT FROM THE DEPARTMENT OF HEALTH, INSTALL A RAIN GAGE PRIOR TO ANY FIELD WORK INCLUDING THE INSTALLATION OF ANY SITE-SPECIFIC BEST MANAGEMENT PRACTICES. THE RAIN GAGE SHALL HAVE A TOLERANCE OF AT LEAST 0.05 INCHES OF RAINFALL, AND HAVE AN OPENING OF AT LEAST ONE-INCH IN DIAMETER. INSTALL THE RAIN GAGE ON THE PROJECT SITE IN AN AREA THAT WILL NOT DETER RAINFALL FROM ENTERING THE GAGE OPENING. THE RAIN GAGE INSTALLATION SHALL BE STABLE AND PLUMBED. DO NOT BEGIN FIELD WORK UNTIL THE RAIN GAGE IS INSTALLED AND SITE-SPECIFIC BEST MANAGEMENT PRACTICES ARE IN-PLACE.

B. WASTE DISPOSAL:

1. WASTE MATERIALS
COLLECT AND STORE ALL WASTE MATERIALS IN A SECURELY LIDDED METAL DUMPSTER. THE DUMPSTER SHALL MEET ALL LOCAL AND STATE SOLID WASTE MANAGEMENT REGULATIONS. DEPOSIT ALL TRASH AND CONSTRUCTION DEBRIS FROM THE SITE IN THE DUMPSTER. EMPTY THE DUMPSTER A MINIMUM OF TWICE PER WEEK OR AS OFTEN AS IS DEEMED NECESSARY. DO NOT BURY CONSTRUCTION WASTE MATERIALS ONSITE. THE CONTRACTOR'S SUPERVISORY PERSONNEL SHALL BE INSTRUCTED REGARDING THE CORRECT PROCEDURE FOR WASTE DISPOSAL. POST NOTICES STATING THESE PRACTICES IN THE OFFICE TRAILER AND THE CONTRACTOR SHALL BE RESPONSIBLE FOR SEEING THAT THESE PROCEDURES ARE FOLLOWED.

2. HAZARDOUS WASTE
DISPOSE ALL HAZARDOUS WASTE MATERIALS IN THE MANNER SPECIFIED BY LOCAL OR STATE REGULATIONS AND BY THE MANUFACTURER. THE CONTRACTOR'S SITE PERSONNEL SHALL BE INSTRUCTED IN THESE PRACTICES AND SHALL BE RESPONSIBLE FOR SEEING THAT THESE PRACTICES ARE FOLLOWED.

3. SANITARY WASTE
COLLECT ALL SANITARY WASTE FROM THE PORTABLE UNITS A MINIMUM OF ONCE PER WEEK, OR AS REQUIRED.

4. SOLID WASTE
THE CONTRACTOR SHALL DEVELOP AND SUBMIT TO THE ENGINEER A SOLID WASTE MANAGEMENT PLAN FOR THE DISPOSAL OF CLEARED AND GRUBBED MATERIAL FROM THE PROJECT SITE DURING CONSTRUCTION. CONTRACTOR SHALL COORDINATE WITH THE CENTRAL MAUI LANDFILL SUPERVISOR AT 270-6153 REGARDING SUITABILITY OF THIS MATERIAL AS LANDFILL COVER.

C. EROSION AND SEDIMENT CONTROL INSPECTION AND MAINTENANCE PRACTICES:

1. INSPECT ALL CONTROL MEASURES AT LEAST ONCE EACH WEEK AND WITHIN 24 HOURS OF ANY RAINFALL EVENT OF 0.5 INCHES OR GREATER.

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

3. REMOVE BUILT-UP SEDIMENT FROM SILT FENCE WHEN IT HAS REACHED ONE-THIRD THE HEIGHT OF THE FENCE.

4. INSPECT SILT SCREEN OR FENCE FOR DEPTH OF SEDIMENT, TEARS, TO VERIFY THAT THE FABRIC IS SECURELY ATTACHED TO THE FENCE POSTS OR CONCRETE SLAB AND TO VERIFY THAT THE FENCE POSTS ARE FIRMLY IN THE GROUND. INSPECT AND VERIFY THE BOTTOM OF THE SILT SCREEN IS BURIED A MINIMUM OF 6 INCHES BELOW THE EXISTING GROUND. AS THE PROJECT PROGRESSES, THE ENGINEER OR HIS REPRESENTATIVE SHALL DETERMINE IF ADDITIONAL SILT FENCE, NOT SPECIFIED BY THE BMP PLANS, SHALL BE REQUIRED TO CONTROL SOIL AND SEDIMENT MIGRATION.

5. INSPECT TEMPORARY AND PERMANENT SEEDING AND PLANTING FOR BARE SPOTS, WASHOUTS AND HEALTHY GROWTH.

6. MAKE A MAINTENANCE INSPECTION REPORT PROMPTLY AFTER EACH INSPECTION. SUBMIT A COPY TO THE ENGINEER NO LATER THAN ONE WEEK FROM THE DATE OF THE INSPECTION.

7. PROVIDE A STABILIZED CONSTRUCTION ENTRANCE TO REDUCE VEHICLE TRACKING OF SEDIMENTS. INCLUDE STABILIZED CONSTRUCTION ENTRANCE IN THE WATER POLLUTION, DUST, AND EROSION CONTROL SUBMITTALS. MINIMUM LENGTH SHOULD BE 50 FEET. MINIMUM WIDTH SHOULD BE 30 FEET OR AS INDICATED ON THE PLANS. MINIMUM DEPTH SHOULD BE 6 INCHES AND UNDERLAIN WITH GEO-TEXTILE FABRIC. CLEAN THE PAVED STREET ADJACENT TO THE SITE ENTRANCE DAILY OR AS REQUIRED TO REMOVE ANY EXCESS MUD, COLD PLANED MATERIALS, DIRT OR ROCK TRACKED FROM THE SITE. COVER DUMP TRUCKS HAULING MATERIAL FROM THE CONSTRUCTION SITE WITH A TARPAULIN.

8. INCLUDE DESIGNATED CONCRETE WASHOUT AREA(S) IN THE WATER POLLUTION, DUST, AND EROSION CONTROL SUBMITTALS.

9. SUBMIT THE NAME OF A SPECIFIC INDIVIDUAL DESIGNATED RESPONSIBLE FOR INSPECTIONS, MAINTENANCE AND REPAIR ACTIVITIES AND FILLING OUT THE INSPECTION AND MAINTENANCE REPORT.

10. 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 ORDER.

11. CONTAIN, REMOVE, AND DISPOSE SLURRY GENERATED FROM SAW CUTTING OF PAVEMENT IN ACCORDANCE WITH APPROVED BMP PRACTICES. PAYMENT FOR CONFINEMENT, REMOVAL, AND DISPOSAL OF SLURRY SHALL BE CONSIDERED INCIDENTAL TO THE VARIOUS CONTRACT ITEMS.

D. GOOD HOUSEKEEPING BEST MANAGEMENT PRACTICES:

1. 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.

CONCRETE	FERTILIZERS
DETERGENTS	PETROLEUM BASED PRODUCTS
PAINTS (ENAMEL AND LATEX)	CLEANING SOLVENTS
METAL STUDS	WOOD
TAR	MASONRY BLOCK

B. USE MATERIAL MANAGEMENT PRACTICES TO REDUCE THE RISK OF SPILLS OR OTHER ACCIDENTAL EXPOSURE OF MATERIALS AND SUBSTANCES TO STORM WATER RUNOFF. MAKE AN EFFORT TO STORE ONLY ENOUGH PRODUCT AS IS REQUIRED TO DO THE JOB.

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

D. KEEP PRODUCTS IN THEIR ORIGINAL CONTAINERS WITH THE ORIGINAL MANUFACTURER'S LABEL.

E. DO NOT MIX SUBSTANCES WITH ONE ANOTHER UNLESS RECOMMENDED BY THE MANUFACTURER.

F. WHENEVER POSSIBLE, USE A PRODUCT UP COMPLETELY BEFORE DISPOSING OF THE CONTAINER.

G. FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR PROPER USE AND DISPOSAL.

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

2. HAZARDOUS MATERIAL POLLUTION PREVENTION PLAN

a. KEEP PRODUCTS IN ORIGINAL CONTAINERS UNLESS THEY ARE NOT RE-SEALABLE.

b. RETAIN ORIGINAL LABELS AND MATERIAL SAFETY DATA SHEETS (MSDS).

c. DISPOSE OF SURPLUS PRODUCTS ACCORDING TO MANUFACTURER'S INSTRUCTIONS AND LOCAL AND STATE REGULATIONS.

3. ONSITE AND OFFSITE PRODUCT SPECIFIC PLAN

THE FOLLOWING PRODUCT SPECIFIC PRACTICES SHALL BE FOLLOWED ONSITE:

A. PETROLEUM BASED PRODUCTS: MONITOR ALL ONSITE VEHICLES FOR LEAKS AND PERFORM REGULAR PREVENTIVE MAINTENANCE TO REDUCE THE CHANCE OF LEAKAGE. STORE PETROLEUM PRODUCTS IN TIGHTLY SEALED CONTAINERS WHICH ARE CLEARLY LABELED. APPLY ASPHALT SUBSTANCES USED ONSITE ACCORDING TO THE MANUFACTURER'S RECOMMENDATION.

B. FERTILIZERS: APPLY FERTILIZERS USED ONLY IN THE MINIMUM AMOUNTS RECOMMENDED BY THE MANUFACTURER. ONCE APPLIED, WORK FERTILIZER INTO THE SOIL TO LIMIT EXPOSURE TO STORM WATER. STORAGE SHALL BE IN A COVERED SHED. TRANSFER THE CONTENTS OF ANY PARTIALLY USED BAGS OF FERTILIZER TO A SEALABLE PLASTIC BIN TO AVOID SPILLS.

C. PAINTS: SEAL AND STORE ALL CONTAINERS WHEN NOT REQUIRED FOR USE. DO NOT DISCHARGE EXCESS PAINT TO THE HIGHWAY DRAINAGE SYSTEM. DISPOSE PROPERLY ACCORDING TO MANUFACTURERS' INSTRUCTIONS OR STATE AND LOCAL REGULATIONS.

D. CONCRETE TRUCKS: WASH OUT OR DISCHARGE CONCRETE TRUCK DRUM WASH WATER ONLY AT A DESIGNATED SITE. DO NOT DISCHARGE WATER IN THE HIGHWAY DRAINAGE SYSTEM OR WATERS OF THE UNITED STATES. CONTACT DRINKING WATER BRANCH, DEPARTMENT OF HEALTH AT 586-4258 TO RECEIVE PERMISSION TO DESIGNATE A DISPOSAL SITE. CLEAN DISPOSAL SITE AS REQUIRED OR AS REQUESTED BY THE OWNER'S REPRESENTATIVE.

1. SPILL PREVENTION PLAN

A. POST A SPILL PREVENTION PLAN TO INCLUDE MEASURES TO PREVENT AND CLEAN UP EACH SPILL.

B. THE CONTRACTOR SHALL BE THE SPILL PREVENTION AND CLEANUP COORDINATOR. DESIGNATE AT LEAST THREE SITE PERSONNEL WHO SHALL RECEIVE SPILL PREVENTION AND CLEANUP TRAINING. THESE INDIVIDUALS SHALL EACH BECOME RESPONSIBLE FOR A PARTICULAR PHASE OF PREVENTION AND CLEANUP. POST THE NAMES OF RESPONSIBLE SPILL PERSONNEL IN THE MATERIAL STORAGE AREA AND IN THE OFFICE TRAILER ONSITE.

C. CLEARLY POST MANUFACTURERS' RECOMMENDED METHODS FOR SPILL CLEANUP. MAKE SITE PERSONNEL AWARE OF THE PROCEDURES AND THE LOCATION OF THE INFORMATION AND CLEANUP SUPPLIES.

D. KEEP MATERIALS AND EQUIPMENT NECESSARY FOR SPILL CLEANUP IN THE MATERIAL STORAGE AREA ONSITE.

E. ANY PERSON DISCOVERING A RELEASE OF MATERIAL FROM A CONTAINER, TANK, OR EQUIPMENT SHALL PERFORM THE FOLLOWING ACTIONS IMMEDIATELY:

-EXTINGUISH ANY SOURCES IF IGNITION.
-IDENTIFY THE MATERIAL RELEASED BY USING THE MSDS SHEETS.
-ATTEMPT TO STOP THE RELEASE AT ITS SOURCE AFTER ASSURING THAT NO DANGER IS BROUGHT TO HUMAN HEALTH.
-INITIATE SPILL NOTIFICATION AND REPORTING PROCEDURES.

F. IF MATERIAL IS RELEASED OUTSIDE THE CONTAMINATION AREA, THE MATERIAL SHOULD BE CONTAINED AS QUICKLY AS POSSIBLE. THE FOLLOWING ACTIONS SHOULD BE CONDUCTED IMMEDIATELY:

-ATTEMPT TO STOP THE RELEASE AT ITS SOURCE.
-CONTAIN THE MATERIAL RELEASED INTO THE ENVIRONMENT.
-RECOVER OR CLEAN UP THE MATERIAL SPILLED.
-CLEAN UP SPILL AREA. KEEP THE SPILL AREA WELL VENTILATED. PERSONNEL SHALL WEAR APPROPRIATE PROTECTIVE CLOTHING TO PREVENT INJURY FROM CONTACT WITH A HAZARDOUS SUBSTANCE.
-DECONTAMINATE TOOLS AND EQUIPMENT USED IN CLEAN UP.
-REPORT SPILLS OF TOXIC HAZARDOUS MATERIAL TO THE APPROPRIATE STATE OR LOCAL GOVERNMENT AGENCY, REGARDLESS OF THE SIZE.
-ARRANGE FOR PROPER DISPOSAL OF WASTE.

E. PERMIT REQUIREMENTS:

1. A SECTION 404 (DA) PERMIT AND SECTION 401 WQC HAVE BEEN SUBMITTED FOR THIS PROJECT. THE CONTRACTOR SHALL PREPARE HIS BID ACCORDINGLY TO ALLOW ADHERENCE TO ALL OF THE CONDITIONS AND BMP'S. COPIES OF THE PERMITS ARE AVAILABLE FOR REVIEW UPON REQUEST.

2. IF A NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT IS REQUIRED FOR CONSTRUCTION ACTIVITIES OF ONE ACRE OR MORE, SUBMIT TO THE ENGINEER SIX SETS OF THE WATER POLLUTION AND EROSION CONTROL SUBMITTALS AS DETAILED IN SUBSECTION 209.03 OF THE SPECIFICATIONS.

3. IF AN NPDES PERMIT FOR CONSTRUCTION DEWATERING IS REQUIRED, THE CONTRACTOR SHALL BE RESPONSIBLE TO OBTAIN THE PERMIT FROM THE DEPARTMENT OF HEALTH, CLEAN WATER BRANCH.

4. COMPLY WITH ALL OTHER APPLICABLE STATE AND FEDERAL PERMIT CONDITIONS. PERMITS MAY INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING:

a. NPDES PERMIT FOR CONSTRUCTION ACTIVITIES
b. NPDES PERMIT FOR CONSTRUCTION DEWATERING
c. NPDES PERMIT FOR HYDROTESTING WATERS

TEMPORARY EROSION CONTROL MEASURES

1. THE CONTRACTOR SHALL USE A WATER TRUCK TO DAMPEN THE GRADED OR GRUBBED SITE WITH WATER.

2. THE PROJECT SITE SHALL BE KEPT DAMP WITH WATER FOR SEVEN DAYS A WEEK. AT THE END OF EACH DAY, THE SITE SHALL BE SUFFICIENTLY DAMPENED SO THAT THE SITE WILL REMAIN MOISTENED THROUGHOUT THE NIGHT.

3. THE CONTRACTOR SHALL CONDUCT HIS OPERATIONS SO THAT EXCAVATION AND EMBANKMENT SHALL BE DAMPENED WITH WATER DURING HIS GRADING OPERATION.

4. THE CONTRACTOR SHALL COVER EXPOSED AREAS BY ONE OR MORE OF THE FOLLOWING ALTERNATES:

a. HYDROMULCHING WITH BERMUDA GRASS.
b. GRASSING WITH MANIENIE SPRIGS AND/OR SEEDS.
c. WATERING UNTIL THE NATIVE VEGETATION RETURNS.
d. 40 LBS COMMON RYE GRASS SEED PER ACRE, 40 LBS PER ACRE 10-10-10 OR EQUIVALENT FERTILIZER WORKED INTO SEED BED BEFORE PLANTING.

5. A MINIMUM OF 90% COVERAGE SHALL BE OBTAINED.

6. A TEMPORARY SPRINKLER SYSTEM SHALL BE INSTALLED CONCURRENTLY WITH ALL PLANTING. PLANTING AND MAINTENANCE OF GRASS SHALL CONFORM TO THE 2005 "HAWAII STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" AS AMENDED.

7. TEMPORARY VEGETATIVE COVER SHALL BE STARTED IMMEDIATELY AFTER THE SITE HAS BEEN GRADED OR BARED OF VEGETATION.

PERMANENT EROSION CONTROL MEASURES

1. A.C. PAVEMENT (SEE PLANS).

2. THE CONTRACTOR SHALL GRASS ALL EXPOSED AREAS THAT HAVE BEEN CONSTRUCTED TO FINAL GRADES IMMEDIATELY. THE CONTRACTOR SHALL ADEQUATELY MAINTAIN THE GRASSED AREAS UNTIL THE COMPLETION OF THE PROJECT.

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THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION
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WAILUKU, MAUI, HAWAII

WAIAKOA DRAINAGEWAY REPAIR
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WATER POLLUTION & EROSION CONTROL NOTES

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BEST MANAGEMENT PRACTICES – NOTES

1. BEST MANAGEMENT PRACTICES (BMP) PRESENTED ON THE BMP PLAN ARE FOR SUGGESTION ONLY. THE PURPOSE OF BMPS IS TO PREVENT THE DISCHARGE OF POLLUTANTS, RESULTING FROM SEDIMENT LADEN STORM WATER RUNOFF, INTO RECEIVING WATER. SOIL PARTICLES RESULTING FROM LAND DISTURBING ACTIVITIES, SHALL BE PREVENTED FROM ENTERING ANY WATER OF HAWAII. FOR THIS REASON, THE CONTRACTOR SHALL DEVELOP A SITE-SPECIFIC BEST MANAGEMENT PRACTICES PLAN FOR THE PROJECT AND OBTAIN ITS APPROVAL BY BOTH DOH AND THE ENGINEER OR HIS REPRESENTATIVE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION ACTIVITIES. EROSION AND SEDIMENT CONTROL SHALL BE IN COMPLIANCE WITH ALL PROVISIONS DESCRIBED IN SECTION 209 – WATER POLLUTION AND EROSION CONTROL, AND THE "CONSTRUCTION BEST MANAGEMENT PRACTICES FIELD MANUAL", DATED JANUARY 2008.

2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY PRECAUTION FOR THE HEALTH AND SAFETY OF HIS/HER EMPLOYEES AT THE PROJECT WHERE CONTAMINATED WATER OR OTHER HAZARDOUS MATERIALS ARE PRESENT AT THE PROJECT SITE.

3. THE CONTRACTOR HAS THE OPTION TO SUBMIT A SITE-SPECIFIC EROSION CONTROL PLAN TO THE DEPARTMENT OF PUBLIC WORKS AND DEPARTMENT OF HEALTH BASED ON THEIR CONSTRUCTION MEANS AND METHODS. ANY ADDITIONAL OBTAINMENT OF LAND USE PERMITS AND RIGHT-OF-ENTRY AGREEMENTS WITH ADJACENT LANDOWNERS FOR USAGE AS STOCKPILE, LAYDOWN AND WASHOUT AREAS WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AND WILL NOT BE PAID FOR SEPARATELY.

4. SHOULD THE CONTRACTOR CHOOSE TO HAVE AN ON-SITE MAINTENANCE/STORAGE/STOCKPILE AREA, THE CONTRACTOR SHALL INSTALL PROPER SECONDARY CONTAINMENT STRUCTURES, SUCH AS DIVERSION BERMS AND SILT FENCES, AROUND THE DESIGNATED AREA TO PREVENT STORM WATER CARRYING CONTAMINANTS INTO DRAINAGE SYSTEMS OR WATER COURSES. IF MATERIAL IS LEFT ONSITE DURING NON-WORKING HOURS, THE STOCKPILE SHALL BE COVERED WITH A TARP OR SHEET TO PREVENT RUNOFF IN AN EVENT OF RAINFALL. THE RAINWATER ACCUMULATING WITHIN THE DESIGNATED AREA SHALL BE NATURALLY EVAPORATED OR INFILTRATED INTO THE GROUND.

5. THE CONTRACTOR SHALL PROVIDE REQUIRED INFORMATION TO THE ENGINEER OR HIS REPRESENTATIVE AND DOH FOR DISCHARGES OF STORM WATER ASSOCIATED WITH CONSTRUCTION ACTIVITY WITHIN THIRTY (30) DAYS BEFORE THE COMMENCEMENT OF CONSTRUCTION. THE CONTRACTOR SHALL USE THE APPROPRIATE BMPS, AS REQUIRED OR SHOWN ON THE EROSION CONTROL PLAN SHEET AND DESCRIBED IN THE CONSTRUCTION BEST MANAGEMENT PRACTICES FIELD MANUAL FOR RUNOFF CONTROL, TO THE APPROVAL OF THE ENGINEER OR HIS REPRESENTATIVE AND DOH.

6. MEASURES TO CONTROL EROSION AND OTHER POLLUTANTS SHALL BE IN PLACE BEFORE ANY EARTHWORK OR DEMOLITION IS INITIATED.

7. STORM DRAIN INLET PROTECTION MUST BE USED THROUGHOUT THE JOBSITE AND AREAS OUTSIDE THE JOBSITE WHERE CONSTRUCTION ACTIVITY MAY TRACK SEDIMENT ONTO PAVED AREAS. STORM DRAIN INLET PROTECTION MUST BE PLACED AT STORM DRAINS, DROP INLETS, CURB INLETS OR WHEREVER RUNOFF MAY OCCUR. AS THE PROJECT PROGRESSES, INLET PROTECTION MAY HAVE TO BE ADDED AS DETERMINED BY ENGINEER OR HIS REPRESENTATIVE.

8. THE CONTRACTOR SHALL PROVIDE SILT FENCE AND STABILIZED CONSTRUCTION ENTRANCE FOR EACH INGRESS/EGRESS POINT UNLESS AUTHORIZED OTHERWISE BY THE ENGINEER OR HIS REPRESENTATIVE. SHOULD THE CONTRACTOR REQUIRE INGRESS OR EGRESS OTHER THAN THAT SHOWN IN DETAIL ON THE PLAN SHEET, THE CONTRACTOR SHALL BE RESPONSIBLE TO OBTAIN ALL NECESSARY APPROVALS.

9. SLOPE AND EXPOSED AREA SHALL BE WATERED, MULCHED, SODDED OR PLANTED AS SOON AS BACKFILL AND FINAL GRADING HAS BEEN ESTABLISHED IN ORDER TO CONTROL DUST, EROSION AND SEDIMENTATION. PLANTING SHALL NOT BE DELAYED UNTIL ALL BACKFILLING AND FINAL GRADING HAS BEEN COMPLETED. BACKFILLING SHALL BE CONTINUOUS AND ANY AREA WITHIN WHICH WORK HAS BEEN INTERRUPTED OR DELAYED SHALL BE STABILIZED. UNLESS INDICATED OTHERWISE ON THE PLANS OR IN THE SPECIFICATIONS, PAYMENT FOR PLANTING OR GRASSING REQUIRED UNDER THIS ITEM (OTHER THAN THAT SPECIFIED FOR LANDSCAPING) SHALL NOT BE PAID FOR DIRECTLY BUT SHALL BE CONSIDERED INCIDENTAL TO AND INCLUDED IN THE PRICE BID FOR EXCAVATION AND EMBANKMENT OR OTHER RELEVANT BID ITEM.

10. AT THE END OF EARTHWORK OPERATIONS, EXISTING INLETS AND MANHOLES SURROUNDING THE PROJECT SITE SHALL BE INSPECTED AND ANY ACCUMULATED SEDIMENT AND DEBRIS FOUND IN THE STRUCTURES SHALL BE REMOVED. FLUSHING INTO THE INLETS AND MANHOLES IS NOT PERMITTED.

11. TEMPORARY BMPS SHALL NOT BE REMOVED UNTIL ALL PERMANENT EROSION CONTROLS ARE IN PLACE AND ESTABLISHED.

12. WASHING DOWN OF CONSTRUCTION EQUIPMENT AND VEHICLES AND WASH OUT OF CONCRETE TRUCK DRUMS ON SITE IS PROHIBITED. WASH WATER FROM WASH DOWNS SHALL NOT BE DISCHARGED INTO DRAINAGE SYSTEMS NOR WATER COURSES.

13. MAINTENANCE OF SEDIMENT AND EROSION CONTROL FEATURES IS AN ON-GOING RESPONSIBILITY. WITHIN THE EROSION AND SEDIMENT CONTROL PLAN THE CONTRACTOR SHALL ESTABLISH AN APPROVED MONITORING PLAN TO VERIFY THIS REQUIREMENT. THE SITE-SPECIFIC BMP PLAN SHOULD BE REFERRED TO FREQUENTLY DURING PROJECT WORK AND REVISED WHEN SITE CONDITIONS OR INFORMATION CHANGES. SITE HOUSECLEANING TO PREVENT INDISCRIMINATE STORAGE OF CONSTRUCTION MATERIALS OR WASTE IS A REQUIREMENT TASKED OR CHARGED TO THE CONTRACTOR.

14. MECHANIZED EQUIPMENT AND CONSTRUCTION MATERIALS SHALL BE CLEAN, UNCONTAMINATED, AND FREE OF DELETERIOUS SUBSTANCES, INCLUDING TOXIC CHEMICALS AND CLAY-COATED MATERIAL.

15. AN OIL SPILL RESPONSE PLAN (OSRP) SHALL BE IN PLACE FOR LANDSIDE PLATFORMS AND ALL IN-MECHANIZED EQUIPMENT WHICH ARE ASSOCIATED WITH THE INSTALLATION OF THE CULVERT. THE OSRP SHALL DETAIL PROCEDURES FOR MANAGING THE ACCIDENTAL RELEASE OF PETROLEUM PRODUCTS TO THE AQUATIC ENVIRONMENT DURING CONSTRUCTION. NO CONTAMINATION OF THE MARINE ENVIRONMENT SHALL RESULT FROM THE PERMITTED ACTIVITIES. NO PETROLEUM PRODUCTS, TRASH, OR OTHER DEBRIS SHALL ENTER NEARSHORE WATERS. WHEN SUCH MATERIAL IS FOUND WITHIN THE OPERATING AREA, THE CONSTRUCTION CONTRACTOR OR ITS DESIGNATED AGENT SHALL COLLECT AND DISPOSE OF THE MATERIAL AT AN APPROVED UPLAND DISPOSAL SITE.

16. THE CONTRACTOR SHALL SUBMIT A SOLID WASTE DISCLOSURE FORM TO THE ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.

17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF REMOVAL AND DISPOSAL ACTIVITIES OF HAZARDOUS WASTE IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL REGULATIONS.

18. WEEKLY SWEEPS SHALL BE CONDUCTED AT ALL CONSTRUCTION ENTRANCES AND EXITS. HOWEVER, IF SEDIMENT BUILD UP IS HEAVY, DAILY SWEEPS SHALL BE CONDUCTED. RESIDUAL ASPHALT OR CONCRETE PRODUCED DURING THE JOB SHALL BE IMMEDIATELY SWEPT, CONTAINED AND MANAGED.

19. CONCRETE WASHOUTS SHALL BE GENERATED IN THE STAGING AREAS OF THE JOBSITE OR AT AN OFFSITE LOCATION. WASHOUT AREAS SHALL BE LINED WITH GEOTEXTILE FABRIC OR PLASTIC SHEETING OR CONTAINED IN APPROVED WASHOUT BINS.

20. SAW CUTTING WASTE SHALL BE VACUUMED WITH A SHOP VACUUM.

21. WATER TRUCKS SHALL BE CIRCULATED THROUGHOUT THE JOBSITE.

22. FUELING TRUCKS SHALL BE USED TO REFUEL VEHICLES AND HEAVY EQUIPMENT AT THE PROJECT LOCATION. FUELING TRUCKS SHALL ALSO STORE AND DISPENSE OTHER REQUIRED LUBRICANTS AND FUELS. IN AN EVENT THE FUELING TRUCK REMAINS AT THE PROJECT SITE, THE TRUCK SHALL BE POSITIONED IN A SAFE ENVIRONMENT CLEAR FROM VEHICULAR AND OPERATIONAL TRAFFIC.

23. IF NECESSARY, ABSORBENT PADS AND DRIP PANS SHALL BE PLACED UNDER THE EQUIPMENT.

24. LITTER SHALL BE PICKED UP AND DISPOSED OF ON A DAILY BASIS.

25. PORTABLE TOILETS SHALL BE PLACED THROUGHOUT THE JOBSITE.

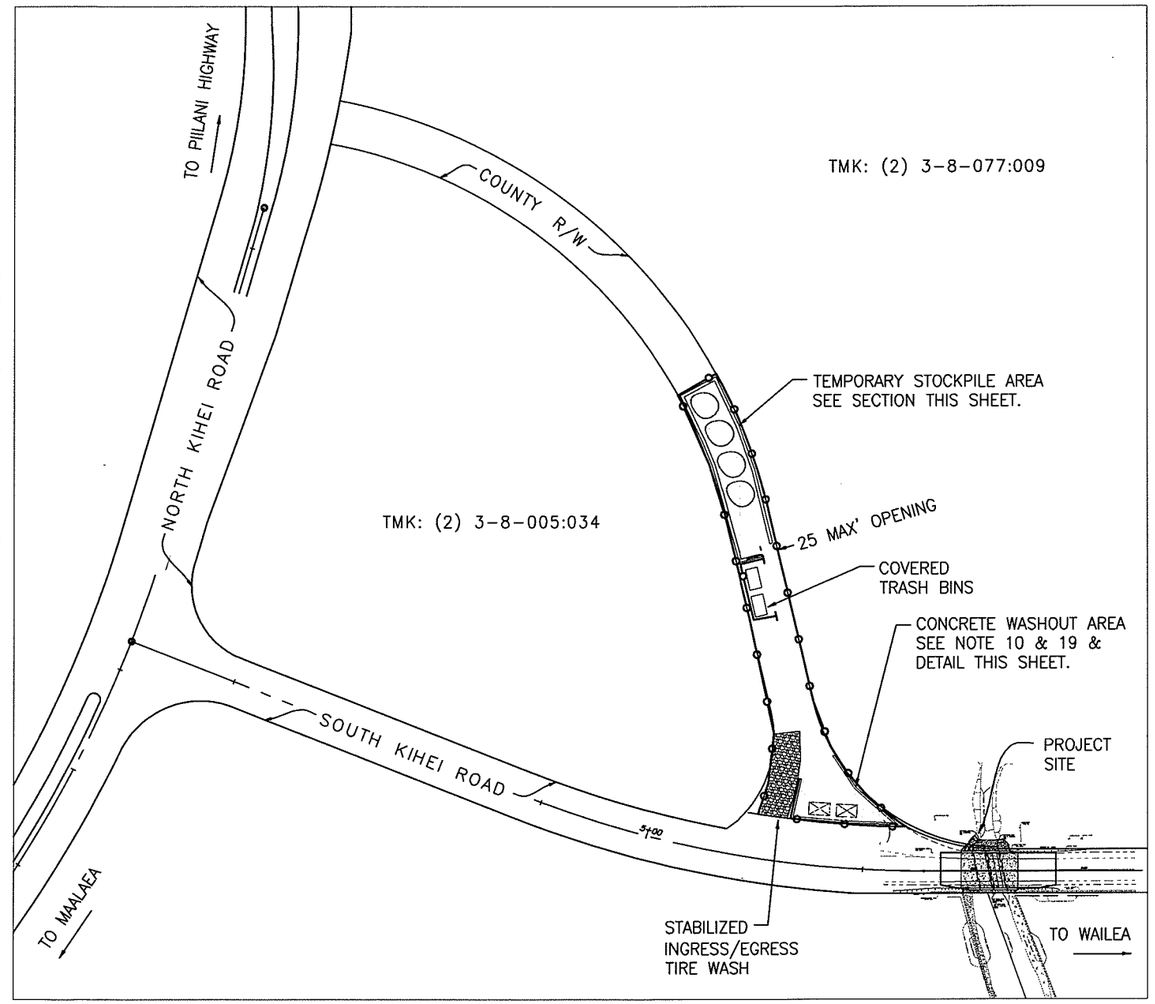
26. THE CONTRACTOR SHALL MAINTAIN FLOW IN WAIAKOA STREAM AT ALL TIMES. SAND BAGS OR TEMPORARY SHEET PILES SHALL BE UTILIZED TO BARRICADE EACH PHASE OF CONSTRUCTION.

27. SAND BAGS SHALL BE FILLED WITH NATIVE MATERIAL.

28. TURBIDITY BARRIERS SHALL BE INSTALLED AS A SECONDARY MEASURE TO ENCLOSE IMMEDIATE WORK AREA, AS SHOWN IN THE PLAN.

29. THE CONTRACTOR SHALL CEASE CONSTRUCTION ACTIVITY DURING STORM EVENTS. NECESSARY PRECAUTIONS SHALL BE TAKEN TO PROTECT THE WORK ZONE AND PREVENT CONSTRUCTION WASTE FROM FLOWING DOWNSTREAM IN ANTICIPATION OF AN UPCOMING STORM EVENT. COSTS ASSOCIATED WITH PREVENTATIVE AND/OR REPAIR MEASURES ASSOCIATED WITH A STORM EVENT WILL NOT BE PAID FOR SEPARATELY.

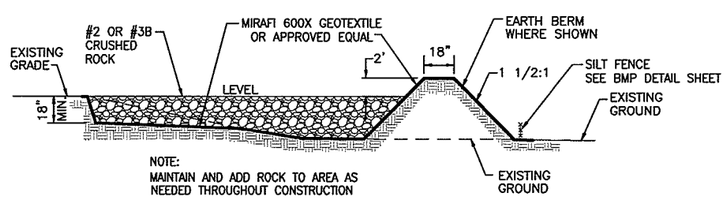
30. THE CONTRACTOR SHALL UTILIZE THE AREA SHOWN ON PLAN AS A LAYDOWN/STAGING AREA. SILT FENCE OR SANDBAGS SHALL BE USED TO PROTECT STOCKPILE AREAS.



NORTH

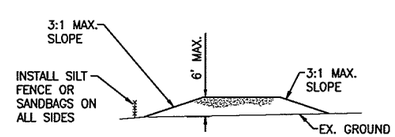
OVERALL EROSION CONTROL PLAN

NOT TO SCALE



TYPICAL SECTION – CONCRETE WASHOUT AREA

NOT TO SCALE



STOCKPILE SECTION

NOT TO SCALE

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04/30/14
EXPIRATION DATE OF THE LICENSE

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
WAILUKU, MAUI, HAWAII

WAIAKOA DRAINAGEWAY REPAIR
AT SOUTH KIHEI ROAD
JOB NO. 11-20

OVERALL EROSION
CONTROL PLAN

	Date:
	Date: 10/12/12
	Design By:
	Drawn By:
	SHEET
	C3
	of 13 Sheets

PROJ. NO.: M1205-00
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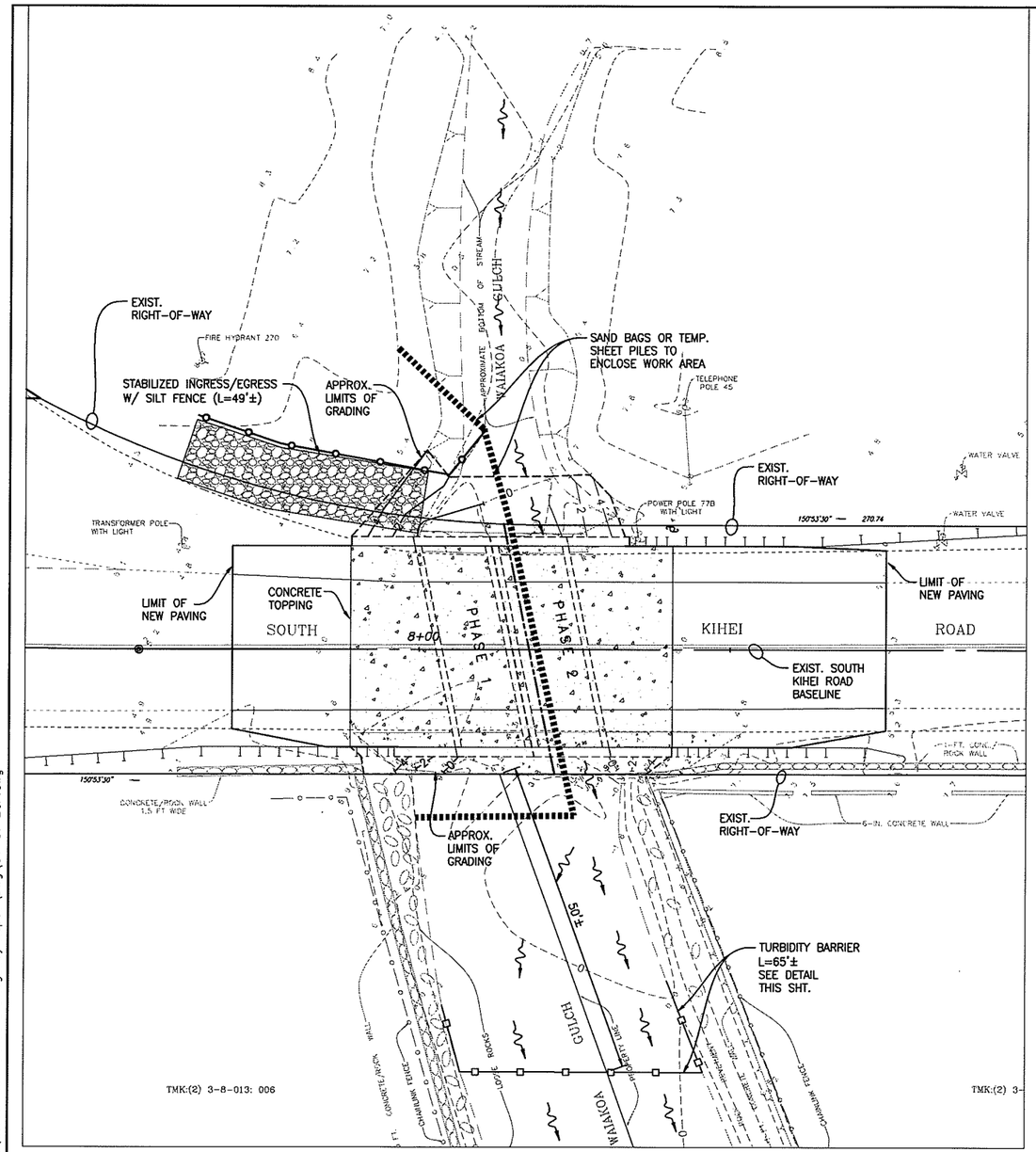
CAD File Name: M:\Projects\M1205-00 Waiakoa Drainageway Repair\Dwg\C4-C7 EOP.dwg

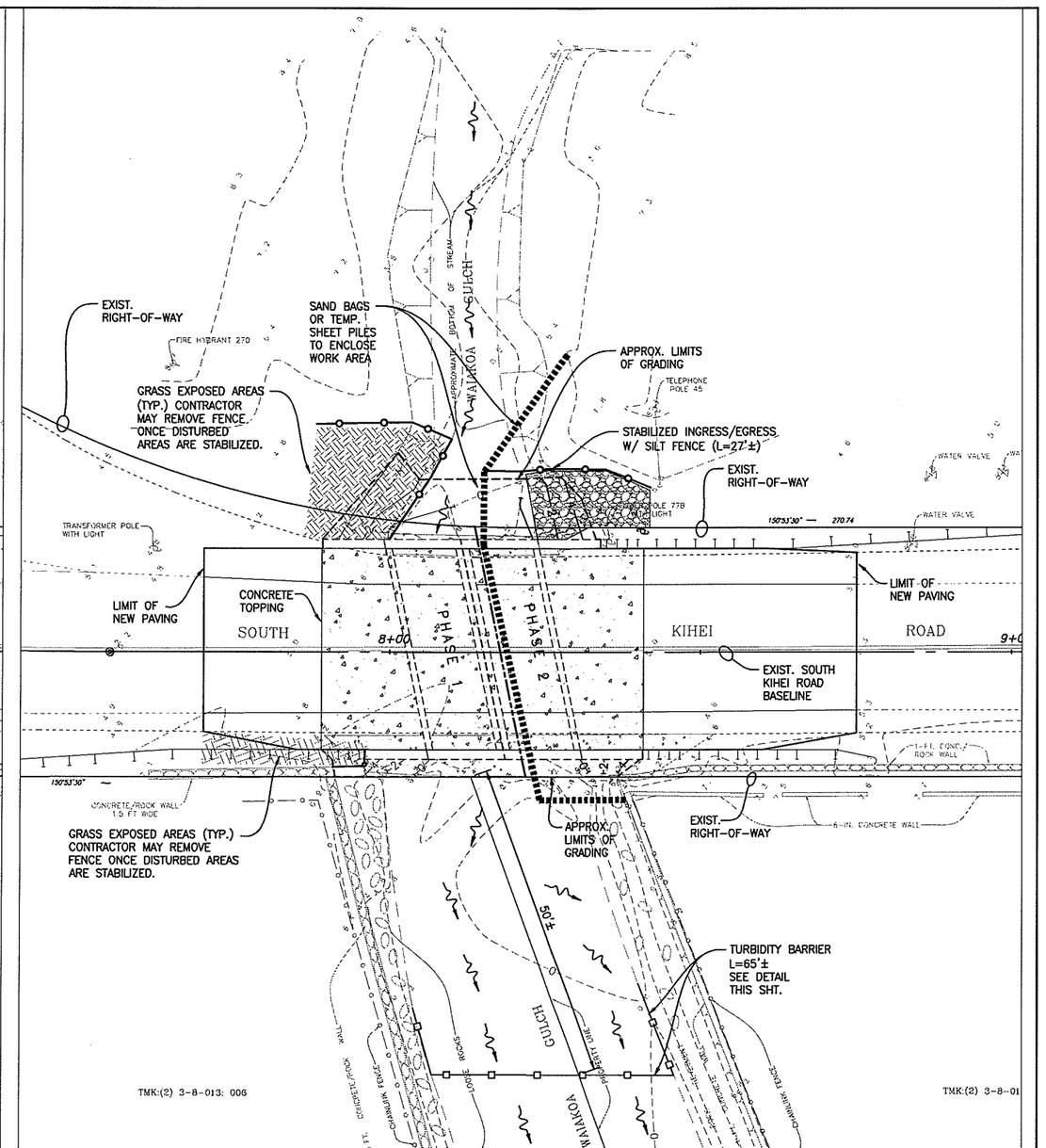


PHASE 1 EROSION CONTROL PLAN

NORTH

10' 5' 0 10' 20' 30'

SCALE: 1"=10'



PHASE 2 EROSION CONTROL PLAN

NORTH

10' 5' 0 10' 20' 30'

SCALE: 1"=10'

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EXPIRATION DATE OF THE LICENSE

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
WAILUKU, MAUI, HAWAII

WAIAKOA DRAINAGEWAY REPAIR
AT SOUTH KIHEI ROAD
JOB NO. 11-20

EROSION CONTROL PLAN – PHASE 1 & 2

Date:

Date: 10/12/12

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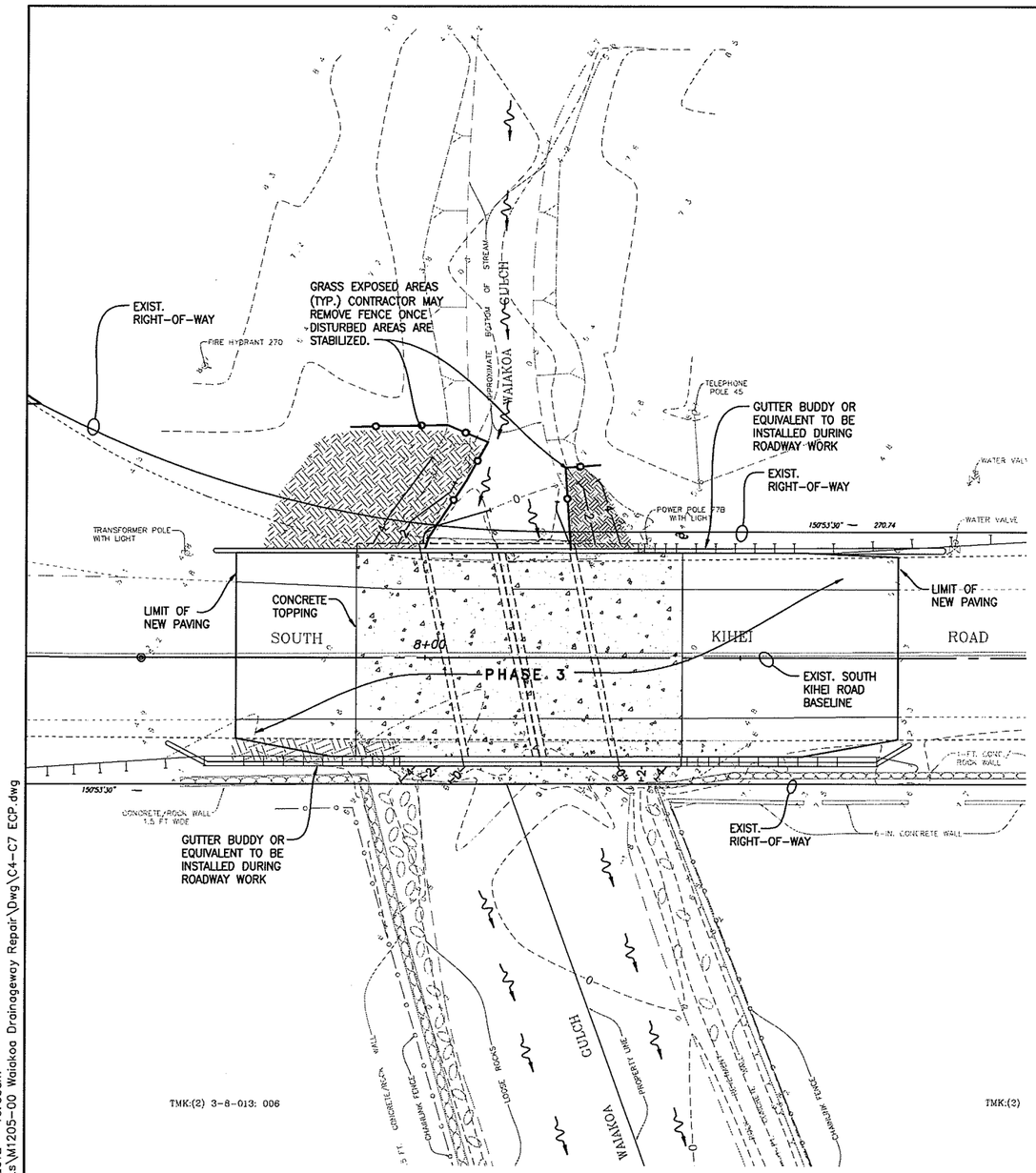
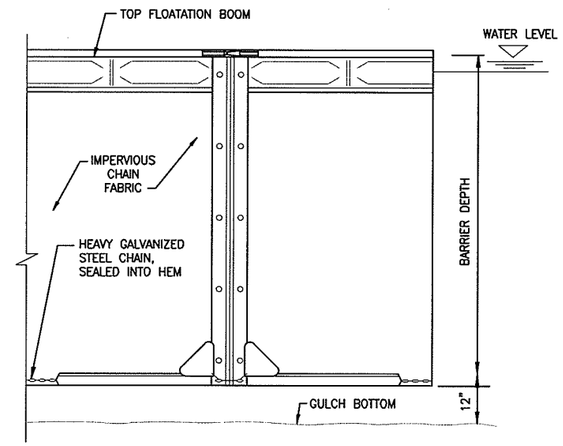


PHASE 3 EROSION CONTROL PLAN

NORTH

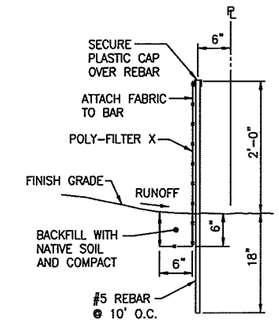
10' 5' 0 10' 20' 30'

SCALE: 1"=10'



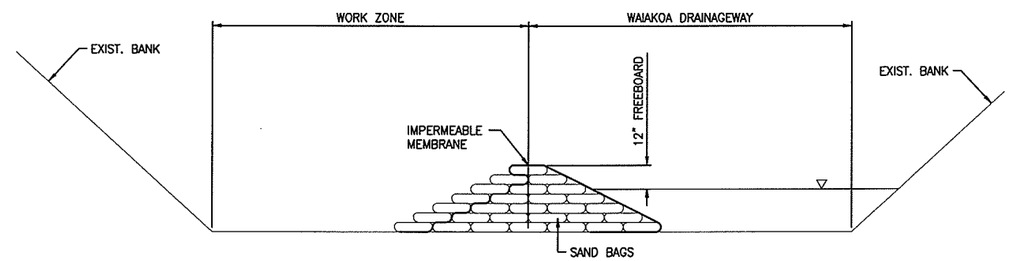
FLOATING TURBIDITY BARRIER

NOT TO SCALE



SILT FENCE

SCALE: 1"=1'-0"

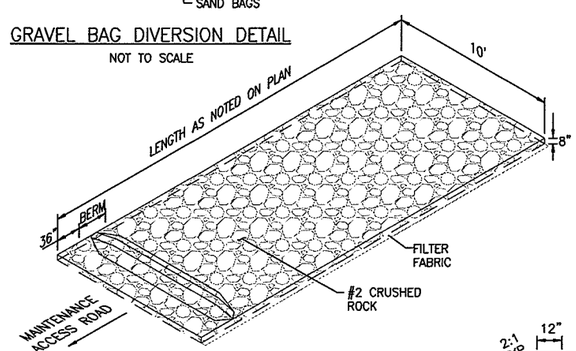


GRAVEL BAG DIVERSION DETAIL

NOT TO SCALE

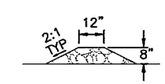
LEGEND

- SILT FENCE
- LIMITS OF GRADING
- TURBIDITY BARRIER
- STABILIZED ENTRANCE
- SAND BAGS



STABILIZED INGRESS/EGRESS WITH TIRE WASH

NOT TO SCALE



SECTION AT BERM

MICHAEL T. ISHIKAWA
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COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
WAILUKU, MAUI, HAWAII

WAIAKOA DRAINAGEWAY REPAIR
AT SOUTH KIHEI ROAD
JOB NO. 11-20

EROSION CONTROL PLAN – PHASE 3 & DETAILS

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GENERAL NOTES FOR TRAFFIC CONTROL

1. TRAFFIC CONTROL PLANS PROVIDED ARE FOR MAJOR CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL DEVELOP HIS OWN TRAFFIC CONTROL PLANS IN ACCORDANCE WITH SECTION 645 OF THE SPECIAL PROVISIONS FOR ACTIVITIES TO COMPLETE WORK NOT COVERED BY THE TRAFFIC CONTROL PLANS. THE CONTRACTOR SHALL SUBMIT THE TRAFFIC CONTROL PLANS TO THE ENGINEER FOR APPROVAL.

2. ALL LANE CLOSURES AND TRAFFIC PATTERN CHANGES (DETOURS) NOT SHOWN ON THE PLAN SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL IN ACCORDANCE WITH SPECIFICATIONS SECTION 645 – WORK ZONE TRAFFIC CONTROL. FOR RESTRICTIONS ON LANE CLOSURES, DETOURS, CONSTRUCTION WORK DURING PEAK HOURS, AND OTHER REQUIREMENTS REGARDING MAINTAINING VEHICULAR AND PEDESTRIAN TRAFFIC, SEE SUBSECTION 107.11 – SAFETY: ACCIDENT PREVENTION; SUBSECTION 107.12 – PROTECTION OF PERSONS AND PROPERTY; SUBSECTION 107.13 – POLLUTION CONTROL AND PROTECTION OF ARCHEOLOGICAL, HISTORICAL, AND BURIAL SITES; AND SECTION 645 – WORK ZONE TRAFFIC CONTROL.

3. THE CONTRACTOR SHALL MAKE MINOR ADJUSTMENTS AT INTERSECTIONS, DRIVEWAYS, BRIDGES, STRUCTURES, ETC., TO FIT FIELD CONDITIONS.

4. CONES OR DELINEATORS SHALL BE EXTENDED TO A POINT WHERE THEY ARE VISIBLE TO APPROACHING TRAFFIC.

5. TRAFFIC CONTROL DEVICES SHALL BE INSTALLED SUCH THAT THE SIGN OR DEVICE FARTHEST FROM THE WORK AREA SHALL BE PLACED FIRST. THE OTHERS SHALL THEN BE PLACED PROGRESSIVELY TOWARD THE WORK AREA.

6. DURING WORKING HOURS THE CONTRACTOR SHALL PROVIDE FLAGGERS AND/OR POLICE OFFICERS TO MONITOR AND DIRECT TRAFFIC.

7. SIGN SPACINGS (L), TAPER LENGTHS (T), AND SPACINGS OF CONES OR DELINEATORS SHALL BE AS SHOWN IN TABLE 1 OF SECTION 645 IN THE SPECIFICATIONS, UNLESS OTHERWISE NOTED ON THE TRAFFIC CONTROL PLANS.

8. ALL TRAFFIC LANES SHALL BE A MINIMUM OF TEN (10) FEET WIDE.

9. ALL SIGNS SHALL BE PROMPTLY REMOVED OR COVERED WHENEVER THE MESSAGE IS NOT APPLICABLE OR NOT IN USE.

10. THE BACKS OF ALL SIGNS USED FOR TRAFFIC CONTROL SHALL BE APPROPRIATELY COVERED TO PRECLUDE THE DISPLAY OF INAPPLICABLE SIGN MESSAGES (I.E., WHEN SIGNS HAVE MESSAGES ON BOTH FACES).

11. AT THE END OF EACH DAY'S WORK OR AS SOON AS THE WORK IS COMPLETED, THE CONTRACTOR SHALL REMOVE ALL TRAFFIC CONTROL DEVICES NO LONGER NEEDED TO PERMIT FREE AND SAFE PASSAGE OF PUBLIC TRAFFIC. REMOVAL SHALL BE IN THE REVERSE ORDER OF INSTALLATION.

12. REPLACE PERMANENT MARKINGS AND TRAFFIC SIGNS UPON COMPLETION OF EACH PHASE OF WORK. TEMPORARY PAVEMENT MARKINGS AND TRAFFIC SIGNS SHALL BE USED IN THE INTERIM.

13. EXISTING CONFLICTING PAVEMENT MARKINGS SHALL BE REMOVED AND TEMPORARY PAVEMENT MARKINGS SHALL BE INSTALLED BEFORE TRAFFIC PATTERNS ARE CHANGED. AFTER COMPLETION OF THE WORK, TEMPORARY PAVEMENT MARKINGS SHALL BE REMOVED.

14. THE LOCATIONS OF PAVEMENT MARKINGS, SIGNS AND DELINEATORS USED IN THE TRAFFIC CONTROL SHALL BE AS SHOWN ON THE PLANS, CONTRACTOR'S APPROVED TRAFFIC CONTROL PLANS, AND/OR AS DETERMINED IN THE FIELD BY THE ENGINEER.

15. DAMAGE TO SIGNS, TEMPORARY PAVEMENT MARKERS, AND DELINEATORS CAUSED BY THE PUBLIC OR CONTRACTOR'S NEGLIGENCE SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR.

16. SIGNS SHALL BE RETROREFLECTIVE AND SHALL BE MOUNTED WITH A TYPE B HIGH INTENSITY FLASHER.

17. STEEL PLATES FOR COVERING TRENCHES SHALL HAVE A SKID RESISTANT SURFACE. THE SKID RESISTANT SURFACE SHALL BE MAINTAINED THROUGHOUT ITS USE. STEEL PLATES SHALL BE INSTALLED IN SUCH A MANNER AS TO MINIMIZE MOVEMENT FROM ITS INTENDED LOCATION AND MINIMIZE NOISE WHEN TRAFFIC CROSSES OVER IT (I.E., STEEL PLATES SHALL NOT GENERATE ANY NOISE IMPACT). STEEL PLATES WILL NOT BE ALLOWED IN THE TRAVELWAY FOR POSTED SPEEDS IN EXCESS OF 35 MPH.

18. THE CONTRACTOR SHALL LIMIT THE EXTENT OF TRENCH AND EXCAVATION WORK FOR PAVEMENT RECONSTRUCTION TO AN AREA THAT CAN BE SATISFACTORILY BACKFILLED IN ONE WORK DAY.

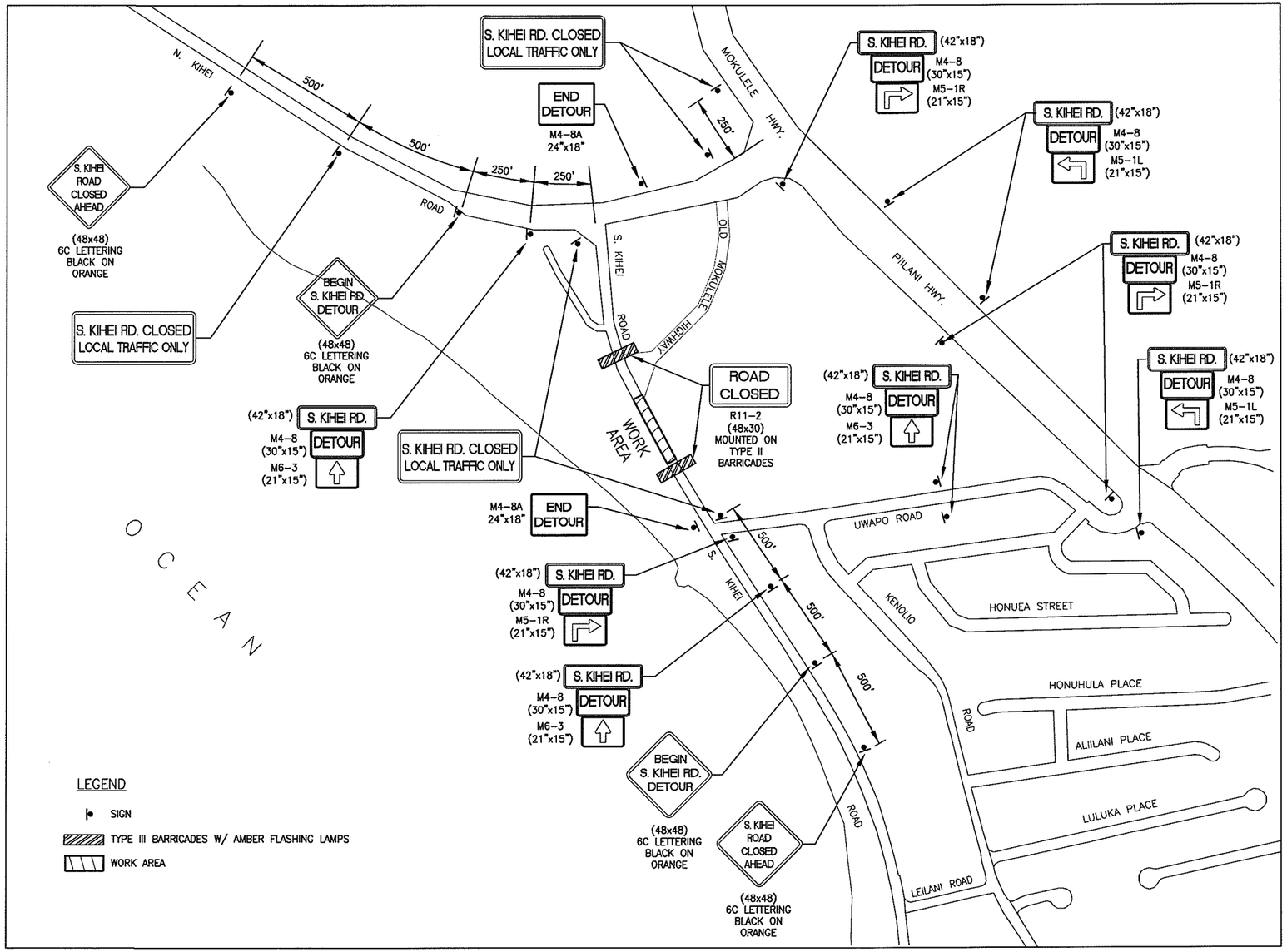
19. WORK ZONE LIMITS SHOWN FOR EACH TRAFFIC CONTROL PHASE ENCOMPASS ALL WORK ITEMS TO BE COMPLETED IN THAT PARTICULAR PHASE. THE LENGTH OF THE WORK ZONE MAY BE REDUCED TO ACCOMMODATE THE CONTRACTOR'S ACTUAL WORK ZONE FOR THAT TIME PERIOD, PROVIDED IT HAS BEEN ACCEPTED BY THE ENGINEER, AND ALL TANGENTS, TAPERS, AND BUFFER LENGTHS ARE MAINTAINED.

20. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL SIGN SUPPORTS AND/OR POSTS FOR CONSTRUCTION WARNING SIGNS.

21. THE CONTRACTOR SHALL PROVIDE A TRANSITION TAPER DURING NON-CONSTRUCTION HOURS FOR OPEN TRENCHES ADJACENT TO THE TRAVELWAY. SEE TRANSITION TAPER DETAIL THIS SHEET.

22. THE CONTRACTOR SHALL PROVIDE ADDITIONAL WARNING DEVICES SUCH AS ELECTRONIC MESSAGE BOARDS OR PUBLIC ANNOUNCEMENTS AS NEEDED TO ENSURE MOTORISTS ARE NOTIFIED OF THE UPCOMING ROAD CLOSURE. THE DATE, LOCATION, INTENDED DETOUR ROUTE AND OTHER RELEVENT INFORMATION SHALL BE INCLUDED IN SUCH NOTICES.

23. THE CONTRACTOR SHALL NOTIFY THE COUNTY OF MAUI, DEPARTMENT OF TRANSPORTATION OF ANY ROAD CLOSURES.



LEGEND

- SIGN
- TYPE III BARRICADES W/ AMBER FLASHING LAMPS
- WORK AREA

ROAD CLOSURE ON SOUTH KIHEI ROAD

NOT TO SCALE

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04/30/14
EXPIRATION DATE OF THE LICENSE

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
WAILUKU, MAUI, HAWAII

WAIAKOA DRAINAGEWAY REPAIR
AT SOUTH KIHEI ROAD
JOB NO. 11-20

SCHEMATIC ROAD CLOSURE PLAN

Date:
Date: 10/12/12
Design By:
Drawn By:
SHEET C6 of 13 Sheets

7

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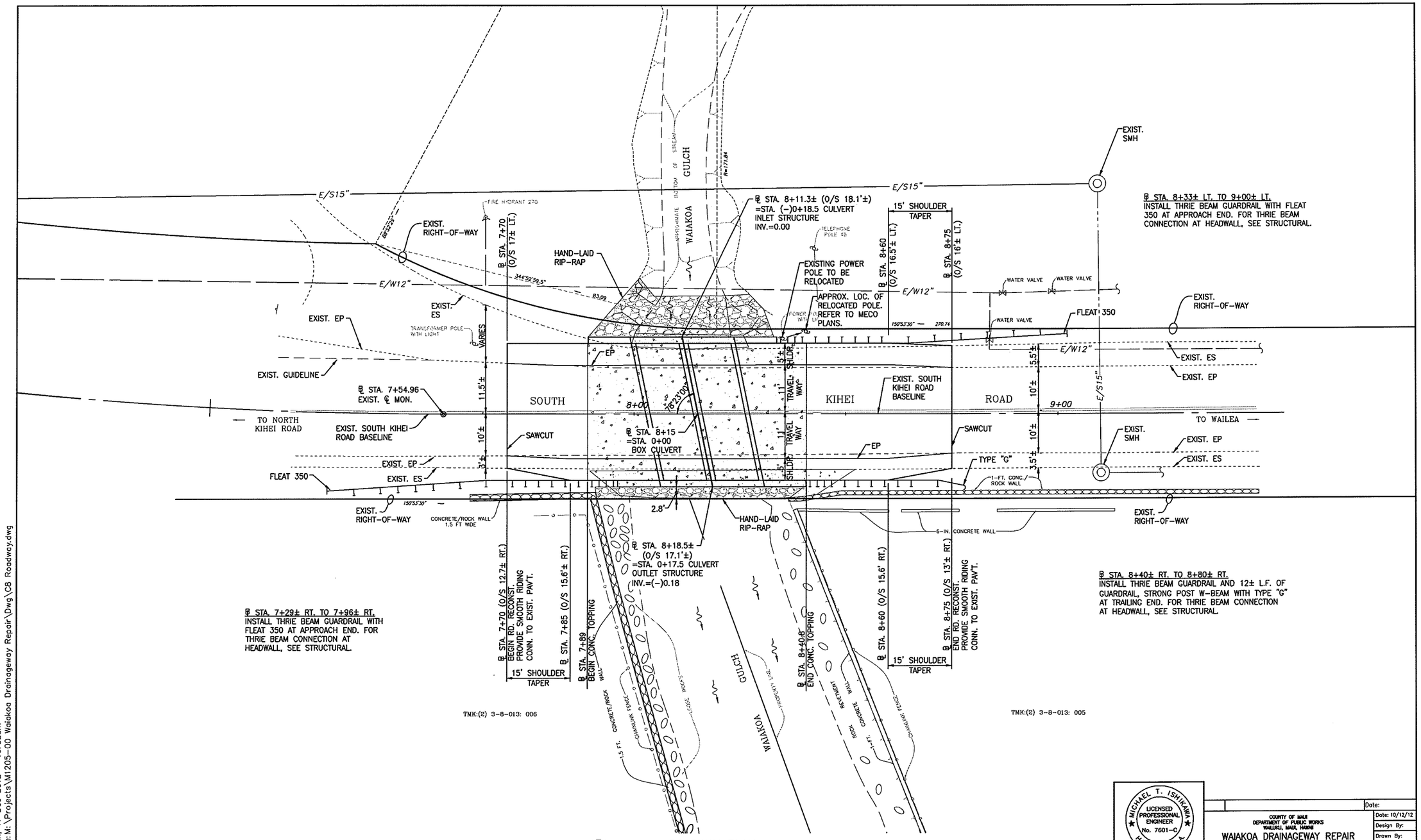

ROADWAY PLAN

MICHAEL T. ISHIKAWA
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COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
WAILUKU, MAUI, HAWAII

WAIAKOA DRAINAGEWAY REPAIR
AT SOUTH KIHEI ROAD
JOB NO. 11-20

ROADWAY PLAN

Date:	
Date: 10/12/12	
Design By:	
Drawn By:	
SHEET	C7
of 13 Sheets	

PROJ. NO.: M1205-00
Date Saved:Mon, 17 Dec 2012 - 10:02am
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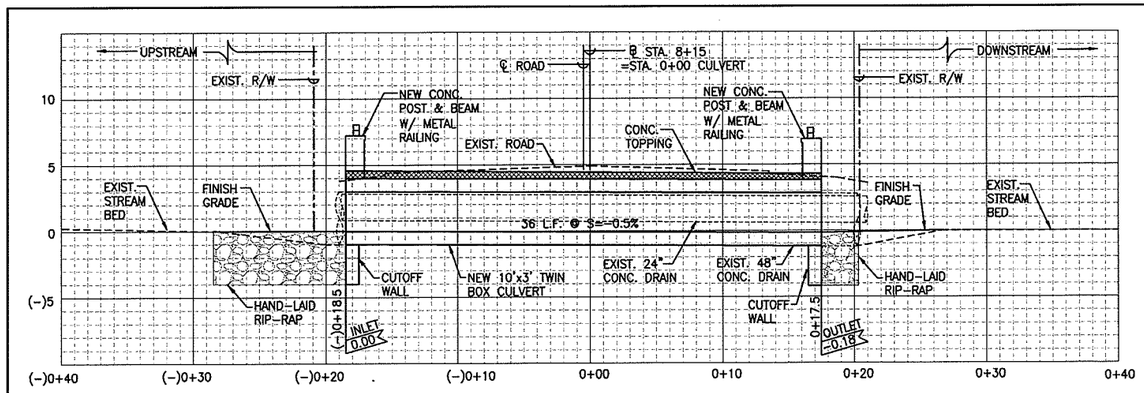
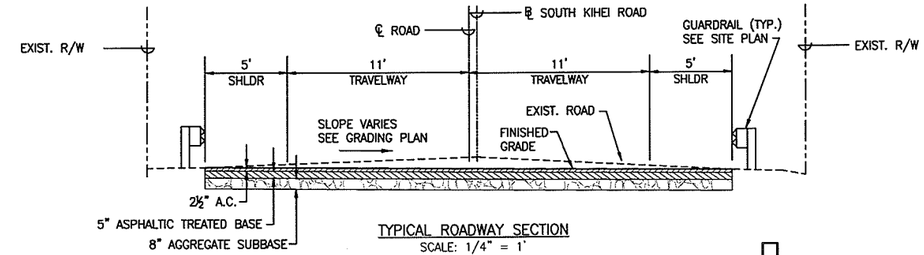
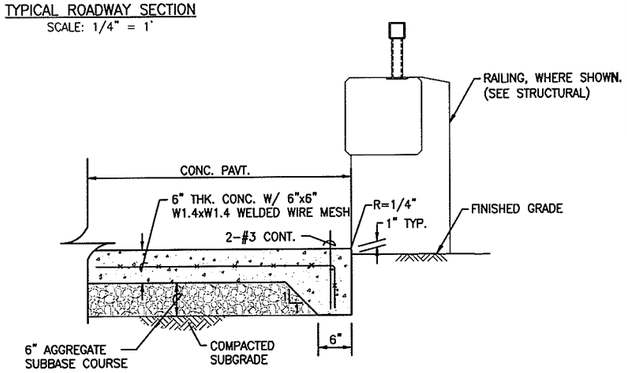


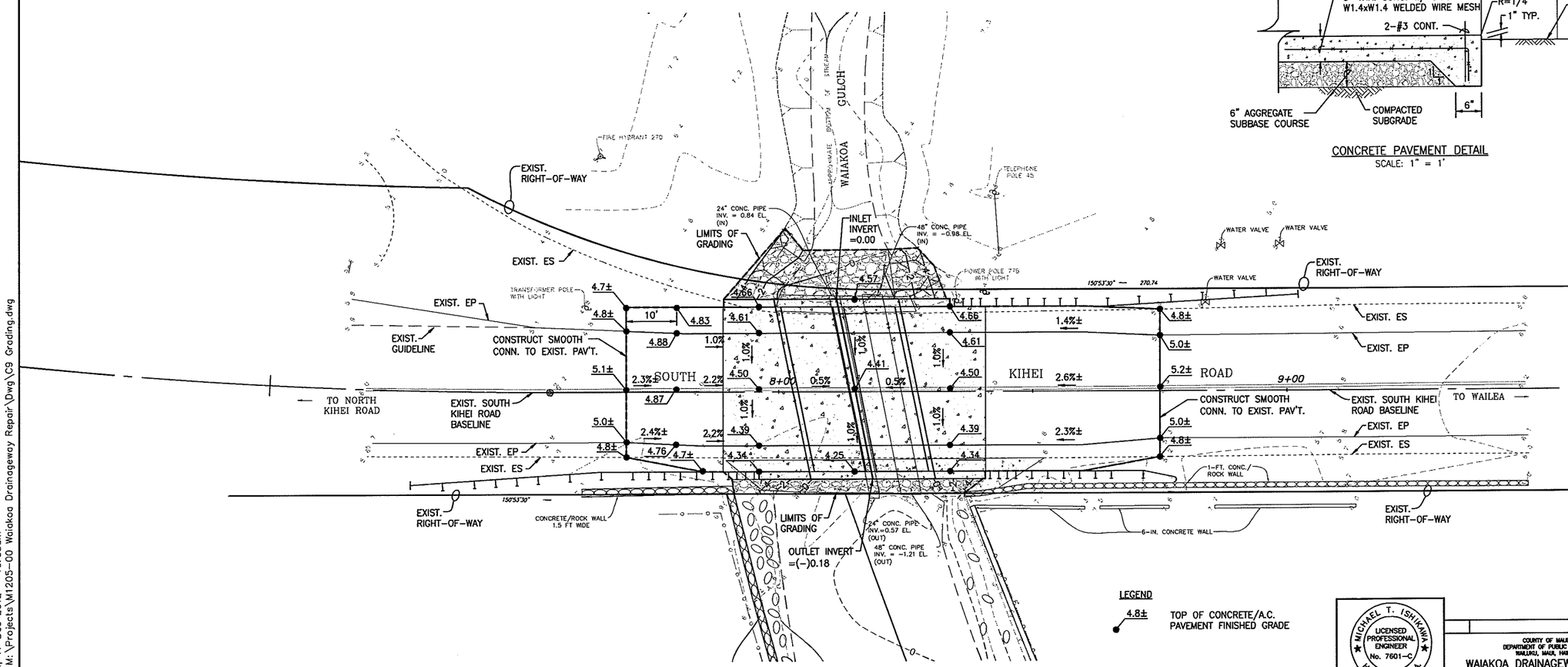
PROPOSED CULVERT PROFILE – ℄ STA. 8+15
SCALE: 1" = 5'



TYPICAL ROADWAY SECTION
SCALE: 1/4" = 1'



CONCRETE PAVEMENT DETAIL
SCALE: 1" = 1'



GRADING PLAN
SCALE: 1"=10'

NORTH

LEGEND

4.8± TOP OF CONCRETE/A.C. PAVEMENT FINISHED GRADE

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04/30/14
EXPIRATION DATE OF THE LICENSE

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
WAILUKU, MAUI, HAWAII

WAIAKOA DRAINAGEWAY REPAIR
AT SOUTH KIHEI ROAD
JOB NO. 11-20

GRADING PLAN

Date:	
Date: 10/12/12	
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Drawn By:	
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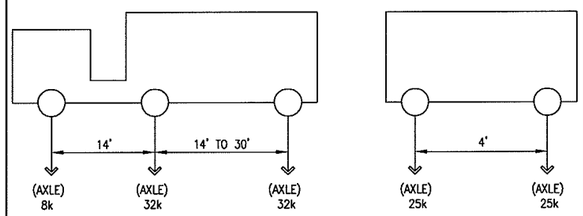
GENERAL NOTES

A. DESIGN CRITERIA:

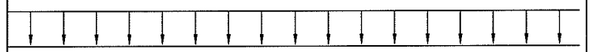
1. DESIGN SPECIFICATIONS ARE:
   A. AASHTO "LRFD BRIDGE DESIGN SPECIFICATIONS", FIFTH EDITION (2010) INCLUDING THE 2011 INTERIM REVISIONS.
   B. STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION, DESIGN CRITERIA FOR BRIDGES AND STRUCTURES, DATED OCTOBER 20, 2010.
2. GEOTECHNICAL REPORT:
   PRELIMINARY RECOMMENDATIONS FOR WAIAKOA DRAINAGE REPAIR, TECHNICAL MEMORANDUM BY GEOLABS, INC. DATED, SEPTEMBER 7, 2012
3. DESIGN LOADS ARE:
   A. DEAD LOADS:
      REINFORCED CONCRETE ..... 0.16 KCF.
      CONCRETE TOPPING ..... 0.150 KCF
      SOIL ..... 0.12 KCF.
      FUTURE UTILITIES (EACH SIDE OF BRIDGE)..... 0.15 KLF.
   B. LIVE LOADS HL-93 (COMBINED AS PER DESIGN SPECIFICATIONS).



DESIGN TRUCK

DESIGN TANDEM

UNIFORM LOAD 0.64 klf PER LANE



DESIGN LANE

C. DESIGN SPEED:
   15 MPH
D. WIND LOADS:
   100 MPH DESIGN WIND SPEED AT 30 FT. ABOVE THE GROUND FOR WIND LOAD ON STRUCTURES.
E. SEISMIC LOADS:
   ACCELERATION COEFFICIENT.....0.18 G
   SITE CLASS .....E
   Fpga 1.86
F. TRAFFIC RAILING LOADS:
   IN ACCORDANCE WITH RAILING PERFORMANCE LEVEL TL-2.
G. EARTH LATERAL PRESSURE:
   ACTIVE PRESSURE:
      ABOVE GROUNDWATER (WITHOUT HYDROSTATIC) .....33 PCF
      BELOW GROUNDWATER (WITH HYDROSTATIC) ..... 78 PCF
      (WITHOUT HYDROSTATIC) ..... 16 PCF
   AT-REST PRESSURE:
      ABOVE GROUNDWATER (WITHOUT HYDROSTATIC) .....52 PCF
      BELOW GROUNDWATER (WITH HYDROSTATIC) ..... 87 PCF
      (WITHOUT HYDROSTATIC) ..... 25 PCF
   PASSIVE PRESSURE (EXTREME EVENT LIMITE STATE):
      ABOVE GROUNDWATER ..... 370 PCF
      BELOW GROUNDWATER (WITH HYDROSTATIC) ..... 230 PCF
      (WITHOUT HYDROSTATIC) ..... 170 PCF
   PASSIVE PRESSURE (STRENGTH EVENT LIMITE STATE):
      ABOVE GROUNDWATER (WITHOUT HYDROSTATIC) .....185 PCF
      BELOW GROUNDWATER (WITH HYDROSTATIC) ..... 115 PCF
      (WITHOUT HYDROSTATIC) ..... 85 PCF
H. TEMPERATURE RANGE:
   ..... 100°F MAX. TEMPERATURE
   ..... 70°F MEAN TEMPERATURE
   ..... 40°F MIN. TEMPERATURE

4. MATERIALS ARE:
   A. CONCRETE:
      PRECAST CONCRETE BOX CULVERT ..... f'c = 5.0 ksi (CLASS A)
      CONCRETE TOPPING, RAILINGS ..... f'c = 4.0 ksi (CLASS C)
      SLAB ON GRADE, FOOTINGS .....f'c = 4.0 Ksi (CLASS B)
      LEAN CONCRETE .....f'c = 1.5 Ksi (CLASS B)
      OTHERS .....f'c = 3.0 Ksi (CLASS A)
      THESE ARE 28 DAYS STRENGTHS.
      CORROSION INHIBITING ADMIXTURE AND SHRINKAGE REDUCING ADMIXTURE SHALL BE INCLUDED IN THE CONCRETE MIX FOR DECK SLAB, APPROACH SLAB AND RAILINGS.
   B. REINFORCING STEEL:
      PER ASTM A615, GRADE 60 (UNLESS NOTED OTHERWISE).
      PER ASTM A955, GRADE 60 FOR STAINLESS STEEL REBARS. PER ASTM A416, 1/2"ø 7-WIRE LOW RELAXATION P/T STRAND
   C. MISCELLANEOUS STEEL:
      PER ASTM A36, HOT DIPPED GALVANIZED PER ASTM A123, (UNLESS NOTED OTHERWISE).
5. SOIL BEARING CAPACITY:
   FOUNDATIONS SHALL BE DESIGNED FOR THE FOLLOWING MAXIMUM BEARING VALUES:
      SERVICE LIMIT STATE ..... 3,000 PSF
      STRENGTH LIMIT STATE ..... 4,000 PSF
      EXTREME EVENT LIMIT STATE ..... 9,000 PSF
6. DESIGN METHODS AND ALLOWABLE STRESSES ARE:
   A. REINFORCED AND POST TENSIONED CONCRETE:
      STRENGTH AND SERVICE LIMIT STATE.
   B. SEISMIC DESIGN:
      EXTREME EVENT LIMIT STATE.

B. REINFORCING NOTES:

1. ACI STANDARD RADII SHALL BE USED TO BEND ALL REINFORCEMENT UNLESS NOTED OTHERWISE. ALL BEND DIMENSIONS GIVEN ARE OUT TO OUT OF BARS.
2. BAR SPACINGS ARE GIVEN IN INCHES UNLESS NOTED OTHERWISE
3. EXCEPT AS NOTED ON THE PLAN, CONCRETE COVER TO REINFORCEMENT (MAIN BARS UNLESS NOTED OTHERWISE) SHALL BE:
   RETAINING WALLS,
   FRONT FACE ..... 2 INCHES
   RETAINING WALLS,
   FORMED FACES ..... 2 INCHES
   FOOTINGS, TOP ..... 2 INCHES
   FOOTINGS, BOTTOM ..... 3 INCHES
   FOOTINGS, SIDES ..... 3 INCHES
   SLAB DECK TOP..... 2 1/2 INCHES
   SLAB DECK BOTTOM ..... 2 INCHES

C. CONSTRUCTION NOTES:

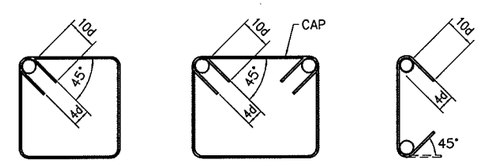
1. CONSTRUCTION SPECIFICATIONS ARE THE "HAWAII STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND PUBLIC WORKS CONSTRUCTION" 1994 AND THE AASHTO LRFD BRIDGE CONSTRUCTION SPECIFICATIONS, 1998 AND SPECIAL PROVISION THERETO.
2. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 3/4 IN x 3/4 IN UNLESS NOTED OTHERWISE.
3. CONSTRUCTION JOINTS SHALL BE LOCATED ONLY AT THOSE LOCATIONS SHOWN ON THE PLANS, UNLESS OTHERWISE APPROVED BY THE ENGINEER.
4. THE CONTRACTOR SHALL VERIFY ALL SITE CONDITIONS AND NOT RELY UPON THESE PLANS FOR ACCESS ROAD OR STREAM LOCATION, ETC.
5. THE CONTRACTOR SHALL DETERMINE THE LOCATION OF ALL UTILITIES AND AVOID DAMAGE THERETO.

D. STAINLESS STEEL:

1. STAINLESS STEEL MAY ALSO BE INDICATED AS S.S. IN THESE DRAWINGS AND SHALL CONFORM WITH THE FOLLOWING:
   A. S.S. REBARS: ASTM A955, Fy =60 ksi, DE FORMED BARS.
   B. S.S. PLATES: ASTM A666, TYPE 316L, Fy =35 ksi MIN.
   C. S.S. BOLTS: ASTM F593, TYPE 316, TENSILE STRENGTH =70 ksi MIN.
   D. S.S. NUTS: ASTM F594, TYPE 316
   E. S.S. WELDS: ARC WELDS WITH SHIELDED ELECTRODES THAT MATCH THE S.S. PARTS.

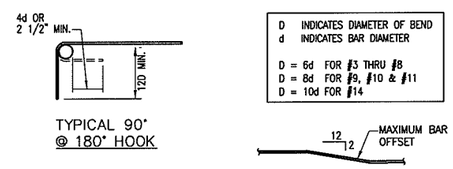
E. OTHER NOTES:

1. ALL STATIONS AND LONGITUDINAL DIMENSIONS ARE MEASURED ALONG THE BASELINES.
2. ALL DIMENSIONS ARE HORIZONTAL OR VERTICAL UNLESS NOTED OTHERWISE. ALL SECTIONS ARE CUT HORIZONTALLY OR VERTICAL UNLESS NOTED OTHERWISE.
3. ALL VIEWS ARE LOOKING UPSTATION UNLESS NOTED OTHERWISE.
4. ALL ELEVATIONS NOTED ON PLANS, SECTIONS, ELEVATIONS AND DETAILS ARE IN FEET UNITS AND ARE IN REFERENCE TO MEAN SEA LEVEL.



COLUMN TIES & BEAM STIRRUPS — ALTERNATE BEAM STIRRUPS — SINGLE STIRRUP OR TIES

TYPICAL COLUMN TIES OR BEAM STIRRUPS



TYPICAL 90° @ 180° HOOK

1 / S-1 TYPICAL REINFORCING STEEL DETAILS
N.T.S.

INDEX OF DRAWINGS

SHT No.	DWG. No.	DESCRIPTIONS
XX	S-1	INDEX OF DRAWINGS AND GENERAL NOTES.
XX	S-2	BRIDGE GENERAL PLAN
XX	S-3	FOUNDATION PLAN
XX	S-4	LONGITUDINAL SECTION AND CULVERT SECTION
XX	S-5	
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XX	S-9	
XX	S-10	
XX	S-11	
XX	S-12	

DEAN A. DOI
LICENSED PROFESSIONAL ENGINEER
No. 5580-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION
04/30/14
EXPIRATION DATE OF THE LICENSE

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
WAILUKU, MAUI, HAWAII

WAIAKOA DRAINAGEWAY REPAIR
AT SOUTH KIHEI ROAD
JOB NO. 11-20

INDEX OF DRAWING AND GENERAL NOTES

Date:
Date: 10/12/12
Design By:
Drawn By:
SHEET
S-1
of 13 Sheets

XX

Date Plotted:Fri, 12 Oct 2012 - 10:01am
File Name:S:\MI205-00-Waiakoa Drainageway Repair\Drawings\Structural\AutoCAD_format\S-1.DWG

E/S15"

FIRE HYDRANT 270

88°52'29"

WAIAKOA STREAM

TELEPHONE POLE 45

HAND-LAID RIP-RAP

(E) 48" CONC. PIPE INV. = -0.98 EL. (TO BE REMOVED)

E/W12"

344°52'39.5"

(E) RIGHT OF WAY

(E) 24" CONC. PIPE INV.=0.84 EL. (TO BE REMOVED)

WATER VALVE

POWER POLE 77B WITH LIGHT (TO BE REMOVED)

150°53'30" 270.74

TRANSFORMER POLE WITH LIGHT

CONC. TOP RAIL

CONC. RAIL POST

CONC. PAVEMENT (SEE CIVIL)

(E) SOUTH KIHEI ROAD BASELINE

PRECAST CONC. BOX CULVERTS W/CONC. TOPPING 5 EQUAL SPACES

EXP. JT

℄ ROAD

SOUTH KIHEI ROAD

8+00

9+00

TO NORTH KIHEI ROAD

TO WAILEA

1-FT. CONC. /ROCK WALL

150°53'30"

CONCRETE/ROCK WALL 1.5 FT WIDE

EXIST. RIGHT OF WAY

3.82

HAND-LAID RIP-RAP

6-IN. CONCRETE WALL

LEGEND

CULVERT TOP SLAB ELEVATION

WAIAKOA STREAM

PROPERTY LINE

NORTH

BRIDGE GENERAL PLAN

SCALE: 3/16"=1'-0"

DEAN A. DOI, LICENSED PROFESSIONAL ENGINEER, No. 5580-S, HAWAII, U.S.A.

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COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
WAILUKU, MAUI, HAWAII

WAIAKOA DRAINAGEWAY REPAIR AT SOUTH KIHEI ROAD
JOB NO. 11-20

BRIDGE GENERAL PLAN

Date: 10/12/12
Design By:
Drawn By:
SHEET S-2 of 13 Sheets

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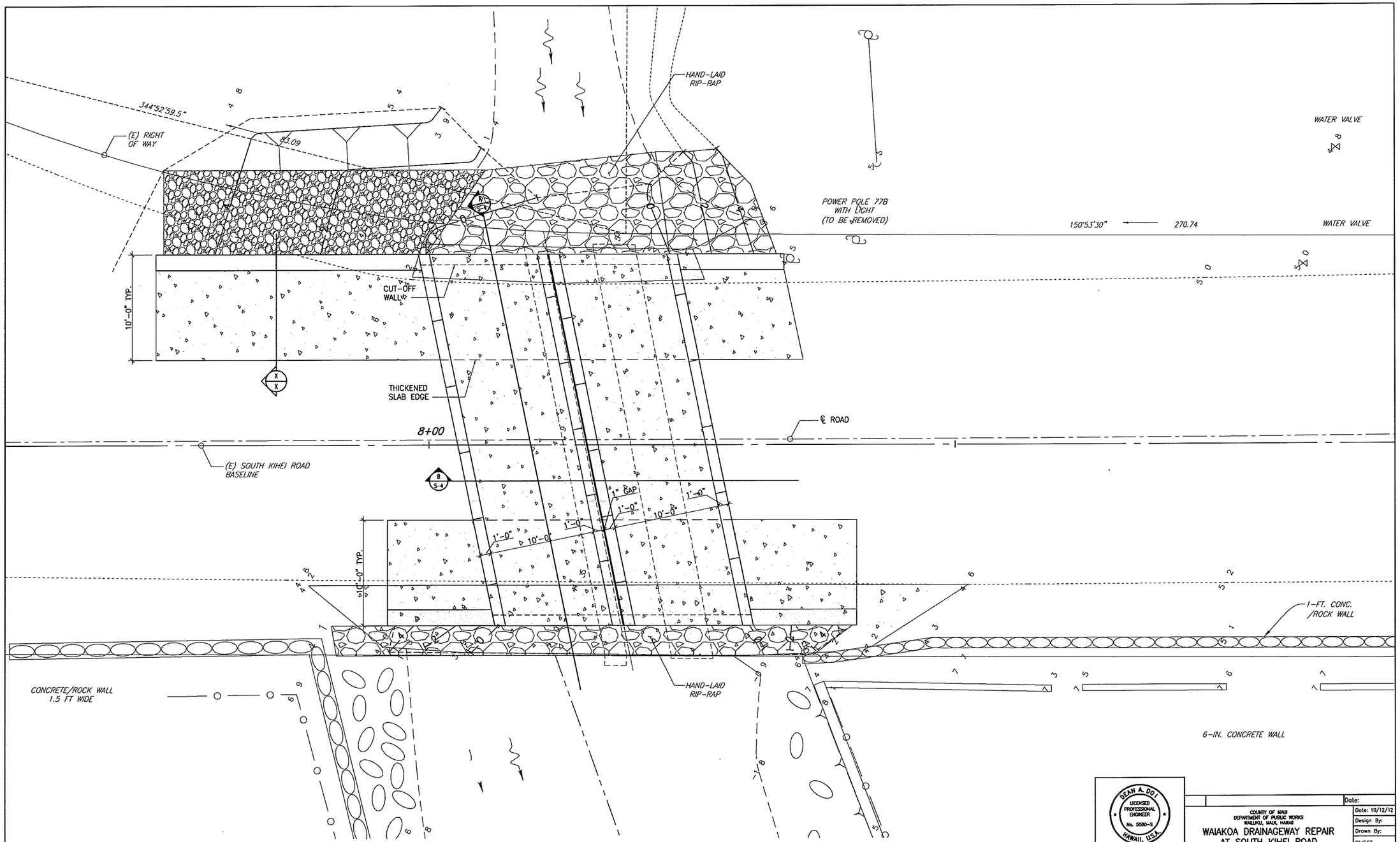
XX



NORTH

FOUNDATION PLAN

SCALE: 1/4"=1'-0"

DEAN A. DOI
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04/30/14
EXPIRATION DATE OF THE LICENSE

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
WAILUKU, MAUI, HAWAII

WAIAKOA DRAINAGEWAY REPAIR
AT SOUTH KIHEI ROAD
JOB NO. 11-20

FOUNDATION PLAN

Date:	
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Drawn By:	
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of 13 Sheets	

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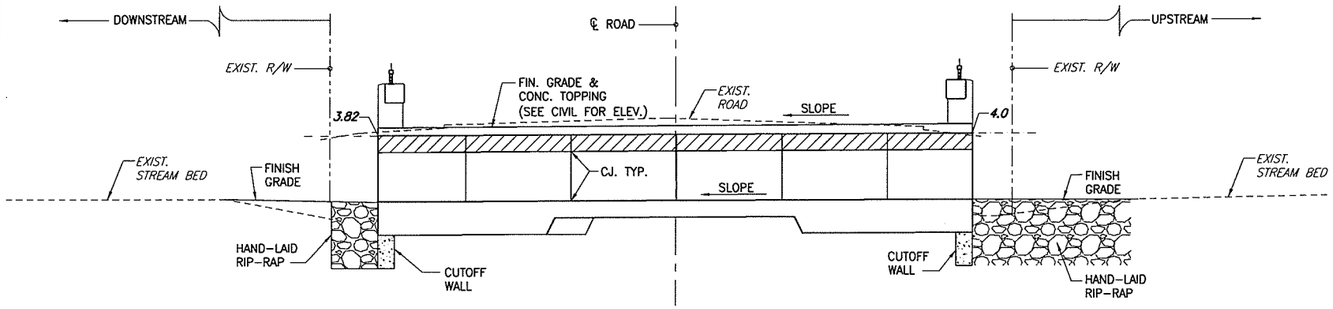
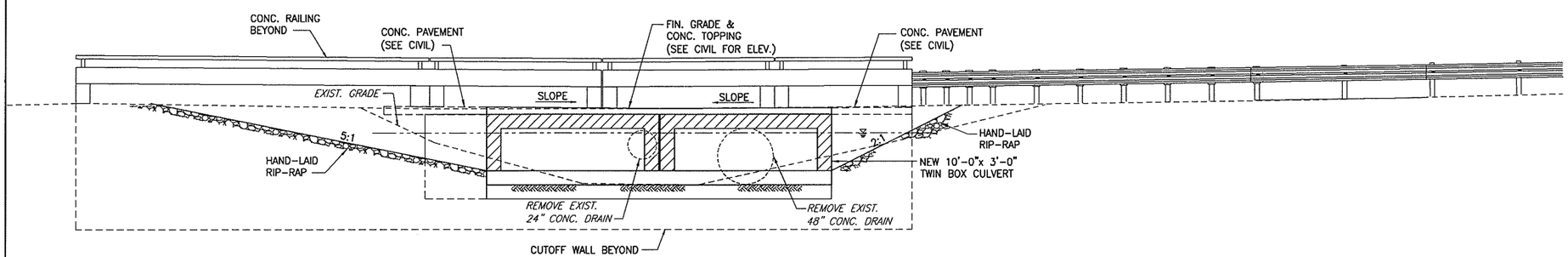
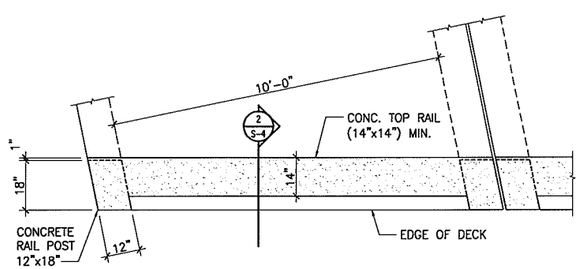


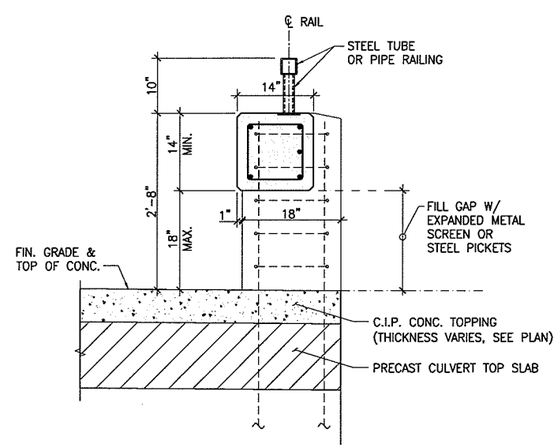
A / S-4 **BOX CULVERT LONGITUDINAL SECTION**
1/4"=1'-0"



B / S-4 **BOX CULVERT BRIDGE SECTION**
1/4"=1'-0"



1 / S-4 **RAILING PLAN**
1/2"=1'-0"



2 / S-4 **RAILING SECTION**
1"=1'-0"

DEAN A. DOI
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No. 5580-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION
04/30/14
EXPIRATION DATE OF THE LICENSE

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
WAILUKU, MAUI, HAWAII

WAIAKOA DRAINAGEWAY REPAIR
AT SOUTH KIHEI ROAD
JOB NO. 11-20

LONGITUDINAL SECTION AND CULVERT SECTION

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Date: 10/12/12
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Drawn By:
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of 13 Sheets

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XX

APPENDIX B.

Drainage Capacity Assessment

Sato & Associates, Inc.

Consulting Engineers

2115 Wells Street, Wailuku, HI 967943
OFFICES IN HONOLULU AND MAUI
web: www.satoandassociates.com

Tel: (808) 244-9265
Fax: (808) 244-5303

DATE: September 12, 2012
TO: County of Maui, Department of Public Works
ATTN: Mr. John Smith
SUBJECT: Drainage Summary for Waiakoa Drainageway at South Kihei Road
FROM: Sato & Associates, Inc.

The following is a technical memorandum containing a drainage summary for the subject project in Kihei, Maui, Hawaii.

Existing Condition

The existing 24" and 48" diameter culverts at the project site are located downstream of the Waiakoa Gulch, which is a major drainageway in the Kihei area. The 100-year storm runoff through this junction is 8,209 cubic feet per second (cfs).[1]

Upstream of the project site, the existing terrain is densely vegetated with dry brush and Keawe trees. The downstream area of the existing culvert, which is owned by the adjacent condominium properties, is normally blocked by a sand dune at the shoreline. The existing culverts are typically filled with stagnant stormwater in result of this blockage. During heavy storm events, South Kihei Road at this crossing is prone to flooding. The existing 24" and 48" diameter culverts have an approximate capacity of 89 cfs.[1]

Proposed Condition

This project proposes to replace the existing drainline culverts and reconstruct a portion of South Kihei Road to address the undermined existing pavement structure at the culvert. The replacement drainage structures will be two 10-foot wide by 3-foot high concrete box culverts. It is not the intention of this project to provide adequate conveyance for a 100-year storm, but rather to repair the critical condition of the deteriorating roadway.

Disturbance to upstream and downstream properties will be minimal, and existing flow patterns are not expected to be altered. The approximate capacity of the new box culverts will be approximately 410 cfs; significantly less than the 8,209 cfs generated during a 100-year storm event. Due to the downstream blockage of the channel, flow conveyance will still be hindered. The roadway will be reconstructed to include a ford crossing. A ford crossing allows for water to flow across the roadway and can accommodate vehicular passage. However, during heavy storms the water level at this crossing may still be too deep to allow for thoroughfare.

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

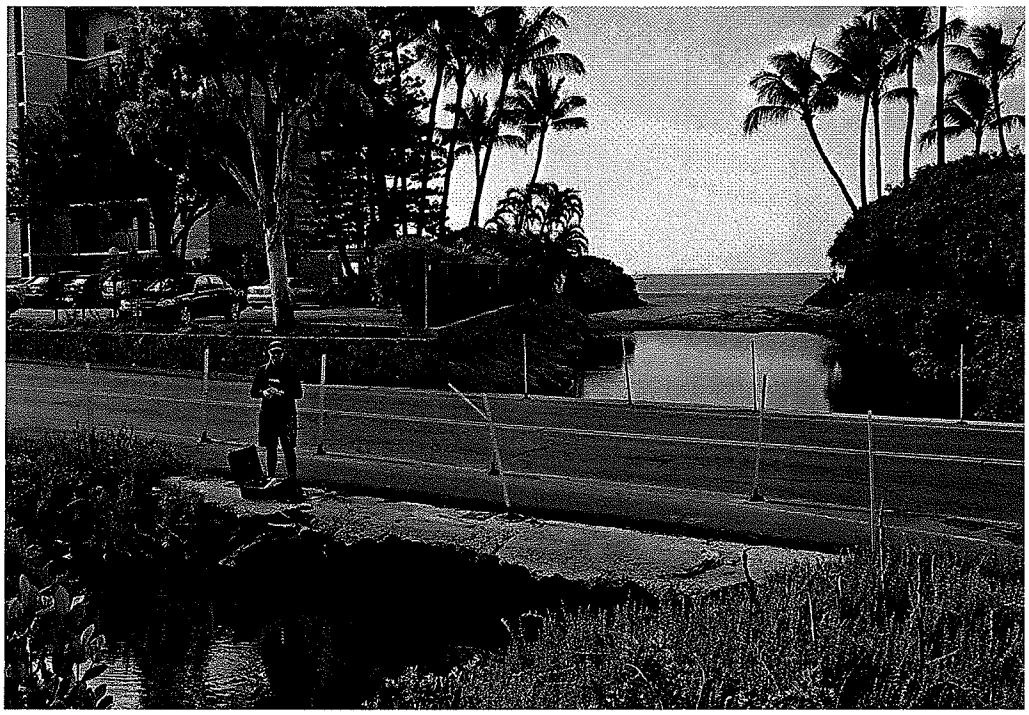
[1] Draft Report for the Kihei Drainage Master Plan Waiakoa Gulch to Kilohana Drive Existing Conditions, April 2009, Prepared by R.M. Towill Corporation.

APPENDIX C.

Water Quality and Biological Survey for a Culvert Repair

AECOS No. 1296

Water quality and biological surveys for Waiakoa culvert repair in Kīhei, Maui.



Prepared by:

AECOS, Inc.
45-939 Kamehameha Hwy, Suite 104
Kāneʻohe, Hawaiʻi 96744-3221

Revised February 5, 2013

Water quality and biological surveys for Waiakoa culvert repair in Kīhei, Maui.

Revised February 5, 2013 *AECOS* No. 1296

Chad Linebaugh
AECOS, Inc.
45-939 Kamehameha Hwy, Suite 104
Kāne'ohe , Hawai'i 96744
Phone: (808) 234-7770 Fax: (808) 234-7775 Email: aecos@aecos.com

Introduction

The culverts under South Kīhei Road at the Waiakoa Gulch—located on the Island of Maui (Fig 1)—are scheduled for repair work. The project is proposing to replace existing 30-inch and 18-inch culverts with twin 10-foot x 3-foot box culverts. Other improvements will include upgrades to the inlet and outlet structures. *AECOS* Inc. was contracted by Munekiyo and Hiraga Inc.[1] to investigate biological resources and water quality at the proposed project site and in January 2012, *AECOS* biologists conducted field surveys in the project area. This report details findings of those surveys.

Waiakoa Gulch

Waiakoa Gulch arises at approximately 1,500 m (4900 ft) elevation on the East Maui Mountain. The gulch extends west-southwest approximately 19.3 km (12 mi) from its origin above the Kula Highway to its coastal outlet into Mā'alaea Bay. Though water flow is only intermittent through the gulch upslope of Piilani Highway, the gulch is a well-defined feature with a distinct bed of exposed bedrock and boulders. Downslope from Piilani Highway the gulch receives a constant supply of brackish groundwater and surface water is always present at the South Kīhei Road project site. The gulch outlet is typically blocked by a deposits of beach sand forming a *muliwai* (brackish water pond) through the project site (see cover photo).

[1] This document will be incorporated into permit applications for the project and will become part of the public record.

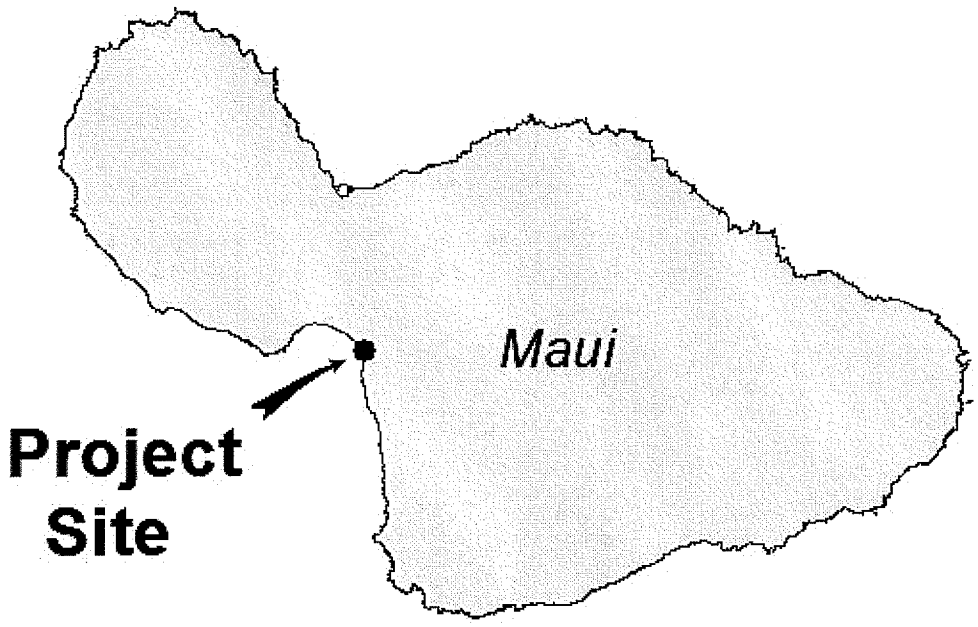


Figure 1. General location of the project on the Island of Maui.

Methods

Water Quality

Field measurements for temperature, dissolved oxygen, and pH were conducted and water samples were collected for analyses comprising total suspended solids (TSS), turbidity, nitrate-nitrite nitrogen, total nitrogen (TN), and total phosphorus (TP) at three stations in the project area. All water samples were collected in screw cap-polypropylene bottles on January 19, 2012 and delivered to *AECOS* laboratory in Kāne'ohe, O'ahu for laboratory analyses (*AECOS* Log No. 27876). Table 1 lists analytical methods and instrumentation used in the analyses.

Water sampling stations are shown in Fig. 2. Station "Culvert" was located at the upstream end of the culvert slated for repair. Station "Downstream" was located 35 m (115 ft) downstream from South Kīhei Road near where the

stream mouth is blocked by the sand berm. Station "Ocean" was located just offshore from the Waiakoa Gulch mouth in coastal waters of 1-m (3-ft) depth. All water samples were collected from just below the water surface. Sampling occurred during a predicted flooding tide around +0.7 ft (NOAA, 2011).

Table 1. Analytical methods and instruments used for water quality analysis.

Analysis	Method	Reference	Instrument
Ammonia	EPA 350.1	USEPA (1993)	Technicon Auto Analyzer II
Chlorophyll	SM 10200H (M)	Standard Methods 20th Edition (1998)	Turner fluorometer
Dissolved Oxygen	SM 4500-O G	Standard Methods 20th Edition (1998)	YSI Model Pro 2030 Dissolved Oxygen Meter
Nitrate + Nitrite	EPA 353.2 Rev 2.0	USEPA (1993)	Technicon AutoAnalyzer II
pH	SM 4500 H+	Standard Methods 20th Edition (1998)	Hannah pocket pH meter
Salinity	SM 2520B	Standard Methods 20th Edition (1998)	YSI Model Pro 2030 Dissolved Oxygen Meter
Temperature	thermister calibrated to NBS. Cert. thermometer SM 2550 B	Standard Methods 20th Edition (1998)	YSI Model Pro 2030 Dissolved Oxygen Meter
Total Nitrogen	persulfate digestion/EPA 353.2	Grasshoff et al (1986)/ USEPA (1993)	Technicon AutoAnalyzer II
Total Phosphorus	EPA 365.30	USEPA (1993)	Technicon AutoAnalyzer II
Total Suspended Solids	Method 2540 D	Standard Methods 20th Edition (1998)	Mettler H31 balance
Turbidity	EPA 180.1 Rev 2.0	EPA (1993)	Hach 2100N Turbidimeter

Aquatic and Marine Biota

Aquatic resources in Waiakoa Gulch were identified by visually observing and sampling gulch waters with hand nets to identify biota present. The January 2012 survey area included the *muliwai* in the project area and the length of the gulch from the shoreline to approximately 240 m (800 ft) upstream of the project site. A brief survey of nearshore marine resources was also conducted

by mask and snorkel, but proved limited due to underwater visibility under 0.3 m(1 ft). The littoral zone (intertidal)of nearby Kīhei Wharf, 180 m (590 ft) to the southeast, was also briefly surveyed.

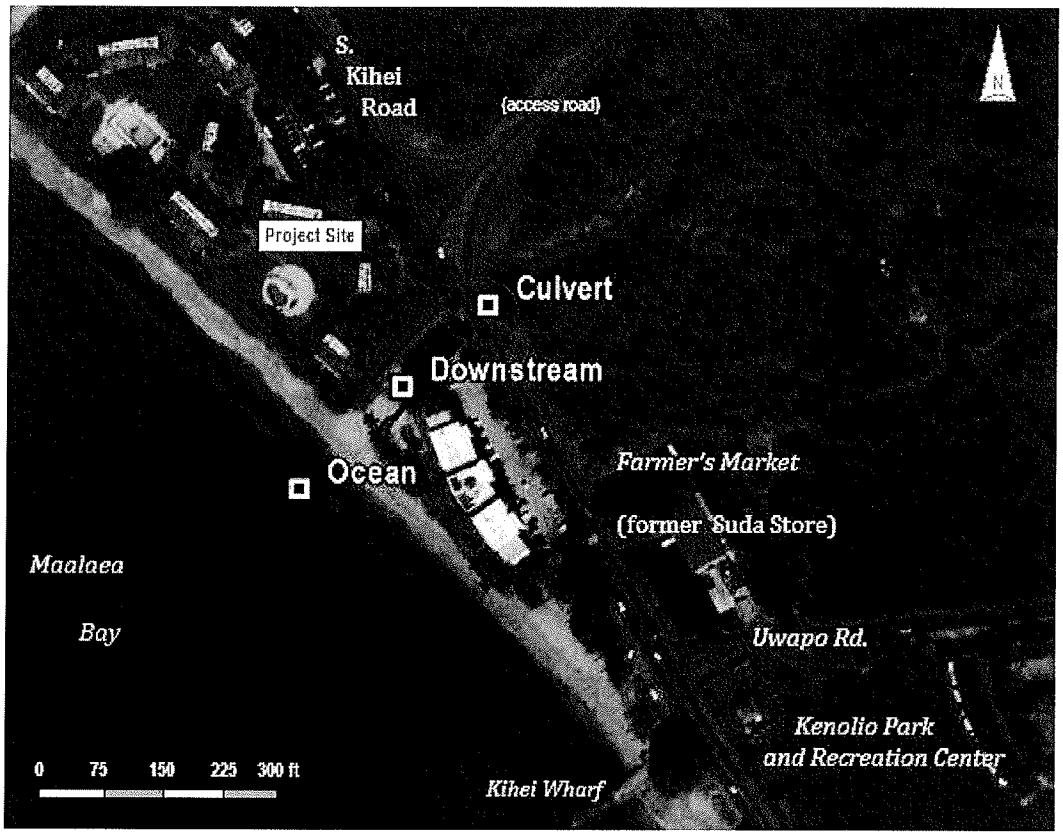


Figure 2. The locations of water quality stations at the South Kīhei Road crossing of Waiakoa Gulch.

Survey Results

Water Quality

The results from *in situ* measurements and analyses of water samples collected from three stations near the project site are provided in Table 2. As is typical, waters in the estuarine reach of Waiakoa Gulch were not flowing into Mā'alaea Bay as a sand berm blocked flow toward the ocean (although seepage through the sand would be occurring). Salinity readings near 3 ppt at Sta. Culvert and at

Table 2. Results for *in situ* measurements and analysis of water samples collected on January 19, 2012.

Station	Temp. (°C)	Dissolved Oxygen (mg/l)	Dissolved Oxygen (% sat.)	pH --	Salinity (psu)	TSS (mg/l)
Culvert	23.1	3.85	46	8.93	3.1	18
Downstream	23.2	6.72	80	8.75	3.0	23
Ocean	24.9	6.69	97	8.05	31.9	81

	Turbidity (ntu)	Nitrate+ Nitrite (µg N/l)	Ammonia (µg N/l)	Total N (µg N/l)	Total P (µg P/l)	Chlorophyll (µg /l)
Culvert	18.4	169	20	2070	169	84.0
Downstream	15.0	14	10	1930	76	102
Ocean	16.2	23	<3	272	142	7.22

Sta. Downstream indicate brackish water composed mostly of freshwater with some, possibly tidally-influenced, seawater mixed in. Gulch waters in close proximity to the culvert, as evidenced by Sta. Culvert, were only partially saturated with oxygen during the sampling event with a DO concentration of 3.85 mg/l, representing only 46% saturation at the measured temperature. Sta. Downstream had a DO concentration of 6.72 mg/l and 80% saturation, a level more typical of coastal estuaries. Both stations had basic pH values with readings of 8.93 and 8.75 for Sta. Culvert and Downstream, respectively.

Particulates, as measured by TSS, were high in gulch waters, ranging from 18 to 23 mg/l at the two gulch stations. Turbidity levels, an indication of cloudiness of the water, ranged from 18.4 to 15.0 ntu, reflecting the turbid green water observed during sampling. Total nitrogen concentrations were in excess of 1900 µgN/l at Sta.Culvert and Sta. Downstream. Nitrate-nitrite levels were 169 at Sta. Culvert and 14 µgN/l at Sta. Downstream. The TP concentrations of 169 and 76 µgP/l at Stas. Culvert and Downstream, as with the TN concentrations, are high for estuarine waters. Chlorophyll concentrations of 84 and 102 µg/l at

stations in the gulch are also high and indicate an abundance of phytoplankton in the water column, contributing to elevated suspend solids and turbidity readings. Such conditions are common in unshaded *muliwai* in Hawai'i as nutrient runoff accumulates in the stagnant water resulting in algal blooms; until a freshet flow in the gulch breaks through the sand barrier and flushes out the estuary.

Nearshore marine waters sampled at Sta. Ocean revealed typical conditions for upper Ma'alaea Bay: turbid, well-oxygenated seawater with a pH near 8.00. Chlorophyll levels of 7.22 μg/l and total phosphorus concentrations appear elevated for coastal waters.

Aquatic Biota

The aquatic biota of Waiakoa Gulch near the proposed project is comprised of a mix of native and naturalized (non-native) species (Table 3). Mixed schools of mosquitofish (*Gambusia affinis*) and mollies (*Poecilia* spp.) swim just beneath the water surface near the Waiakoa Gulch culvert. Blackchin tilapia (*Sarotherodon melanotheron*), *āholehole* (*Kuhlia xenura*), and mullet (*Mugil cephalus*) are also present in lesser numbers. Shore crabs (*Metopograpsus thuhukar*) crawl among the pickleweed (*Batis maritma*) along *muliwai* margin and on the culvert proposed for repair. All these species are common inhabitants of estuarine waters in the main Hawaiian Islands. Rambur's forktail (*Ischnura ramburi*), a naturalized damselfly typically common in low elevations, also utilizes the project area.

Marine Biota

Table 4 lists all marine biota encountered during the January 19, 2012 survey. The sand beach at the mouth of the gulch is home to pallid ghost crab (*Ocypode pallidula*), a small crab that can typically be seen maintaining its burrow or scavenging for food just above the ocean waterline. The Hawaiian mussel (*Brachidontes crebstriatus*), a crustose, coralline algae (*Hydrolithon onkodes*), and a bryozoan (possibly *Schizoporella unicornis*) encrust the cobbles and boulders that litter the seafloor in the survey area.

The boulder rip-rap of Kīhei Wharf is covered with *limu 'aki'aki* (*Ahnfeltiopsis concinna*) and *limu pālahalaha* (*Ulva fasciata*) in the littoral zone, with *Grateloupia hawaiiana* growing in the lower littoral and sublittoral zones. A few black-foot *'opihi* (*Cellana exarta*) and helmet urchins (*Colobocentratus atratus*) colonize the seaward end of the structure.

Table 3. List of aquatic species observed in the estuarine reach (*muliwai*) of Waiakoa Gulch.

PHYLUM, CLASS, ORDER, FAMILY *Genus species*	Common name	Abundance	Status	ID Code
	INVERTEBRATES			
ARTHROPODA,INSECTA				
ODONATA				
COENAGRIONIDAE				
Ischnura ramburi Selys	Rambur's forktail	R	Nat.	1
	FISHES		--	
ARTHROPODA, MALACOSTRACA, DECAPODA				
GRAPSIDAE				
Metopograpsus thukuhar Owen	*'alamihi, kukuau*; purple-clawed shorecrab	O	Ind.	1
CHORDATA, ACTINOPTERYGII			--	
CICHLIDAE			--	
Sarotherodon melanotheron Rüppell	blackchin tilapia	O	Nat.	1
KUHLIIDAE			--	
Kuhlia xenura Jordan&Gilbert	*āholehole*; Hawaiian flagtail	C	End.	1
MUGILIDAE			--	
Mugil cephalus Linneaus	*'ama'ama*; striped mullet	O	Ind.	1
POECILIIDAE				
Gambusia affinis Baird and Girard	mosquitofish	C	Nat.	1
Poecilia spp	indet. mollies	C	Nat.	1

Key to Table 3:

Abundance categories:
- R – Rare – only one or two individuals observed.
- U – Uncommon – several to a dozen individuals observed.
- O – Occasional – seen irregularly in small numbers
- C – Common -observed everywhere, although generally not in large numbers.
- A – Abundant – observed in large numbers and widely distributed.

Status categories:
- End – Endemic – species found only in Hawaii
- Ind. – Indigenous – species found in Hawaii and elsewhere
- Nat. – Naturalized – species introduced to Hawaii intentionally, or accidentally.

Identification codes:
- 1 – identified in the field on January 19, 2012.

Table 4. List of species observed in nearshore marine waters in proximity to the project site.

PHYLUM, CLASS, ORDER, FAMILY *Genus species*	Common name	Abundance	Status	Location Code
	ALGAE			
CHLOROPHYTA				
ULVACEAE			--	
Ulva fasciata Delile	*limu pālahalaha*	C	Ind	2
RHODOPHYTA				
CORALLINACEAE			--	
Hydrolithon onkodes (Heydrich) Penrose & Chamberlain		R	Ind	1,2
HALYMENIACEAE			--	
Grateloupia hawaiiana Dawson		U	End	2
PHYLLOPHORACEAE			--	
Ahnfeltiopsis concinna (J. Agardh) Silva & DeCew	*limu 'aki'aki*	C	Ind	2
	INVERTEBRATES			
ANNELIDA POLYCHAETA				
CANALIPALATA				
SERPULIDAE			--	
indet.	unid. serpulid worm	R	--	1
ECTOPROCTA				
GYMLOAEMATA				
CHELIOSOMATA				
SCHIZOPORELLIDAE				
indet.	unid. bryozoan	C		1
MOLLUSCA, GASTROPODA				
ARCHAEOGASTROPODA				
PATELLIDAE			--	
Cellana exarata Reeve	*'opihi makaiaūli* black-foot 'opihi	R	End	2
MOLLUSCA, GASTROPODA				
NEOGASTROPODA				
THAIDIDAE			--	
Morula granulata Duclose	*maka'awa*; granular drupe	R	Ind	2

Table 4 (continued).

PHYLUM, CLASS, ORDER, FAMILY *Genus species*	Common name	Abundance	Status	Location Code
MOLLUSCA, BIVALVIA				
MYTILOIDA				
MYTILIDAE				
Brachidontes crebristriatus (Conrad)	*nahawele li'ili'i*; Hawaiian mussel	C	End	1
ARTHROPODA, MALACOSTRACA, DECAPODA				
OCYPODIDAE				
Ocypode pallidula Jacquinot	*'ōhiki*; pallid ghost crab	U	Ind	1
ECHINOMETRIDAE			--	
Colobocentrotus atratus Linneaus	*ha'uke'ukekaupali*; helmet urchin	O	Na.	2

Key to Table 4:

Abundance categories:
- R – Rare – only one or two individuals observed.
- U – Uncommon – several to a dozen individuals observed.
- O – Occasional – seen irregularly in small numbers
- C – Common -observed everywhere, although generally not in large numbers.
- A – Abundant – observed in large numbers and widely distributed.

Status categories:
- End – Endemic – species found only in Hawaii
- Ind. – Indigenous – species found in Hawaii and elsewhere
- Nat. – Naturalized – species introduced to Hawaii intentionally, or accidentally.

Location codes:
- 1 – observed in marine waters fronting Waiakoa Gulch
- 2 – observed on Kīhei Wharf

Assessment

Water Quality

Waiakoa Gulch does not appear on the Hawai'i Cooperative Stream Assessment (HDOH, 1990) or the Department of Health list of impaired waters in Hawai'i (HDOH, 2008) prepared under Clean Water Act, §303(d), likely due to the fact that water is typically absent from nearly the entire gulch. Stream gage data published by the United State Geological Survey (USGS) indicate that in ten of 39 years with monitoring data, no water flow was recorded from the Waiakoa Gulch gage located just upslope from Piilani Hwy (USGS, 2012).

During the January 19, 2012 water quality survey, gulch waters near the project site were nutrient, sediment, and chlorophyll laden with elevated pH levels and slightly depressed dissolved oxygen concentrations relative to State of Hawai'i water quality criteria for estuaries (Table 5). Values obtained in our survey cannot be directly compared with the criteria in Table 5 to assess compliance with the standards, because a comparison requires a representative geometric mean calculated from a minimum of three sampling events. The results do indicate that generally poor water quality conditions were present during the survey.

Table 5. State of Hawai'i water quality criteria for estuaries from HAR §11-54-05.2(b) (HDOH, 2009).

Parameter	Total Nitrogen (µg N/l)	Nitrate + Nitrite (µg N/l)	Total Phosphorus (µg P/l)	Turbidity (NTU)	Chlorophyll (mg/l)
Geometric mean not to exceed given value	200.0	8.0	25.0	1.5	2.0
Not to exceed more than 10% of the time	350.0	25.0	50.0	3.0	5.00
Not to exceed more than 2% of the time	500.0	35.0	75.0	5.0	10.0

pH – shall not deviate more than 0.5 units from ambient and shall not be < 7.0 nor > 8.6.
Dissolved oxygen – not less than 75% saturation.
Temperature – shall not vary more than 1 °C from ambient.
Salinity – not more than 10% from ambient conditions.

Low dissolved oxygen concentration in brackish waters with such obviously high chlorophyll levels, and hence rate of photosynthesis, may evidence the bulk of the gulch waters origin as groundwater rather than flowing surface water which absorbs oxygen from the atmosphere. The presence of higher concentrations of nitrate-nitrate nitrogen may indicate the source of the groundwater is closer to the Sta. Culvert than Sta. Downstream.

Nearshore marine waters, as sampled by Sta. Ocean, are sediment and chlorophyll laden, well oxygenated and have a pH near 8.00. Chronic turbidity is a problem in the region as HDOH recent water quality data from Sta. 00671-Kīhei North, located next to Kīhei Wharf, indicates (Table 6). Mean temperature, DO, and pH data from the HDODH monitoring of the station are very similar to the readings obtained on January 19, 2012.

Figure 6. Recent nearshore water quality data near the project site (HDOH, 2012).

Date	Time	Temp.	Salinity	D. O.	% Sat.	pH	Turbidity
2011							
Sept 14	5:57 AM	25.18	31.78	6.38	93.7	8.12	8.67
May 17	6:11 AM	25.11	31.70	6.31	93.1	8.12	16.50
2010							
Dec. 14	6:11 AM	24.79	30.09	6.32	91.5	8.10	8.31
Oct. 5	6:16 AM	25.77	32.47	5.84	87.4	8.13	2.10
Jun. 30	6:26 AM	24.77	30.74	6.19	90.2	8.01	2.53
May 4	6:33 AM	24.89	32.42	6.03	88.3	8.13	3.18
Mar. 30	6:45 AM	23.26	29.51	6.68	93.7	8.00	2.91
2009							
Dec. 8	6:52 AM	24.47	30.87	6.28	90.5	8.19	6.60
Sept. 20	6:50 AM	25.74	32.32	6.21	92.6	8.18	1.73
July 21	6:54 AM	24.86	29.95	6.57	95.0	8.07	6.65
May 27	7:09 AM	26.14	30.73	6.43	95.8	8.09	3.27
Apr. 7	7:04 AM	22.41	28.40	6.67	91.6	8.06	3.54
Jan. 9	7:05 AM	24.00	28.83	--	--	7.94	5.05
2008							
Oct. 1	6:57 AM	25.06	32.14	6.07	89.5	8.01	7.14
July 29	6:57 AM	25.18	29.02	5.95	86.4	7.95	6.84
	mean	**24.78**	**30.73**	**6.28**	**91.4**	**8.07**	**4.72**
	st. dev.	0.9	1.3	0.2	2.7	0.1	3.7
	min	22.41	28.40	5.84	86.4	7.94	1.73
	max	26.14	32.47	6.68	95.8	8.19	16.5
	n	*15*	*15*	*14*	*14*	*15*	*15*

Aquatic Resources

The aquatic biota observed during the January 2012 survey of Waiakoa Gulch estuary included some native species: *āholehole*, *'ama'ama*, and *'alamihi* crab. Though the reach of the gulch typically containing water is short, it is possible that native *'o'opu 'akupa* (*Eleotris sandwicensis*) and *'ōpaekala'ole* (*Macrobrachium grandimanus*)—not observed during the survey—may utilize the brackish environment near the project site. Any population present is likely limited in size by the continual blockage of the gulch mouth by deposited sand, as these diadromous species need passage to the open ocean as larva and passage upstream to brackish waters as post-larva to carry out their life cycle. Project work is not anticipated to have long term adverse effects on any aquatic or marine biota within or nearby the project site.

Conclusions and Recommendations

None of the marine or aquatic species observed in the project area is listed as threatened or endangered (HDLNR, 1998; USFWS, 2012). Furthermore, the proposed action will not result in modification of any federally designated Critical Habitat, as there is none present on or adjacent to the South Kīhei Road crossing of Waiakoa Gulch.

However, two tree tobacco plants (*Nicotiana glauca*) were observed near the project culvert, in an area that would seem appropriate to be used as a staging/equipment storage area or at least has the potential to be impacted by the project. The species is not itself endangered but is sometimes host to the endangered Blackburn's Sphinx Moth (*Manduca blackburni*). Both tree tobacco plants were given an inspection for the presence of *M. blackburni* and no larvae or eggs were observed. Current protocol recommended by USFWS is removal of tree tobacco from project work areas after inspection by a qualified entomologist.

Aside from possible short term turbidity plumes associated with project, the proposed work is not anticipated to adversely affect the already poor water quality at the sight. A Best Management Practices (BMP) plan should be designed and implemented to minimize and localize adverse environmental impacts to protect water quality and aquatic biota in the vicinity of the project site during construction.

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APPENDIX C-1.

Wetland Assessment Survey

AECOS, Inc.
45-939 Kamehameha Highway, Suite 104♦Kaneohe HI 96744
Telephone: (808)234-7770♦ Fax: (808)234-7775 ♦Email: aecos@aecos.com

April 3, 2013

Leilani Pulmano
Munekiyo & Hirago, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

Dear Ms. Pulmano:

On February 13, 2013, *AECOS* scientists conducted a wetlands survey for the South Kīhei Road culvert repair project at Waiakoa Gulch. The Project area encompasses Tax Map Key: (2) 3-8-077: 009. The purpose of the survey was to determine if wetlands are present in the project area and, if so, to delineate the boundaries of those wetlands. The scientists took photographs (Attachment 1) and completed wetland determination data forms (Attachment 2) for 5 sampling points. Only one sampling point (SP-05) qualifies as a wetland; SP-05 is within the *muliwai* of Waiakoa Gulch, *makai* of South Kīhei Road on a 1-m^2 sill. Attachment 3 shows the sampling locations (as determined by a GPS) on project plans.

Waiakoa Gulch is a drainage feature that discharges directly into the Pacific Ocean at Ma'alaea Bay. At the mouth of the gulch is a *muliwai* (estuary behind a beach) that is likely tidal and therefore subject to federal jurisdiction under Section 10 of the Rivers and Harbors Act. Because flow of water in the gulch itself is intermittent, this feature is a "not relatively permanent", non-navigable tributary that is jurisdictional by virtue of a significant nexus or influence on the adjacent coastal waters (Grumbles and Woodley, 2008) and therefore potentially jurisdictional under Sections 402 and 404 of the Clean Water Act (CWA). The *muliwai* within the project area, although not directly connected to the ocean for much of the time, is nonetheless insufficiently isolated to be regarded as non-jurisdictional. The channel of this *muliwai* is well-defined and the jurisdictional boundary of this tidal waterbody would be the elevation contours corresponding to the mean higher high tide line of +1.14 ft (0.347 m), relative to mean sea level (MSL; NOAA, 2003). Wetlands adjacent to the jurisdictional *muliwai* would also be jurisdictional.

The approximately 1-m^2 wetland at SP-05 is within the area of US Army Corps (Corps) jurisdiction under CWA Section 404 and Section 10 approved in a letter to you dated March 7, 2012 (Attachment 4). It is a relatively ephemeral feature that will move, disappear, and rebuild depending upon stream flow, sedimentation, and storm surges. It does not provide significant

functions or values to the Waiakoa Gulch *muliwai*. According to the latest erosion control plan and details for this project, prepared by Sato & Associates, the wetland lies *makai* of the Phase 1 limits of grading and between the designated location of sand bags and the turbidity barrier; therefore, it will not be directly impacted by the project.

Thank you,

Susan Burr
Vice president of biology

with Attachments

References

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Attachment 1

Photographs

First page:

Upper photograph: View from South Kihei Road at culvert on Waiakoa Gulch looking across *muliwai* at right bank covered by *Batis maritima* (SP-01 and SP-02). SP-03 is located near telephone pole.

Lower photograph: View from above right bank looking *makai* at *muliwai* and South Kihei Road culvert crossing (SP-04 and SP-05).

Second page:

Upper photograph: SP-01, SP-02, and OP-1

Lower photograph left: SP-04 and SP-05

01/19/2012

OP-1
SP-02
SP-01
SP-04
SP-05

Attachment 2

Wetland Data Forms

WETLAND DETERMINATION DATA FORM—Hawai'i and Pacific Islands

Project/Site: Waiakoa Gulch at South Kīhei Road City: Kīhei Sampling Date: February 13, 2013 Time: 1000

Applicant/Owner: County of Maui, Department of Public Works State/Terr./Comm.: Hawai'i Island: Maui Sampling Point: **SP-01**

Investigator(s): Susan Burr and Chad Linebaugh TMK/Parcel: (2) 3-8-077:009

Landform (hillslope, coastal plain, etc.): coastal estuary and floodplain Local relief (concave, convex, none): bank

Lat: 20° 46.975' N Long: 156° 27.800' W Datum: NAD83 Slope (%): ~10

Soil Map Unit Name: Pulehu silt loam, 0 to 3 percent slopes NWI classification: upland

Are climactic/hydrologic conditions on the site typical for this time of year: Yes X No ___ (If no, explain in Remarks)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS—Attach a site map showing sampling point locations transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	
Hydric Soil Present?	Yes ___	No X	**Is the Sampled Area within a Wetland? Yes ___ No X**
Wetland Hydrology Present?	Yes X	No ___	

Remarks:

VEGETATION—Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	___ =Total Cover		
Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	___ =Total Cover		
Herb Stratum (Plot size: ___)			
1. *Batis maritima*	100	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	___ =Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ___ (A)

Total Number of Dominant Species Across All Strata: ___ **(B)**

Percent of Dominant Species That Are OBL, FACW, or FAC: ___ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ___	x1= ___
FACW species ___	x2= ___
FAC species ___	x3= ___
FACU species ___	x4= ___
UPL species ___	x5= ___
Column Totals: ___ (A)	___ (B)

Prevalence Index = B/A= ___

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation [1] (Explain in Remarks or in the delineation report)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: Scattered *Prosopis pallida*, *Pluchea indica*, and *Rhizophora mangle*

SOIL

Sampling Point: SP-01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type [1]	Loc[2]	Texture	Remarks
0 - 13	10YR 2/2	100	none				loamy sand	
14 - 15	7.5YR 2/2	100	none				loamy sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains

[2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histisols (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Muck Presence (A8)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Glayed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Dark-Surface (S7)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Sandy Mucky Mineral (S1)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:_____

Depth (inches):_____

Hydric Soil Present: Yes_____ No___X___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)

Primary Indicators (minimum of one required: check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Innundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Tilapia Nests (B17)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tiled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Salt Deposits (C5)
- ___ Stunted or Stressed Plants (D1)
- X___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes_____ No___X___ Depth (inches):_____

Water Table Present? Yes_____ No___X___ Depth (inches):_____

Saturation Present? (includes capillary fringe) Yes___X___ No_____ Depth (inches):___15_____

Wetland Hydrology Present? Yes___X___ No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM—Hawai'i and Pacific Islands

Project/Site: Waiakoa Gulch at South Kīhei Road City: Kīhei Sampling Date: February 13, 2013 Time: 1015

Applicant/Owner: County of Maui, Department of Public Works State/Terr./Comm.: Hawai'i Island: Maui Sampling Point: **SP-02**

Investigator(s): Susan Burr and Chad Linebaugh TMK/Parcel: (2) 3-8-077:009

Landform (hillslope, coastal plain, etc.): coastal estuary and floodplain Local relief (concave, convex, none): concave

Lat: 20° 46.975' N Long: 156° 27.801' W Datum: NAD83 Slope (%): ~5

Soil Map Unit Name: Pulehu silt loam, 0 to 3 percent slopes NWI classification: upland

Are climactic/hydrologic conditions on the site typical for this time of year: Yes X No ___ (If no, explain in Remarks)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS—Attach a site map showing sampling point locations transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	
Hydric Soil Present?	Yes ___	No X	**Is the Sampled Area within a Wetland? Yes ___ No X**
Wetland Hydrology Present?	Yes X	No ___	

Remarks:

VEGETATION—Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	___ =Total Cover		
Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	___ =Total Cover		
Herb Stratum (Plot size: ___)			
1. *Batis maritima*	100	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	___ =Total Cover		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	___ =Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ___ (A)

Total Number of Dominant Species Across All Strata: ___ **(B)**

Percent of Dominant Species That Are OBL, FACW, or FAC: ___ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ___	x1= ___
FACW species ___	x2= ___
FAC species ___	x3= ___
FACU species ___	x4= ___
UPL species ___	x5= ___
Column Totals: ___ (A)	___ (B)

Prevalence Index = B/A= ___

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation [1] (Explain in Remarks or in the delineation report)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: Scattered *Prosopis pallida*, *Pluchea indica*, and *Rhizophora mangle*

SOIL

Sampling Point: SP-02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type [1]	Loc[2]	Texture	Remarks
0 - 14	7.5YR 2/2	100	none				sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains

[2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histisols (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Muck Presence (A8)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Glayed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Dark-Surface (S7)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Sandy Mucky Mineral (S1)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:_____

Depth (inches):_____

Hydric Soil Present: Yes_____ No___X___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)

Primary Indicators (minimum of one required: check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Innundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Tilapia Nests (B17)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tiled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Salt Deposits (C5)
- ___ Stunted or Stressed Plants (D1)
- X___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes_____ No___X___ Depth (inches):_____

Water Table Present? Yes_____ No___X___ Depth (inches):_____

Saturation Present? (includes capillary fringe) Yes_____ No___X___ Depth (inches):_____

Wetland Hydrology Present? Yes___X___ No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SP-02 is 2 m upslope from SP-01

WETLAND DETERMINATION DATA FORM—Hawai'i and Pacific Islands

Project/Site: Waiakoa Gulch at South Kīhei Road City: Kīhei Sampling Date: February 13, 2013 Time: 1030

Applicant/Owner: County of Maui, Department of Public Works State/Terr./Comm.: Hawai'i Island: Maui Sampling Point: **SP-03**

Investigator(s): Susan Burr and Chad Linebaugh TMK/Parcel: (2) 3-8-077:009

Landform (hillslope, coastal plain, etc.): coastal estuary and floodplain Local relief (concave, convex, none): minimal/flat

Lat: 20° 46.982' N Long: 156° 27.805' W Datum: NAD83 Slope (%): 0

Soil Map Unit Name: Pulehu silt loam, 0 to 3 percent slopes NWI classification: upland

Are climactic/hydrologic conditions on the site typical for this time of year: Yes X No ___ (If no, explain in Remarks)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS—Attach a site map showing sampling point locations transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	
Hydric Soil Present?	Yes ___	No X	**Is the Sampled Area within a Wetland? Yes ___ No X**
Wetland Hydrology Present?	Yes X	No ___	

Remarks:

VEGETATION—Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	___ =Total Cover		
Sapling/Shrub Stratum (Plot size: ___)			
1. *Prosopis pallida*	5	Yes	FACU
2. *Pluchea indica*	5	Yes	FAC
3.			
4.			
5.			
	___ =Total Cover		
Herb Stratum (Plot size: ___)			
1. *Batis maritima*	5	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	___ =Total Cover		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	___ =Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 **(B)**

Percent of Dominant Species That Are OBL, FACW, or FAC: 66% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ___	x1= ___
FACW species ___	x2= ___
FAC species ___	x3= ___
FACU species ___	x4= ___
UPL species ___	x5= ___
Column Totals: ___ (A)	___ (B)

Prevalence Index = B/A= ___

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is $\leq 3.0^1$

___ Problematic Hydrophytic Vegetation [1] (Explain in Remarks or in the delineation report)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: Scattered *Heliotropium currasavicum*, *Pennisetum ciliare*, and *Dactyloctenium aegyptium*

SOIL

Sampling Point: SP-03

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type [1]	Loc[2]	Texture	Remarks
0 - 7	7.5YR 3/3	100	none				clay loam	
7								asphalt

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains

[2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histisols (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Muck Presence (A8)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Dark-Surface (S7)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Sandy Mucky Mineral (S1)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:_____

Depth (inches):_____

Hydric Soil Present: Yes_____ No___X___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)

Primary Indicators (minimum of one required: check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Innundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Tilapia Nests (B17)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tiled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- X Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Salt Deposits (C5)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes_____ No___X___ Depth (inches):_____

Water Table Present? Yes_____ No___X___ Depth (inches):_____

Saturation Present? (includes capillary fringe) Yes_____ No___X___ Depth (inches):_____

Wetland Hydrology Present? Yes___X___ No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM—Hawai'i and Pacific Islands

Project/Site: Waiakoa Gulch at South Kīhei Road City: Kīhei Sampling Date: February 13, 2013 Time: 1045

Applicant/Owner: County of Maui, Department of Public Works State/Terr./Comm.: Hawai'i Island: Maui Sampling Point: **SP-04**

Investigator(s): Susan Burr and Chad Linebaugh TMK/Parcel: (2) 3-8-077:009

Landform (hillslope, coastal plain, etc.): coastal estuary floodplain Local relief (concave, convex, none): bank

Lat: 20° 46.968' N Long: 156° 27.817' W Datum: NAD83 Slope (%): ~10

Soil Map Unit Name: Pulehu silt loam, 0 to 3 percent slopes NWI classification: upland

Are climactic/hydrologic conditions on the site typical for this time of year: Yes X No ____ (If no, explain in Remarks)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS—Attach a site map showing sampling point locations transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Area within a Wetland? Yes ____ No X**
Wetland Hydrology Present?	Yes X	No ____	

Remarks:

VEGETATION—Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: ____)			
1. *Batis maritima*	100	Yes	OBL
2. *Ipomoea pes-caprae*	10	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	____ =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ **(B)**

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x1=
FACW species		x2=
FAC species		x3=
FACU species		x4=
UPL species		x5=
Column Totals:	(A)	(B)

Prevalence Index = B/A= ____

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is $\leq 3.0^1$

____ Problematic Hydrophytic Vegetation [1] (Explain in Remarks or in the delineation report)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: SP-04

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type [1]	Loc[2]	Texture	Remarks
0 - 6	7.5YR 2.5/2	100	none				sandy loam	
6 - 15	7.5YR 2.5/2	100					sandy loam	
15 - 24	7.5YR 2.5/2	50	7.5YR 2.5/1	50		M	sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains

[2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histisols (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Muck Presence (A8)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Glayed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Dark-Surface (S7)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Sandy Mucky Mineral (S1)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:_____

Depth (inches):_____

Hydric Soil Present: Yes_____ No___X___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)

Primary Indicators (minimum of one required: check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Innundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Tilapia Nests (B17)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tiled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Salt Deposits (C5)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes_____ No___X___ Depth (inches):_____

Water Table Present? Yes_____ No___X___ Depth (inches):_____

Saturation Present? (includes capillary fringe) Yes___X___ No_____ Depth (inches):___6___

Wetland Hydrology Present? Yes___X___ No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM—Hawai'i and Pacific Islands

Project/Site: Waiakoa Gulch at South Kīhei Road City: Kīhei Sampling Date: February 13, 2013 Time: 1050

Applicant/Owner: County of Maui, Department of Public Works State/Terr./Comm.: Hawai'i Island: Maui Sampling Point: **SP-05**

Investigator(s): Susan Burr and Chad Linebaugh TMK/Parcel: (2) 3-8-077:009

Landform (hillslope, coastal plain, etc.): coastal estuary and floodplain Local relief (concave, convex, none): bank

Lat: 20° 46.966' N Long: 156° 27.819' W Datum: NAD83 Slope (%): ~10

Soil Map Unit Name: Pulehu silt loam, 0 to 3 percent slopes NWI classification: upland

Are climactic/hydrologic conditions on the site typical for this time of year: Yes X No ____ (If no, explain in Remarks)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS—Attach a site map showing sampling point locations transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____
Hydric Soil Present?	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____

Is the Sampled Area within a Wetland? Yes X No ____

Remarks:

VEGETATION—Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Rhizophora mangle*	80	Yes	OBL
2.			
3.			
4.			
5.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: ____)			
1. *Batis maritima*	50	Yes	OBL
2. *Ipomoea pes-caprae*	10	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	____ =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ **(B)**

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x1= ____
FACW species	____	x2= ____
FAC species	____	x3= ____
FACU species	____	x4= ____
UPL species	____	x5= ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A= ____

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is $\leq 3.0^1$

____ Problematic Hydrophytic Vegetation [1] (Explain in Remarks or in the delineation report)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: Escaped *Thevetia peruviana* from neighboring yard.

SOIL

Sampling Point: SP-05

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type [1]	Loc[2]	Texture	Remarks
0 - 6	7.5YR 2.5/2	50					sandy loam	
	black	50					muck	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains

[2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histisols (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- X Muck Presence (A8)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Dark-Surface (S7)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Sandy Mucky Mineral (S1)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:_____

Depth (inches):_____

Hydric Soil Present: Yes X No_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)

Primary Indicators (minimum of one required: check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Innundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Tilapia Nests (B17)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tiled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Salt Deposits (C5)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes_____ No X Depth (inches):_____

Water Table Present? Yes X No_____ Depth (inches): ~10

Saturation Present? (includes capillary fringe) Yes X No_____ Depth (inches): 6

Wetland Hydrology Present? Yes X No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM—Hawai'i and Pacific Islands

Project/Site: Waiakoa Gulch at South Kīhei Road City: Kīhei Sampling Date: February 13, 2013 Time: 1120

Applicant/Owner: County of Maui, Department of Public Works State/Terr./Comm.: Hawai'i Island: Maui Sampling Point: OP-1

Investigator(s): Susan Burr and Chad Linebaugh TMK/Parcel: (2) 3-8-077:009

Landform (hillslope, coastal plain, etc.): coastal estuary and floodplain Local relief (concave, convex, none): bank

Lat: 20° 46.970' N Long: 156° 27.800' W Datum: NAD83 Slope (%): ~10

Soil Map Unit Name: Pulehu silt loam, 0 to 3 percent slopes NWI classification: upland

Are climactic/hydrologic conditions on the site typical for this time of year: Yes X No ___ (If no, explain in Remarks)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS—Attach a site map showing sampling point locations transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

VEGETATION—Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	___ =Total Cover		

Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	___ =Total Cover		

Herb Stratum (Plot size: ___)			
1. *Batis maritima*	100	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	100 =Total Cover		

Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	___ =Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ___ (A)

Total Number of Dominant Species Across All Strata: ___ **(B)**

Percent of Dominant Species That Are OBL, FACW, or FAC: ___ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ___	x1= ___
FACW species ___	x2= ___
FAC species ___	x3= ___
FACU species ___	x4= ___
UPL species ___	x5= ___
Column Totals: ___ (A)	___ (B)

Prevalence Index = B/A= ___

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation [1] (Explain in Remarks or in the delineation report)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: Scattered *Prosopis pallida* and *Pluchea indica*

SOIL

Sampling Point: OP-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type [1]	Loc[2]	Texture	Remarks
0 - 10	7.5YR 2/2	100	none				sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains

[2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histisols (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Muck Presence (A8)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Glayed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Dark-Surface (S7)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Sandy Mucky Mineral (S1)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:_____

Depth (inches):_____

Hydric Soil Present: Yes_____ No___X___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)

Primary Indicators (minimum of one required: check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Innundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Tilapia Nests (B17)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tiled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Salt Deposits (C5)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes_____ No___X___ Depth (inches):_____

Water Table Present? Yes_____ No___X___ Depth (inches):_____

Saturation Present? (includes capillary fringe) Yes_____ No___X___ Depth (inches):_____

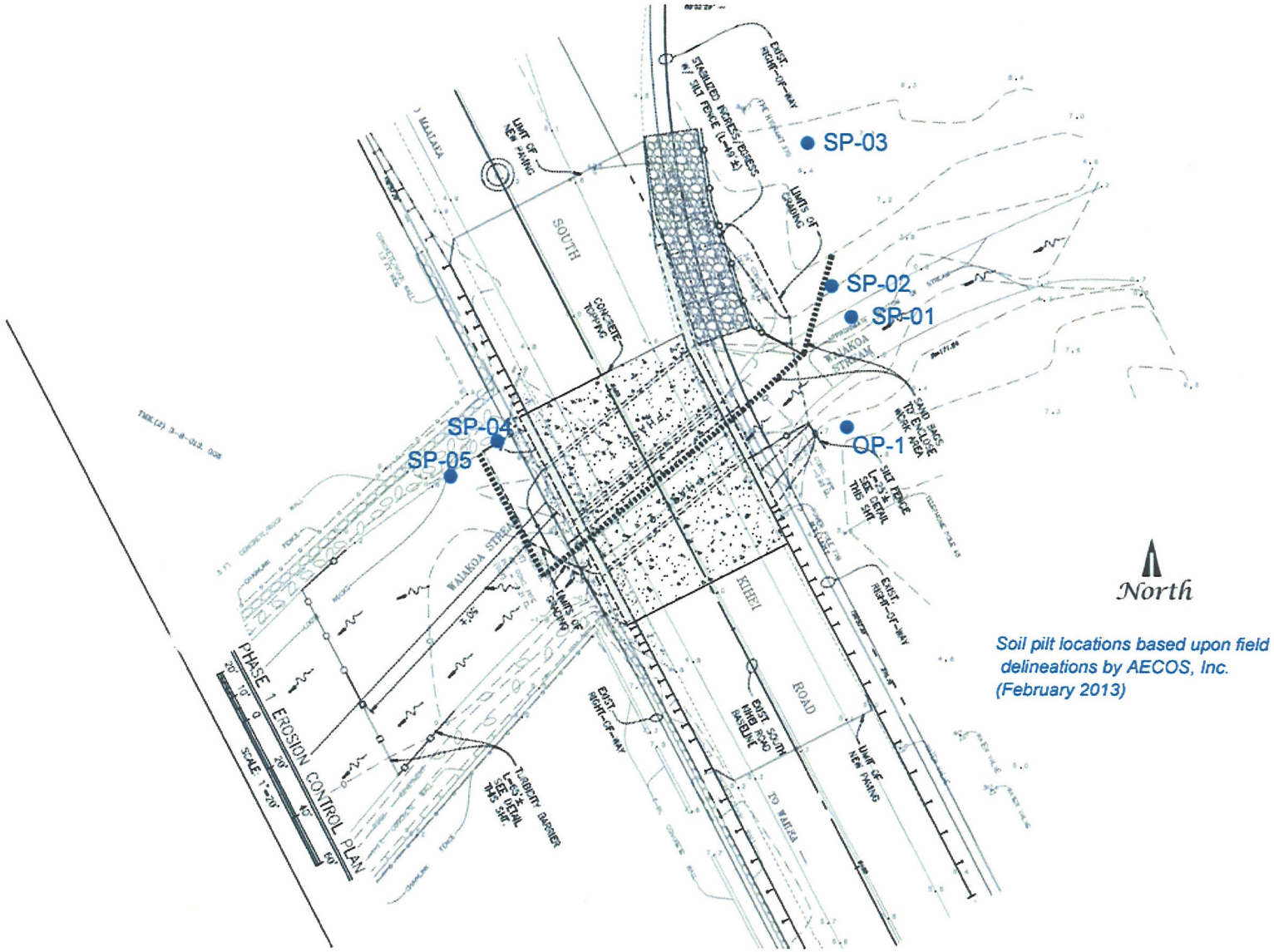
Wetland Hydrology Present? Yes_____ No___X___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Attachment 3

Sampling Location Map


SP-03
SP-02
SP-01
SP-04
SP-05
OP-1
North
Soil pilt locations based upon field delineations by AECOS, Inc. (February 2013)
PHASE 1 EROSION CONTROL PLAN
SOUTH
KIHEI
ROAD
WAIAKOA STREAM
EXIST RIGHT-OF-WAY
LIMITS OF GRADING
CONCRETE TOPPING
SAND BAGS TO ENCLOSE WORK AREA
SILT FENCE
TURBIDITY BARRIER
UNIT OF NEW PAVING
EXIST SOUTH MAUI ROAD BASELINE
TO WAILEA

Attachment 4

Approved Jurisdictional Determination (JD)

MAR 12 2012

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, HONOLULU DISTRICT
FORT SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF:

March 7, 2012

Regulatory Branch

File Number. **POH-2012-00036**

Munekiyo & Hiraga, Inc.
Attn: Leilani Pulmano
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Pulmano:

This is in response to your letter dated February 3, 2012, submitted on behalf of the County of Maui requesting a Jurisdictional Determination (JD) and confirmation for Department of the Army (DA) Nationwide Permit (NWP) for the proposed replacement of culverts located at the crossing of the South Kihei Road and Waiakoa Gulch stream, Kihei, Maui Island, Hawaii (TMK XXX). We have determined the proposed project site contains waters subject to the regulatory jurisdiction of the Corps of Engineers.

Your proposed project was reviewed pursuant to Section 10 of the Rivers and Harbors Act of 1899 (Section 10) and Section 404 of the Clean Water Act (Section 404). Section 10 requires that a DA permit be obtained for certain structures or work in or affecting navigable waters of the United States (U.S.), prior to conducting the work (33 U.S.C. 403). Navigable waters of the U.S. are those waters subject to the ebb and flow of the tide shoreward to the mean high water mark, and/or other waters identified as navigable by the Honolulu District. In addition, a Section 10 permit is required for structures or work outside this limit if they affect the course, capacity, or condition of the waterbody.

Section 404 requires that a DA permit be obtained for the placement or discharge of dredged and/or fill material into waters of the U.S., including wetlands, prior to conducting the work (33 U.S.C. 1344). For regulatory purposes, the U.S. Army Corps of Engineers (Corps) defines wetlands as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. The area of Corps jurisdiction under Section 404 extends to the Mean Higher High Tide Line (MHHTL) or to the Ordinary High Water Mark (OHWM) for navigable waters other than the Pacific Ocean, and to the upland boundary of any adjacent wetlands. Projects involving discharges typically include placement of fill material for homes and landscaping, impoundments, causeways, road fills, dams and dikes, riprap, groins, breakwaters, revetments, and beach nourishment. Section 404 also regulates discharges of dredged material incidental to certain activities such as grading, mechanized land clearing, ditching or other excavation activity, and the installation of certain pile-supported structures.

Based on the information furnished in your submittal, available resources, and an on-site visit conducted by a member of my staff on February 28, 2012, we have determined that the Waiakoa Gulch Stream at this location is a navigable water of the U.S. subject to the Corps' regulatory jurisdiction, pursuant to Section 10. It also appears that the proposed project would also involve the temporary or permanent placement of fill and/ or dredged material below the tributary's mean high water mark; therefore, a DA permit is required, pursuant to Section 404.

Conversely, we are unable to confirm if the proposed project is eligible for verification under the Corps' Nationwide Permits (NWP) No #3 (Maintenance) or No #14 (Linear Transportation Projects). Verifications for NWP authorizations are issued for activities that have only minimal individual and cumulative adverse effects on the aquatic environment and satisfy other public interest factors. During our review of your submittal, we found it absent of the requisite of information used to determine whether the proposed culvert replacement is eligible for verification under the NWPs and have identified the following items for you to include for the project's anticipated future submittal: 1) a detailed project description (i.e., include the structural dimensions and estimated quantities of fill to be placed below the MHHTL for culverts and headwall for this proposed project); 2) a list of any list threatened and endangered species or designated critical habitat or that may be affected or is in the vicinity of the project; and 3) a list/map of any cultural and historic properties listed or eligible for listing on the State and National Register of Historic Places that may be affected by the proposed work.

Finally, we recommend you access our website at http://www.poh.usace.army.mil/EC-R/EC-R.htm to download copies of the DA permit application materials that you will need to complete and submit to us in order to request authorization to perform any activities falling under the Corps' jurisdiction. As described in the application materials, you will need to include plan and cross-section view drawings of your proposed work in 8 1/2 x 11 inch format.

This letter contains an approved JD for the subject crossing and is valid for a period of five (5) years unless new information warrants revision of the determination before the expiration date. If you object to this determination, you may request an Administrative Appeal under Corps regulations at 33 Code of Federal Regulations (CFR) Part 331. We have enclosed a Notification of Appeal Process and Request For Appeal (NAP/RFA) form. If you request to appeal this determination you must submit a completed RFA form, according to instructions in the RFA, to the Corps' Pacific Ocean Division office at the following address:

Thom Lichte, Appeals Review Officer
U.S. Army Corps of Engineers
Pacific Ocean Division, ATTN: CEPOD-PDC
Building 525
Fort Shafter, HI 96858-5440

Thank you for giving us the opportunity to review this proposal and for your cooperation with our regulatory program. Please be advised you can provide comments on your experience with the Honolulu District Regulatory Branch by accessing our web-based customer survey form at http://per2.nwp.usace.army.mil/survey.html.

Should you have any questions, please contact Ms. Joy Anamizu of this office at the above address or telephone 808-438-7023 (FAX: 808-438-4060) or by E-Mail at Joy.N.Anamizu@usace.army.mil. Please refer to File Number **POH-2012-36** in all future communications with this office regarding this or other projects at this location.

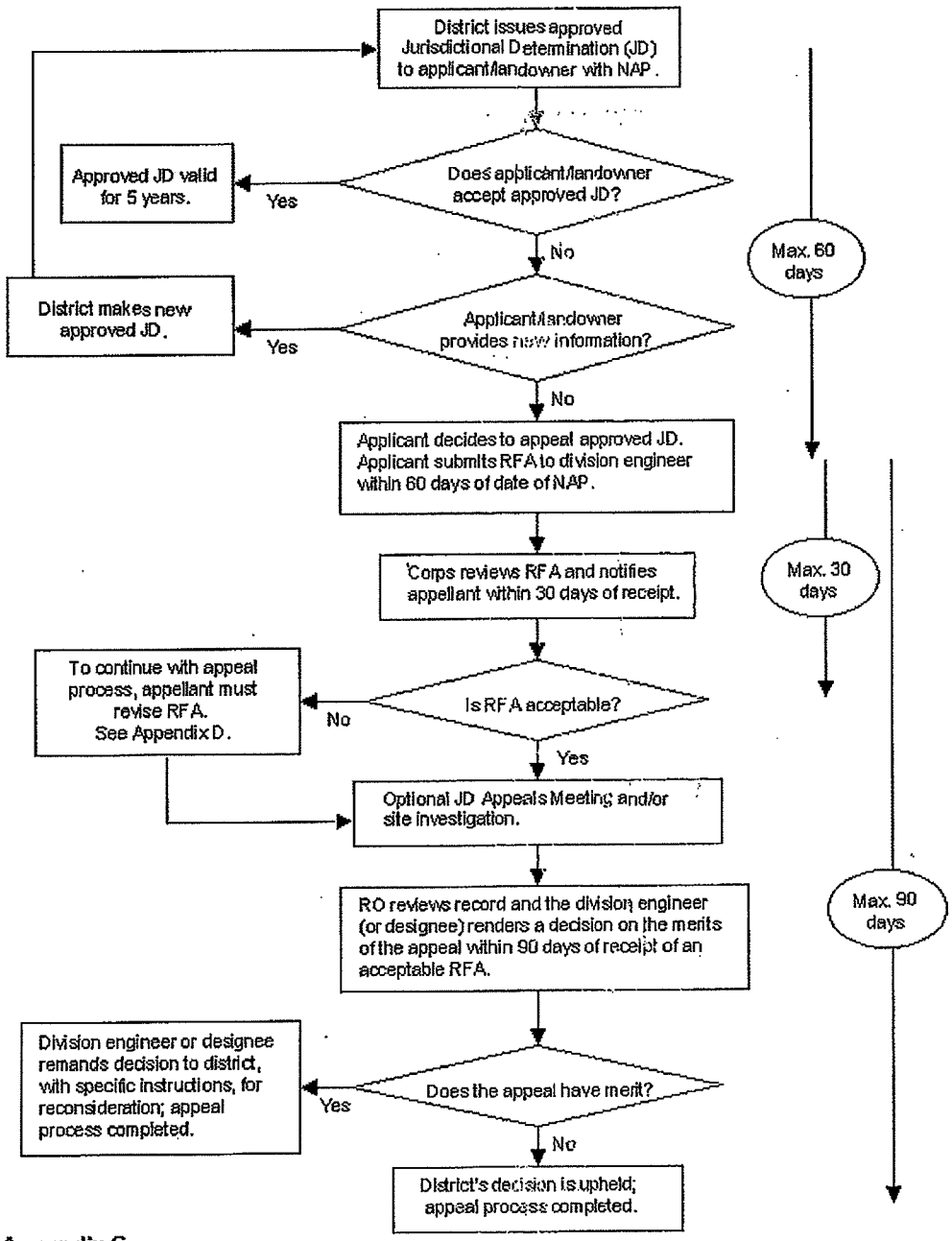
Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

Enclosures

Final JD Form
Flowchart
RFA Document

Administrative Appeal Process for Approved Jurisdictional Determinations



Appendix C

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: Maui County, Dept. of Public Works		File Number: POH-2012-00036	Date: March 7, 2012
Attached is:			See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)		A
	PROFFERED PERMIT (Standard Permit or Letter of permission)		B
	PERMIT DENIAL		C
XX	APPROVED JURISDICTIONAL DETERMINATION		D
	PRELIMINARY JURISDICTIONAL DETERMINATION		E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://www.usace.army.mil/CECW/Pages/reg_materials.aspx or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.

- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION

If you have questions regarding this decision and/or the appeal process you may contact:	If you only have questions regarding the appeal process you may also contact:
Joy N. P. Anamizu U.S. Army Corps of Engineers Honolulu District, ATTN: CEPOH-EC-R Building 230 Fort Shafter, HI 96858-5440 Tel. (808) 438-7023	Thom Lichte, Appeal Review Officer Pacific Ocean Division ATTN: CEPOD-PDC Building 525 Fort Shafter, HI 96858-5440 Tel. (808) 438-0397

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

	Date:	Telephone number:
Signature of appellant or agent.		

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): 02-Mar-2012

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: Honolulu District, POH-2012-00036-JD1

C. PROJECT LOCATION AND BACKGROUND INFORMATION:

State :	HI - Hawaii
County/parish/borough:	Maui
City:	Kihei
Lat:	20.78279
Long:	-156.46351
Universal Transverse Mercator	Folder UTM List *UTM list determined by folder location* • NAD83 / UTM zone 4N Waters UTM List *UTM list determined by waters location* • NAD83 / UTM zone 4N
Name of nearest waterbody:	Waiakoa Gulch Stream
Name of nearest Traditional Navigable Water (TNW):	Pacific Ocean
Name of watershed or Hydrologic Unit Code (HUC):	

☑ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.

☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc¿) are associated with the action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION:

☑ Office Determination Date: 08-Mar-2012

☑ Field Determination Date(s): ☐ 28-Feb-2012

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION

There appear to be"navigable waters of the U.S." within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area.

☑ Waters subject to the ebb and flow of the tide.

☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.

Explain:

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There "waters of the U.S." within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area.

1. Waters of the U.S.

a. Indicate presence of waters of U.S. in review area:[1]

Water Name	Water Type(s) Present
Waiakoa Stream	TNWs, including territorial seas

b. Identify (estimate) size of waters of the U.S. in the review area:

Area: (m^2)
Linear: (m)

c. Limits (boundaries) of jurisdiction:

based on:
OHWM Elevation: (if known)

2. Non-regulated waters/wetlands:[3]

Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain:

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

1.TNW

TNW Name	Summarize rationale supporting determination:
Waiakoa Stream	The portion of the Waiakoa Gulch Stream underlying the proposed culverts to be replaced appears to be tidally influenced based on location/proximity to the Ocean and the salt tollerant hydrophytic vegetation lining and growing from the sides of the tributary.

2. Wetland Adjacent to TNW
Not Applicable.

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:
Watershed size:
Drainage area:
Average annual rainfall: inches
Average annual snowfall: inches

(ii) Physical Characteristics
(a) Relationship with TNW:

[ ] Tributary flows directly into TNW.
[ ] Tributary flows through [ ] tributaries before entering TNW.
:Number of tributaries

Project waters are river miles from TNW.
Project waters are river miles from RPW.
Project Waters are aerial (straight) miles from TNW.
Project waters are aerial(straight) miles from RPW.

[ ] Project waters cross or serve as state boundaries.
Explain:
Identify flow route to TNW:[5]

Tributary Stream Order, if known:
Not Applicable.

(b) General Tributary Characteristics:

Tributary is:
Not Applicable.

Tributary properties with respect to top of bank (estimate):
Not Applicable.

Primary tributary substrate composition:
Not Applicable.

Tributary (conditions, stability, presence, geometry, gradient):
Not Applicable.

(c) Flow:
Not Applicable.

Surface Flow is:
Not Applicable.

Subsurface Flow:
Not Applicable.

Tributary has:
Not Applicable.

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction:

High Tide Line indicated by:
Not Applicable.

Mean High Water Mark indicated by:
Not Applicable.

(iii) Chemical Characteristics:
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality;general watershed characteristics, etc.).
Not Applicable.

(iv) Biological Characteristics. Channel supports:
Not Applicable.

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:
(a) General Wetland Characteristics:
Properties:
Not Applicable.

(b) General Flow Relationship with Non-TNW:

Flow is:
Not Applicable.

Surface flow is:
Not Applicable.

Subsurface flow:
Not Applicable.

(c) Wetland Adjacency Determination with Non-TNW:
Not Applicable.

(d) Proximity (Relationship) to TNW:
Not Applicable.

(ii) Chemical Characteristics:
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Not Applicable.

(iii) Biological Characteristics. Wetland supports:
Not Applicable.

3. Characteristics of all wetlands adjacent to the tributary (if any):

All wetlands being considered in the cumulative analysis:
Not Applicable.

Summarize overall biological, chemical and physical functions being performed:
Not Applicable.

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Significant Nexus: Not Applicable

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE:

1. TNWs and Adjacent Wetlands:

Wetland Name	Type	Size (Linear) (m)	Size (Area) (m^2)
Waiakoa Stream	TNWs, including territorial seas	-	8093.712
Total:		**0**	**8093.712**

2. RPWs that flow directly or indirectly into TNWs:
Not Applicable.

Provide estimates for jurisdictional waters in the review area:
Not Applicable.

3. Non-RPWs that flow directly or indirectly into TNWs:[8]
Not Applicable.

Provide estimates for jurisdictional waters in the review area:

Not Applicable.

4. Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.
Not Applicable.

Provide acreage estimates for jurisdictional wetlands in the review area:
Not Applicable.

5. Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs:
Not Applicable.

Provide acreage estimates for jurisdictional wetlands in the review area:
Not Applicable.

6. Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs:
Not Applicable.

Provide estimates for jurisdictional wetlands in the review area:
Not Applicable.

7. Impoundments of jurisdictional waters:[9]
Not Applicable.

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS:[10]
Not Applicable.

Identify water body and summarize rationale supporting determination:
Not Applicable.

Provide estimates for jurisdictional waters in the review area:
Not Applicable.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS

☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements:

☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce:

☐ Prior to the Jan 2001 Supreme Court decision in "SWANCC," the review area would have been regulated based soley on the "Migratory Bird Rule" (MBR):

☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (Explain):

☐ Other (Explain):

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (ie., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment:
Not Applicable.

Provide acreage estimates for non-jurisdictional waters in the review area, that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction.
Not Applicable.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD
(listed items shall be included in case file and, where checked and requested, appropriately reference below):

Data Reviewed	Source Label	Source Description
--Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant	Exhibit A, Draft Plans	Munekiyo & Hiraga, Inc (enclosure with submittal dated Feb 3, 2012).
--U.S. Geological Survey map(s).	Figure for approved JD POH-2012-36	USGS Topo Quad overlay (ORM, 2012)
--National wetlands inventory map(s).	Figure for approved JD POH-2012-36	NWI overlay (USFWS, 2012)
--Photographs	-	-
----Other	Exhibit B, Photographs of the Project Area	Munekiyo & Hiraga, Inc (enclosure with submittal dated Feb 3, 2012).

B. ADDITIONAL COMMENTS TO SUPPORT JD:
Not Applicable.

---

[1]-Boxes checked below shall be supported by completing the appropriate sections in Section III below.

[2]-For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).

[3]-Supporting documentation is presented in Section III.F.

[4]-Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

[5]-Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

[6]-A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.

[7]-Ibid.

[8]-See Footnote #3.

[9] -To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.

[10]-Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA Memorandum Regarding CWA Act Jurisdiction Following Rapanos.

APPENDIX C-2.

Water Quality Monitoring and Assessment Plan

Applicable Monitoring and Assessment Plan for CWA Section 401 WQC. South Kīhei Road Waiakoa Culvert Repair. Kīhei, Maui

March 27, 2013 *AECOS* No. 1296B

Chad Linebaugh
AECOS, Inc.
45-939 Kamehameha Hwy, Suite 104
Kāne'ohe, Hawai'i 96744
Phone: (808) 234-7770 Fax: (808) 234-7775 Email: aecos@aecos.com

Introduction

This Applicable Monitoring and Assessment Plan (AMAP) is written to accompany the Section 401 Water Quality Certification (WQC) application for the proposed South Kīhei Road Waiakoa Culvert Repair Project, hereinafter referred to as "the Project." This monitoring plan has been prepared in accordance with water quality regulations promulgated in Hawai'i Administrative Rules (HAR) Chapter 11-54 (HDOH, 2009) and guidance from the General Monitoring Guideline for Section 401 Water Quality Certification Projects (HDOH, 2000).

The intent of the AMAP is to conduct water quality sampling and analysis to monitor potential impacts caused by construction work. The AMAP includes baseline (preconstruction), construction, and postconstruction water quality monitoring at four stations. Data collected as part of the AMAP will be used to assess the adequacy of Best Management Practices (BMPs) applied during construction and will facilitate assessing the impacts of the Project on State waters. If shown to be necessary by the monitoring data, BMPs will be modified during construction by the construction contractor in order to protect Waiakoa Gulch and Mā'alaea Bay waters.

Waiakoa Gulch

Waiakoa Gulch arises at approximately 4900-ft (1,500-m) elevation on the East Maui Mountain. The gulch extends west-southwest approximately 12 mi (19.3

km) from its origin above Kula Highway to its coastal outlet into Mā'alaea Bay. Though water flow is only intermittent through the gulch upslope of Pi'ilani Highway, the gulch is a well-defined feature with a distinct bed of exposed bedrock and boulders. Downslope from Pi'ilani Highway the gulch receives a constant supply of brackish groundwater and surface water is always present at the South Kīhei Road Project site. The Waiakoa Gulch outlet is typically blocked by deposits of beach sand forming a *muliwai* (brackish water pond) through the project site.

The Project involves work in Class 2, inland-estuary waters as defined by HAR 11-54 (HDOH, 2009). Though the waters of Waiakoa Gulch at the Project site do not appear on the Hawai'i Department of Health list of impaired waters in Hawai'i (HDOH, 2012), prepared under Clean Water Act §303(d), the water body is likely impaired for turbidity, total suspended solids, nutrients and chlorophyll-*a*. During an initial water quality survey in January 2012, gulch waters near the project site were nutrient, sediment, and chlorophyll laden with elevated pH levels and slightly depressed dissolved oxygen concentrations relative to State of Hawai'i water quality criteria for estuaries (HDOH, 2009).

Project Description

The Project site is located in North Kīhei, just *mauka* of the Pacific Ocean shore on the southern coast of Maui's central isthmus (Figure 1). The Project work will be phased to allow construction on the eastern, then western half of the drainage way. Project work proposed by the County of Maui, Department of Public Works includes:

1. Constructing a temporary ingress/egress corridors on county right-of-way and on both stream banks on the *mauka* side of the roadway,
2. Replacing the existing 48 and 24-in culverts with two 10 x 3 ft box culverts,
3. Constructing inlet and outlet structures along the drainage way ,
4. Replacing ford crossing over new box culverts, and
5. Grassing exposed or disturbed earth in the project area.

The Project work is anticipated to last approximately 6 months. Sand bags will be used to isolate the work areas and a silt curtain will be placed in the channel downstream from the project to contain suspended sediments.

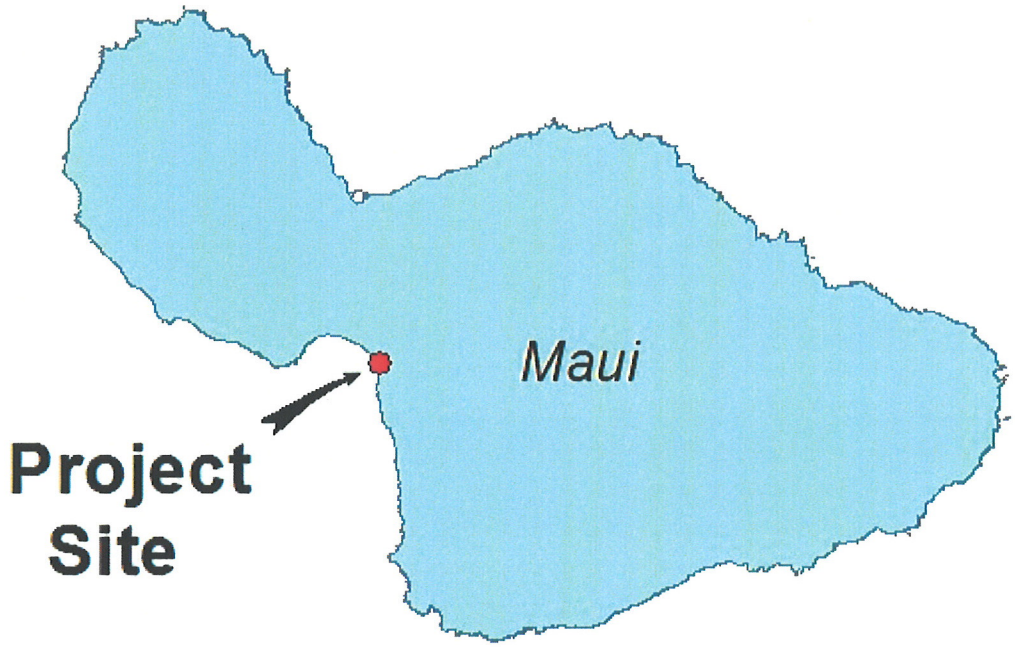


Figure 1. General location of the project on the Island of Maui.

Organization and Responsibilities

The construction contractor and monitoring firms have not been selected for the Project. Upon selection of these entities, this AMAP must be revised to include names, responsibilities, and qualifications of those chosen to conduct monitoring (Table 1). This AMAP is written using *AECOS*, Inc. monitoring (sampling and analytical) protocols. If another laboratory is hired to conduct sampling and/or analysis for this AMAP, this document should be revised to include information specific to that firm and be submitted to Hawai'i Department of Health Clean Water Branch (HDOH-CWB) for approval, prior to the start of pre-construction monitoring.

A representative assigned by the construction contractor will perform daily visual inspections and take photographs of the construction site to ensure that the construction activities do not result in adverse impacts to State waters. Personnel from the selected monitoring entity will perform visual inspections of

water quality and take photographs of water conditions at each monitoring station and note the condition of project BMPs during each sampling event.

Information recorded by the contractor's representative and the monitoring personnel will include at a minimum: date, time, stream flow, weather conditions, precipitation, and description of the construction activity ongoing during sampling. Notes will include any other observed activities, which may or may not be related to construction activities but may affect water quality. A copy of the contractor's daily observations and photographs will be provided to monitoring personnel for use in preparing the final reports.

Observations by the monitoring personnel will be included with the individual sampling reports. Contractor observations will be available on-site while the Project is on-going. Upon project completion all observations and field books will be available (for at least five years) for inspection by Hawai'i Department of Health-Clean Water Branch (HDOH-CWB)-authorized personnel during normal business hours. Table 1 provides the names, responsibilities and qualifications of the personnel involved with this monitoring program.

Parameters to be Measured

Due to the duration (approx. 6 months) of construction and the likelihood that no changes in water quality, other than a temporary increase in suspended sediment are anticipated as a result of the Project, only those general parameters recommended in the General Monitoring Guidelines (HDOH, 2000) will be measured. Parameters to be monitored in this AMAP include temperature, salinity, pH, dissolved oxygen, turbidity, and total suspended solids (TSS). In addition, photographs of the work site, sampling stations, and in-water BMPs will be taken during each sampling event. Photographs will include the date, time, and description of the photo. Visual inspections of project BMPs will also be made by field samplers at the time of sampling.

The field samplers will record their initials, the date, calibration and secondary check data, time of sample collection and field measurements, location, and field measurement data for each sample. They will note weather conditions, construction activity, unusual site conditions, and condition of any BMPs at the time of sample collection. Samplers will note any construction and non-construction activity that might impact water quality at the Project.

Table 1. Summary of responsibilities and qualifications.

Name	Responsibility	Qualification
TBD	Project Manager	Project management, laboratory, and field sampling experience in 401 WQC and monitoring.
TBD (Monitoring entity)	Collect water samples and perform field measurements at each station. Take field notes and photographs of water quality stations. Perform turbidity analysis on site with field meter. Report exceedances to on-site foreman and project manager. Compile preconstruction summary and post construction assessment.	Trained and experienced in collecting water samples and performing field measurements in marine environments, and monitoring construction contractors working in marine environments.
TBD (Construction contractor representative to be determined by contractor)	Notify monitoring firm and DOH-CWB when in-water construction will start with enough time to collect 401 WQC preconstruction samples prior to starting work. Make daily visual observations of BMPs and construction activity to be logged in a notebook (SM, 1998). Take photographs (with date/time stamp and description) and provide notebook and photographs to monitoring entity to be used as part of the assessment process. Notify HDOH-CWB of any modifications of work plan, BMPs, or AMAP. Investigate any water quality exceedances, take corrective actions, and report findings to HDOH-CWB. Issue construction work stoppages as necessary to prevent degradation of water quality.	Knowledgeable of construction activities as they relate to 401 WQC requirements. Familiar with marine environments. Knowledgeable of WQC monitoring requirements for this project.

Sampling Locations

Water samples will be collected from just below the water's surface at four stations. Sta. Downstream Impact will be located 3ft (1m) downstream from the silt curtain and Sta. Upstream Impact will be located 3 ft (1 m) upstream from the terminus of sand bags isolating the work area. Two control stations (Upstream Control and Downstream Control) will be located 50 ft (15 m) from respective impact stations. Estimated locations of water quality monitoring stations are depicted on project plans in Appendix A. Nomenclature for samples and coordinates for sampling stations are provided in Table 2.

Table 2. Nomenclature for samples and estimated GPS coordinates (Datum WGS84) for sampling stations.

SAMPLE ID	LATITUDE (N)	LONGITUDE (W)
Upstream Control (UC)	20° 46.977'	156° 27.792'
Upstream Impact (UI)	20° 46.973'	156° 27.801'
Downstream Impact (DI)	20° 46.956'	156° 27.825'
Downstream Control (DC)	20° 46.949'	156° 27.831'

Sampling Frequency

Preconstruction Sampling

Prior to construction, ten sampling events will be undertaken over a minimum of a two-week period (a longer period may be used if scheduling allows). All four monitoring stations will be sampled with 1 liter polypropylene bottles. Immediately following sampling, temperature, salinity, dissolved oxygen, and pH will be measured *in situ* at the station. Turbidity will be measured from collected samples using a field turbidimeter immediately following the collection of all stations. The remaining 1 liter sample will be delivered to the laboratory for analysis of TSS.

During Construction Sampling

During construction monitoring will once per week. All four monitoring stations will be sampled with 1 liter polypropylene bottles. Immediately following sampling, temperature, salinity, dissolved oxygen, and pH will be measured *in situ* at the station. Turbidity will be measured from the collected sample using a field turbidimeter immediately following the collection of all stations. The remaining 1 liter sample will be delivered to the laboratory for analysis of TSS.

Post-Construction Sampling

Following construction, monitoring will occur once per week for four weeks. All four monitoring stations will be sampled. Immediately following sampling, temperature, salinity, dissolved oxygen, and pH will be measured *in situ* at the station. Turbidity will be measured from the collected sample using a field turbidimeter immediately following the collection of all stations. The remaining 1 liter sample will be delivered to the laboratory for analysis of TSS.

Sampling and Analytical Methods

Weather conditions and relevant observations will be noted daily by the construction contractor's representative and logged in a field notebook. Visual inspections of water quality by this representative will be made at a minimum twice daily as long as construction is occurring. This will help ensure that no adverse physical changes in the character of the receiving water occur due to construction. Results of the visual inspections will be noted in the field notebook. These notes will be provided for use in assessing impacts to water quality in a final report.

If there is a discharge or plume due to defective construction BMPs, HDOH-CWB will be notified within 24 hours or the next business day. Repairs, if necessary, to existing BMPs will be implemented in a timely manner. Any repairs to BMPs will be recorded and reported to HDOH-CWB at 586-4309 or via E-mail to cleanwaterbranch@doh.hawaii.gov. An email or letter will always follow up a phone call.

In compliance with Water Quality Certification standard conditions, any change(s) to the implemented BMPs shall be submitted in writing to the CWB for review and comment, as such change(s), correction(s) or modification(s) arise. The permitee shall properly address all comment(s) and/or concern(s) to

the HDOH Director's satisfaction before such change(s), correction(s) or modification(s) become effective.

Temperature, salinity, dissolved oxygen, and pH will be measured *in situ* directly following the sampling at each station. Turbidity will be measured following the sampling of all stations using a field turbidimeter. Samples for TSS will be collected in 1 liter polypropylene bottles for delivery to the chosen analytical laboratory. The sampler will note any site conditions that may affect water quality and the condition of any BMPs at the time of collection. Table 3 lists the analytical methods to be used in the monitoring plan. Table 4 lists the analytical hold times and field preservation for each method.

Photographs to be taken by monitoring personnel will include a time/date stamp and be accompanied by a brief description of content when submitted. Each monitoring event all sampling stations will be photographed and additional photographs will be taken to document turbidity plumes or faulty or missing project BMPs, if observed.

Table 3. Analytical methods and instruments to be used for the Project's water quality monitoring plan.

Analysis	Units	Method	Instrument	Reference
Dissolved Oxygen	mg/l & % sat	SM4500-O G	YSI 85 or 550 meter	SM (1998)
pH	su	SM 4500-H+	Hanna pHep	SM (1998)
Salinity	ppt	SM 2520-B	refractometer	SM (1998)
Temperature	°C	SM 2550-B	YSI 85 or 550 meter	SM (1998)
TSS	mg/l	SM 2540-D	Mettler Balance	SM (1998)
Turbidity	ntu	EPA 180.1, Rev. 2.0	HACH 2100 Q turbidimeter	USEPA (1993)

Table 4. Analytical hold times and preservation for the Project's water quality monitoring parameters.

Analysis	Hold Time	Field Preservation
Dissolved oxygen	immediate	none
pH	immediate	none
Salinity	immediate	none
Temperature	immediate	none
TSS	7 days	chill on ice to 4°C
Turbidity	immediate (up to 48 hrs)	chill on ice to 4°C

Quality Assurance Plan

The analytical laboratory chosen must participate in Hawai'i Department of Health (HDOH) and Environmental Protection Agency (EPA) sponsored quality assurance (QA) programs available for all analyses conducted as part of this applicable monitoring and assessment plan (AMAP). This includes EPA Water Supply performance evaluations and EPA Water Pollution performance evaluation programs. Relevant quality assurance/quality control (QA/QC) results will be provided to HDOH upon request.

The construction contractor and monitoring entity will retain in their records, the analytical procedures used, any relevant QA/QC information, and instrument calibration information pertaining to the specific analysis used in this AMAP. All analytical results and field notes will be entered into a notebook or file established for this purpose, and provided in a final report prepared for the monitoring plan. This file will be available for inspection by HDOH-authorized personnel during normal business hours.

During construction, the contractor's assigned representative will perform visual inspections of the construction site and BMPs to ensure that the construction activities do not result in adverse impacts to the quality of Waiakoa Gulch water or the nearby coastal waters of Mā'alaea Bay. Observations will be recorded in a field notebook. Information recorded will

include (but not be limited to): date, time, weather conditions, tidal stage, the description of the construction activity, and any other observed activities that may affect water quality. Any photographs that have been taken will be kept on file at the contactor's office. A hard or electronic copy of these observations and any photographs will be provided for use in preparing the final assessment report. This field notebook will be available for inspection by HDOH-CWB authorized personnel during normal business hours.

Data Quality Objectives

Data quality objectives (DQOs) are qualitative and quantitative statements developed through a seven-step process based on EPA guidance for developing DQOs (USEPA, 2006). The project-specific DQOs below describe each step and how it pertains to the applicable monitoring and assessment plan (AMAP).

Step 1: State the Problem

The proposed Project to replace culverts crossing South Kīhei Road at Waiakoa Gulch will require construction work in jurisdictional waters. Construction has the potential to temporarily suspend sediments and may affect the pH and dissolved oxygen concentrations in estuarine waters in the immediate vicinity of the Project.

Step 2: Identify the Goals of the Study

The intent of the applicable monitoring and assessment plan (AMAP) is to conduct water sampling and analysis that will monitor the effect of the proposed construction on water quality. The intent of this sampling and analysis is to 1) ascertain that the BMPs are adequate for compliance with Hawai'i water quality standards (HDOH, 2009), in other words, to ensure that the nearshore waters beyond the work area are unaffected by the construction, 2) promptly determine if BMPs prove inadequate so that modification of the BMPs can be implemented in a timely manner to bring the activity into compliance, and 3) serve as a basis for self-compliance, so that activities associated with the proposed action can proceed within the parameters required by State of Hawai'i Water Quality Standards.

Step 3: Identify the Information Inputs

The data that are collected as a part of the monitoring plan will be used to determine whether the objectives listed above are being met. Preconstruction monitoring will provide data to assess baseline conditions. During construction results will be used to assess whether the Project is impacting state waters and will be used, if necessary, to modify BMPs. Post-construction monitoring will be conducted four times after construction is completed to demonstrate no long term impacts from construction work have occurred (by comparison to preconstruction data).

Preconstruction monitoring data will be submitted to HDOH within two weeks of completion of all analyses and before the commencement of project work. During construction field monitoring data (dissolved oxygen, pH, salinity, temperature and turbidity) will be sent to HDOH-CWB by facsimile or email within 24 hours or by the next business day. TSS data will be submitted upon completion within 8 business days of sampling.

Within two weeks of completing all analyses, the permitee will compile and submit a typed report of results to the HDOH-CWB via facsimile or email to cleanwaterbranch@doh.hawaii.gov. These reports will have a running statistical summary for each phase of the Project and include field notes.

A final monitoring and assessment report which will be submitted to HDOH-CWB within 60 days of completion of post-construction monitoring and analysis. The final monitoring report will include a summary of all water quality monitoring results (preconstruction, during construction, and post-construction) for the Project. Data for dissolved oxygen, temperature, salinity, pH, turbidity and TSS will be suitable for assessment of construction impacts upon the receiving waters of Waiakoa Gulch.

Step 4: Define the Boundaries of the Study

The Project is expected to require approximately 6 months of construction. Pre-construction monitoring will take a minimum of two weeks. Post construction monitoring will be conducted in the four weeks following the Project. Temporally the AMAP will monitor 7 months and two weeks.

Four sampling stations: Upstream Control, Upstream Impact, Downstream Impact, and Downstream Control will be monitored using discrete grab samples. Preconstruction sampling includes ten sampling events over a minimum of two week period. Sample collection will occur once every other week during construction, and four weekly sampling events will occur post-construction. Samples will be collected during construction work hours, 0800 hours (8:00 a.m.) and before 1600 hours (4:00 p.m.). All parameters listed in Tables 3 and 4 will be measured.

The monitoring stations will spatially cover a 350 ft (107 m) segment of Waiakoa Gulch. This area spans all work to be done in State waters and provides control stations 50 ft (15) upstream and downstream of the construction area.

Step 5 Develop the Analytic Approach

The results of construction monitoring will be evaluated by comparing the results of Upstream Impact and Downstream Impact to their control station

counterparts, and to preconstruction monitoring data to address decisions outlined in Step 2 of the DQO process. During field sampling, samplers are required to take field notes, which are clearly defined by this monitoring plan. If at any time it is noted that there is a turbidity plume extending beyond the BMPs and the plume is associated with construction, all work should stop until the cause is determined and corrected.

If any of the following are noted, a determination must be made as to the exact nature of the deviation and its probable cause (i.e., attributable or not to construction activity):

1) the **dissolved oxygen** at any of the Impact Stations varies from this numerical reference:

- less than 75% saturation as a function of ambient salinity and water temperature, or

2) **pH** results at any Impact Station:

- fall outside of the range of 7.0 to 8.6, or
- deviates more than 0.5 units from the closest control stations, or
- deviates more than 0.5 units from the preconstruction range, or

3) the **salinity** at any Impact Station varies from this numerical reference:

- +/-10% of closest control value considering the effect of hydrologic input or oceanographic conditions, or

4) the **turbidity** at any Impact Station exceeds this numerical reference:

- the upper limit of the range for preconstruction results + 10% (this value will be calculated and reported in the pre-construction monitoring report and included in data report sheets to be submitted to HDOH-CWB).

5) the **TSS** at any Impact Station exceeds this numerical reference:

- the upper limit of the range for preconstruction results + 10% (this value will be calculated and reported in the pre-construction monitoring report and included in data report sheets to be submitted to HDOH-CWB).

If the field samplers notice a problem in the field, they will notify the foreman or on-site manager. The sampler and foreman will attempt to track the cause of the exceedance. Data collected from the control stations, and observations from

the field samplers will be used in the investigation to aid in determining whether construction is impacting water quality. If it is determined that construction is causing the problem, then the activity responsible should cease until the problem is corrected or BMPs must be adjusted to contain the plume. HDOH-CWB will be notified within 24 hours or the next business day.

Step 6: Specify Performance/Acceptance Criteria

In making decisions concerning water quality impacts, uncertainty exists. This uncertainty is potentially a result of sample design, or of measurement errors, or simply environmental variability. When examining impact vs. control (or pre- vs. during) data sets, a decision must be made whether the comparison shows water quality to be within the range of ambient conditions (pre- or control station data sets) or if the water quality is statistically different (that is, there was an impact, presumably from construction activities). Two potential decision errors are defined in statistical inference: Type I—false rejection of a null hypothesis (concluding that a water quality impact has occurred where one has not); or Type II—false acceptance of a null hypothesis (concluding no water quality impact has occurred where one has).

A minimum of ten preconstruction sample values for each parameter will be used to establish both baseline (ambient) conditions (mean and range) and an action level (plus or minus 10% of the upper or lower bound of the range of each parameter as appropriate; see Step 5 above) for the Project water quality monitoring program. For data assessment purposes, arithmetic or geometric mean—as appropriate from the state water quality criteria—will be used. For statistical analysis, a significance level (α) of 0.05 will be used. This value is the probability of committing a Type I error and defines the decision error limit on falsely rejecting the baseline condition at 5%. Falsely accepting the baseline condition when it is indeed false (Type II error) is considered a less serious consequence, and a higher value for β (0.2) is tolerable.

Field replicate analysis for turbidity will be conducted on one sample each day of monitoring representing 25% of samples during each phase of construction monitoring. Acceptable relative percent differences for field duplicates at Impact stations are 20% or less. Relative percent differences above 20% may indicate a need to alter the sampling protocol. Three known standards will be tested daily before turbidity analysis is conducted to verify that the meter is operating correctly.

All field meters will be calibrated prior to use and calibration procedures will be recorded in the field book or a special notebook used only for recording meter calibrations and maintenance procedures.

Step 7: Develop the Plan for Obtaining Data

Directed sampling will be employed in the study area. The sampling locations and sampling frequency were developed in accordance with water quality regulations promulgated in Hawai'i Administrative Rules (HAR) Chapter 11-54 (HDOH, 2009) and the General Monitoring Guideline for Section 401 Water Quality Certification Projects (HDOH, 2000). Modifications to optimize the sampling design may be necessary if construction is found to be impacting water quality.

Sampling of the Project impact and control Stations for temperature, dissolved oxygen, pH, salinity, turbidity and TSS once per week should be adequate to assess the effectiveness of project BMPs. Visual inspections of project BMPS will be documented daily by the construction contractor.

Chain of Custody Procedures

Once water samples have been obtained and site conditions and field measurements have been properly documented in the field notebook, a written record of the chain of custody of the samples must be made for the laboratory analyses. A chain-of-custody (COC) form serves the purpose of accompanying the samples to the laboratory and directing laboratory analysts on the analyses to be performed. The form also identifies the samples, so the laboratory can report the analytical results by sample ID. When transferring possession of samples, the sampler should sign and record the date and time on the COC record. Each person who subsequently takes custody should fill in the appropriate section of the COC record. The COC will be filed with the laboratory data and become a part of the permanent record.

Field Analysis Quality Control

All instrument calibration procedures will be undertaken prior to field measurements and documented in the field notes. The pH meter and turbidity meter will be maintained and calibrated according to manufacturer instructions (HACH 2008, Hanna Instruments 2005) and monitoring firms SOPs. Operation and calibration will only be performed by personnel who have been properly trained in these procedures. Documentation of calibration and any maintenance information will be maintained in appropriate field or log books. All calibrations will be made prior to analyzing the samples. Measurements of pH and temperature will be made immediately following collections of samples.

Calibration checks for the pH meter will be conducted immediately following calibration (prior to sampling) in two known standards (7 and 10 standard units) and immediately following sampling in at least one known standard (7 standard units) to verify the meter is operating within an acceptable range +/- 0.10 standard units.

Turbidity values will be measured with a HACH 2100Q Turbidimeter immediately following the sampling of all stations. Measurement must be made with the instrument on a level, still surface with the sampled aliquot at ambient temperature. Measurements will be made in triplicate for each sample and the arithmetic mean reported. Prior to turbidity analysis each monitoring day, Gelex standard checks will be conducted and noted in the project field notes to verify the meter is operating within an acceptable range (+/-10% of standard values).

Any item of field equipment that has shown by calibration or otherwise to be defective is to be taken out of service until it has been repaired. The equipment is placed back in service only after verifying by calibration that the equipment performs satisfactorily.

Reports/Assessment

The results and field notes for daily construction monitoring will be faxed (586-4235) or emailed (cleanwaterbranch@doh.hawaii.gov) to HDOH-CWB by the permitee or its authorized representative within 24 hours of completion of analyses or the next business day. A brief report for submittal to HDOH-CWB will be prepared within two weeks of completion of pre-construction monitoring analysis. In addition to analytical results, the report will include time and date of sampling, name of the person who collected the samples, date each analysis was conducted, and identification of the laboratory and analyst(s) that conducted the work. The reports will have a running statistical summary for each phase of the project AMAP.

A final report and water quality assessment will be prepared upon completion of the monitoring plan. This report will be submitted to HDOH by the permittee within 60 days following completion of post-construction monitoring and analysis. The final report will identify the methods and procedures for analytical measurements and include all data collected as well as statistical summaries of results by station and activity phase (preconstruction, during construction, and post-construction). This report will also assess whether water quality was affected by the construction activity. Upon completion of the monitoring plan, the contract laboratory will retain the original data and field notebook for a minimum of five years.

References

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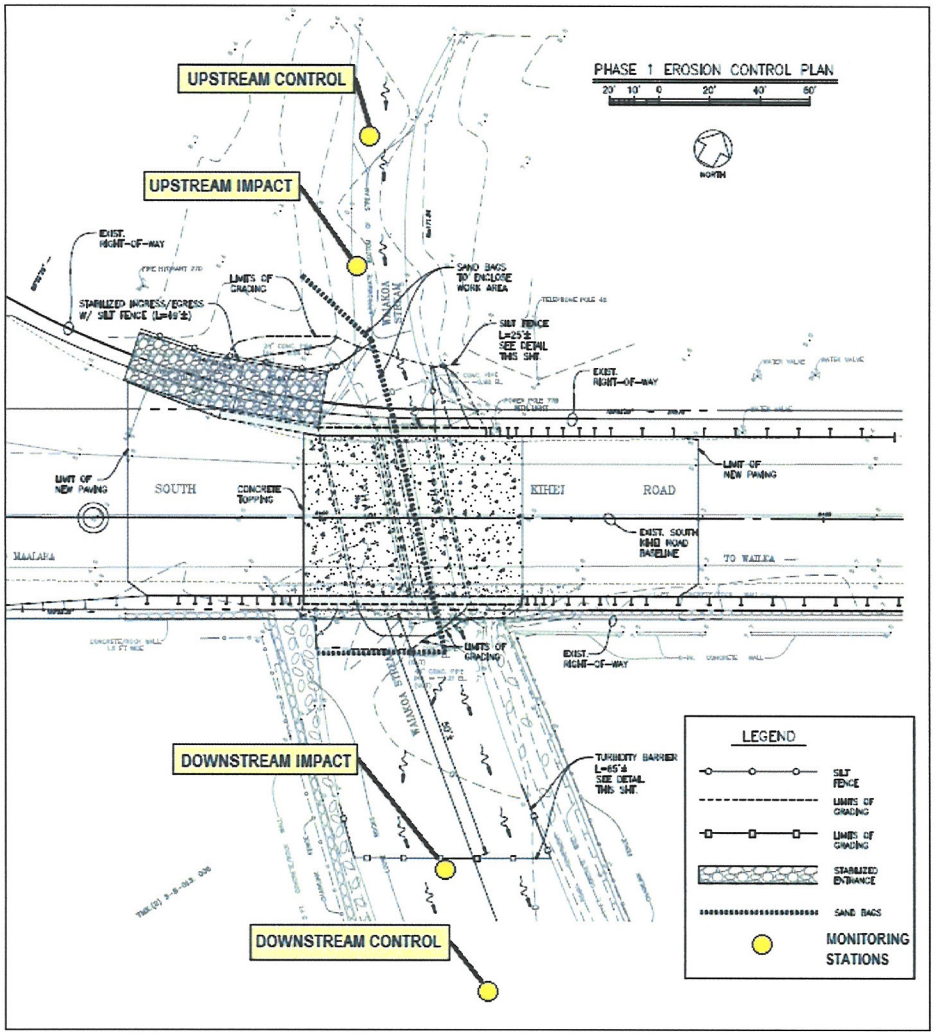
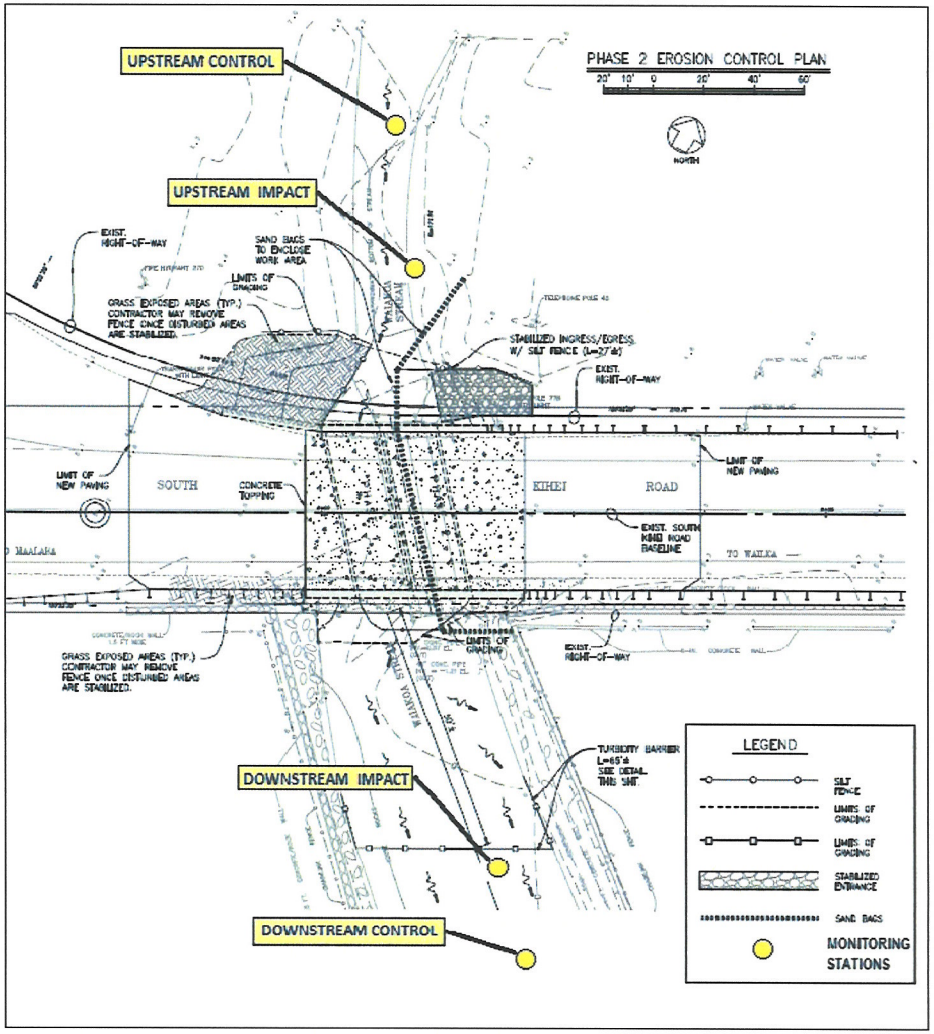
APPENDIX A

AMAP Monitoring Stations

South Kīhei Road Culvert
at Waiakoa Gulch


PHASE 1 EROSION CONTROL PLAN
20' 10' 0 20' 40' 60'
NORTH
UPSTREAM CONTROL
UPSTREAM IMPACT
DOWNSTREAM IMPACT
DOWNSTREAM CONTROL
EXIST. RIGHT-OF-WAY
LIMITS OF GRADING
STABILIZED INGRESS/EGRESS W/ SILT FENCE (L=65'±)
SAND BAGS TO ENCLOSE WORK AREA
SILT FENCE L=25'± SEE DETAIL THIS SHT.
LIMIT OF NEW PAVING
SOUTH
KIHEI
ROAD
CONCRETE TOPPING
EXIST. SOUTH KIHEI ROAD BASELINE
MAALAPA
TO WAILEA
TURBIDITY BARRIER L=65'± SEE DETAIL THIS SHT.
LEGEND
SILT FENCE
LIMITS OF GRADING
LIMITS OF GRADING
STABILIZED ENTRANCE
SAND BAGS
MONITORING STATIONS


PHASE 2 EROSION CONTROL PLAN
20' 10' 0 20' 40' 60'
NORTH
UPSTREAM CONTROL
UPSTREAM IMPACT
DOWNSTREAM IMPACT
DOWNSTREAM CONTROL
EXIST. RIGHT-OF-WAY
SAND BAGS TO ENCLOSE WORK AREA
LIMITS OF GRADING
GRASS EXPOSED AREAS (TYP.) CONTRACTOR MAY REMOVE FENCE ONCE DISTURBED AREAS ARE STABILIZED.
STABILIZED INGRESS/EGRESS W/ SILT FENCE (L=37'±)
LIMIT OF NEW PAVING
SOUTH
KIHEI
ROAD
CONCRETE TOPPING
EXIST. SOUTH KIHEI ROAD BASELINE
MAALAPA
TO WAILEA
TURBIDITY BARRIER L=65'± SEE DETAIL THIS SHT.
LEGEND
SILT FENCE
LIMITS OF GRADING
LIMITS OF GRADING
STABILIZED ENTRANCE
SAND BAGS
MONITORING STATIONS

APPENDIX D.

Archaeological Literature Review and Field Inspection for Drainage Repair on South Kihei Road

An Archaeological Literature Review and Field Inspection for Drainage Repair on South Kīhei Road at the Waiakoa Drainageway
Pūlehu Nui Ahupua'a, Wailuku District, Maui Island
TMK: (2) 3-8-013: 999 and 005-006 and (2) 3-8-077:009 and (2) 3-8-005:034 and 002

Prepared for

Munekiyo & Hiraga, Inc.

Prepared by

Colleen P. Medeiros, B.S.

And

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Cultural Surveys Hawai'i, Inc.

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Section 1 Management Summary

Reference	An Archaeological Literature Review and Field Inspection Report for Drainage Repair on South Kīhei Road at the Waiakoa Drainageway, Pūlehu Nui Ahupua'a, Wailuku District, Maui Island TMK: (2) 3-8-013: 999 and 005-006 and (2) 3-8-077:009 and (2) 3-8-005:034 and 002 (Medeiros and Hammatt 2012).
Date	May 2012 (Draft)
Project Number (s)	Cultural Surveys Hawai'i, Inc. (CSH) Job Code: PULEHUNUI 10
Investigation Permit Number	CSH completed this literature review and field inspection for the proposed Waiakoa drainage repairs along South Kīhei Road under State Archaeological Permit No. 11-17 (2012) issued by the Department of Land & Natural Resources/State Historic Preservation Division (DLNR/ SHPD), per Hawai'i Administrative Rules (HAR) § 13-13-282.
Project Location	The Waiakoa drainageway is located along South Kīhei Road, between the Kīhei Beach Condominium and the Maalaea Surf in Pūlehu Nui Ahupua'a, Wailuku District, Maui Island [TMK: (2) 3-8-013: 999 and 005-006 and (2) 3-8-077:009 and (2) 3-8-005:034 and 002. This area is depicted on the 1997 Wailuku Quadrangle 7.5-minute USGS topographic map (Figure 3).
Project Funding and Land Jurisdiction	Project Funding: Maui County Land Jurisdiction: Private and County
Agencies	County: Maui County, Department of Public Works State: Department of Land and Natural Resources State Historic Preservation Division (SHPD)
Project Description	Anticipated ground disturbance includes removal of the existing pavement to facilitate repairs, grubbing and grading associated with project site prep, and trench excavation associated with removal of existing culverts and installation of new culverts.
Project Acreage	Approximately 0.15 acres
Area of Potential Effect (APE)	The APE for this project will be limited to the immediate area surrounding the Waiakoa drainageway.
Historic Preservation Regulatory Context	The project area is subject to Hawai'i State environmental and historic preservation review legislation [Hawai'i Revised Statutes (HRS) Chapter 343 and HRS 6E-8/ Hawai'i Administrative Rules (HAR) Chapter 13-13-275 respectively]. This document is intended to assist in the project planning, and informs planners of further requirements to complete the project's historic preservation review.
Fieldwork Effort	A field inspection was accomplished on May 1, 2012 by Colleen P. Medeiros, B.S., under the general supervision of Hallett H. Hammatt, Ph.D., as principal investigator. The field effort included a systematic pedestrian inspection and photographs of the proposed project area. The total time required to complete the fieldwork consisted of two hours.

Number of Historic Properties Identified	There were no historic propertied identified in the current project area.
Summary and Recommendations	Based on the field inspection findings and background research there is a low potential for the discovery of previously unidentified historic properties. Yet, while impacts of flooding episodes and modification associated with road construction and maintenance have greatly altered sediments of the project area, the possibility of encountering intact subsurface cultural deposits including human burials should not be underestimated. Because the project area is located in a region where sandy soils exist, there is a possibility for encountering pre-contact cultural deposits as well as human burials in intact sandy deposits. Additionally, Kīhei Camp #1 was located nearby and cultural materials associated with this historic plantation camp may also be encountered. Furthermore, an archaeological inventory survey was previously performed at the current project area by Sinoto and Pantaleo in 1992, and therefore archaeological monitoring for all ground disturbing activities is recommended in addition to close consultation with the Archaeological Branch of SHPD.

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Section 2 Introduction

2.1 Project Background

At the request of Munekiyo & Hiraga, Inc., Cultural Surveys Hawai'i, Inc. (CSH) has prepared this Literature Review and Field Inspection for the proposed drainage culvert repairs located at the intersection of South Kīhei Road and Waiakoa Gulch in the Pūlehu Nui Ahupua'a, Wailuku District, Maui Island TMK: (2) 3-8-013: 999 and 005 and (2) 3-8-077:009 (Figure 1 and Figure 2).

The Waiakoa Stream and Gulch is one of several drainage channels of South Maui that experiences flooding during the heavy *nāulu* or winter rains. The flooding is often accompanied by debris carried down from the *mauka,* or *kula*, reaches of this gulch. Maui County has proposed repairs to the culverts located near the Waiakoa Stream mouth, where South Kīhei Road crosses Waiakoa Gulch. Expected work would include the installation of temporary culvert, replacement of the existing culverts with twin 10-foot by 3-foot box culverts, construction of inlet and outlet structures, and a ford crossing over the box culverts. Anticipated associated ground disturbance includes removal of the existing pavement to facilitate repairs, grubbing and grading for project site prep, and trench excavation associated with removal of existing culverts and installation of new culverts.

2.2 Scope of Work

The scope of work included:

1. Historical 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. Limited 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 limited 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.

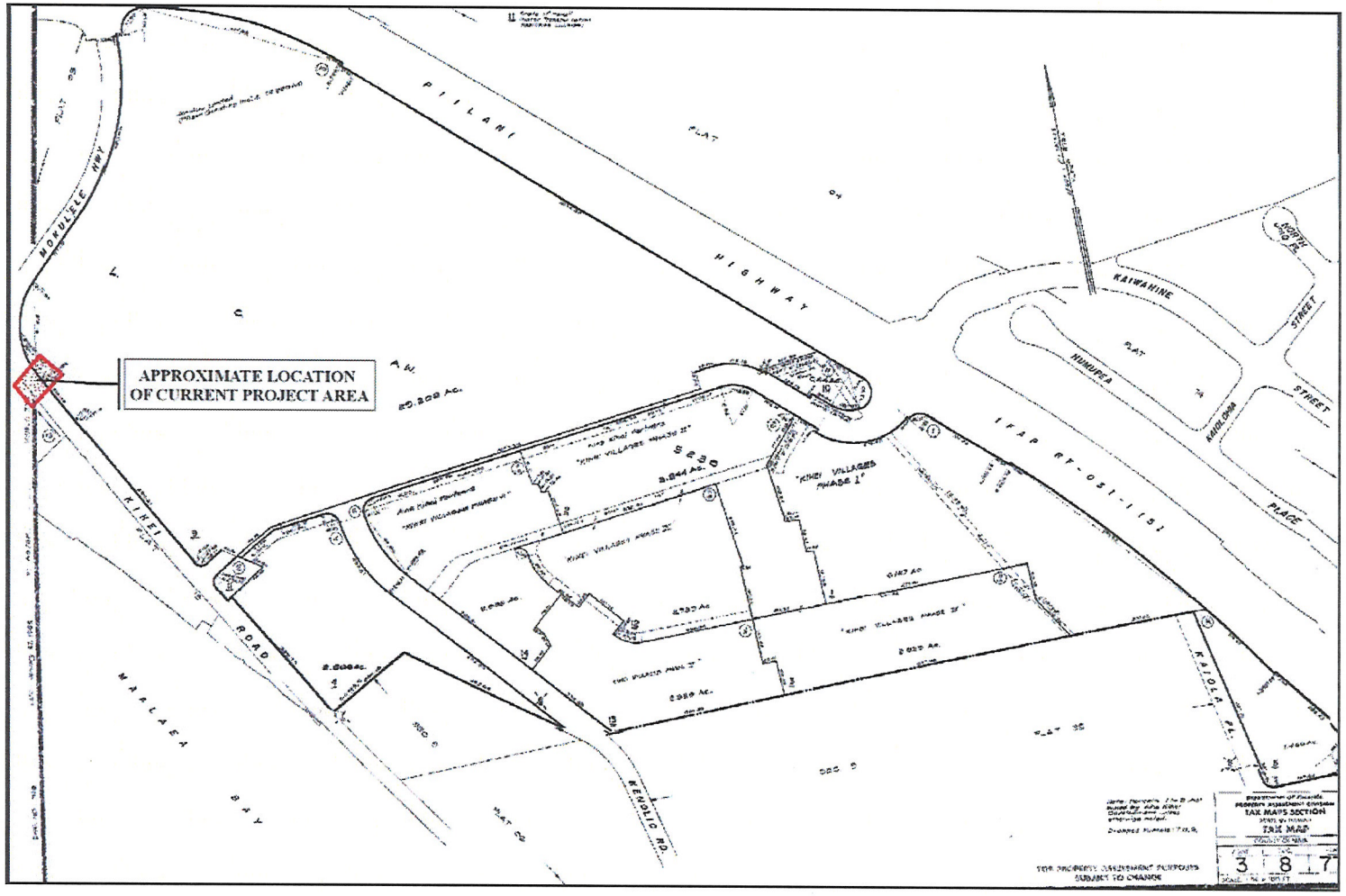


Figure 1. TMK map showing project area in red

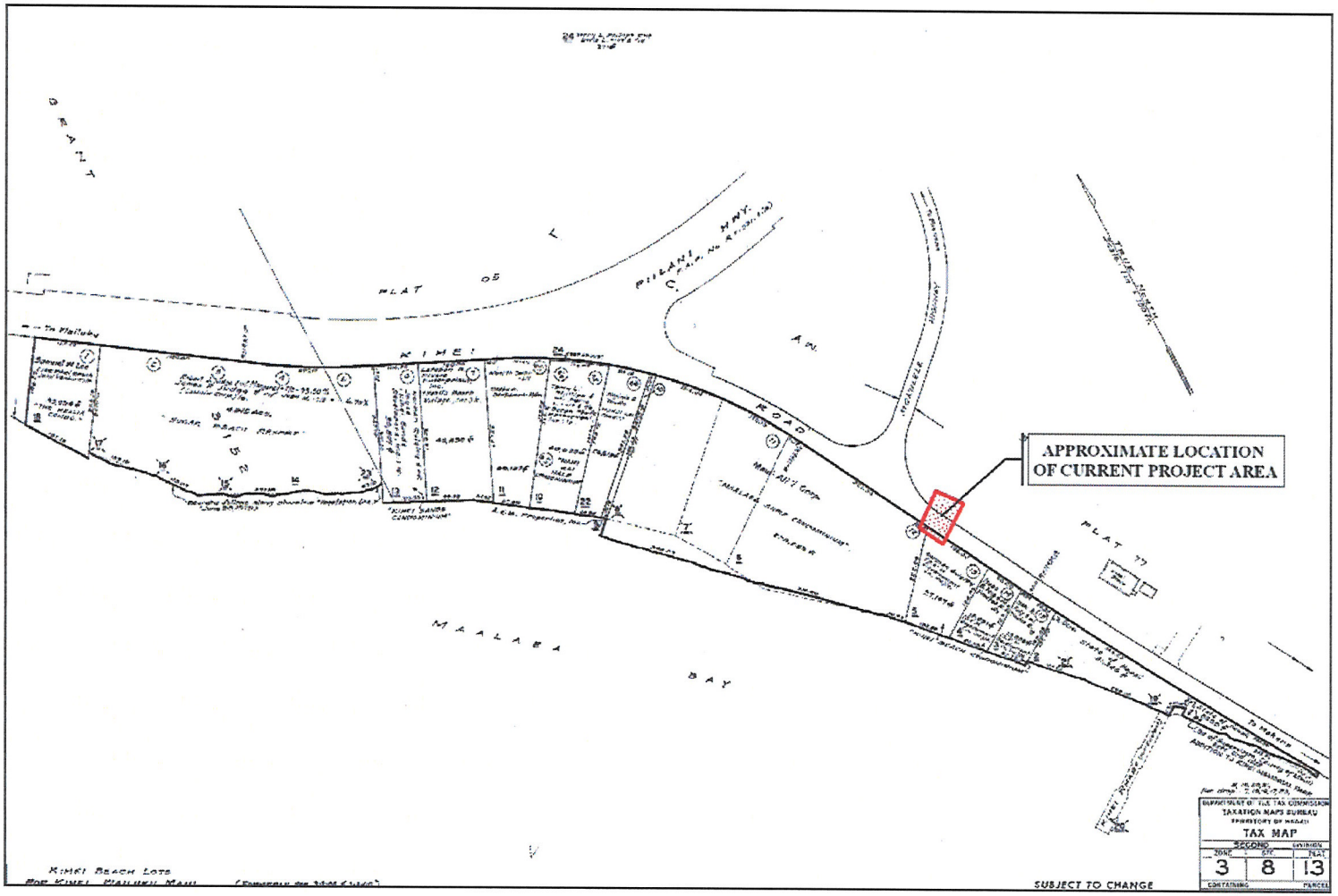


Figure 2. TMK map depicting project area in red

Figure 3. Mā'alaea (1996) 7.5 minute USGS topographic map depicting project area

2.3 Environmental Setting

2.3.1 Natural Environment

Located on the leeward facing slopes of Haleakala, the current project area is located approximately 0.1 miles from the Kīhei coastline near mean sea level. The overall topography of the lands comprising the project area is flat to gently sloping alluvium drained by Pūlehu, Keahuaiwi, and Waiakoa Gulches. The mouth of the Waiakoa Gulch makes up the study area for the current project area. The main soils within the project area are of the Pulehu-Ewa-Jaucas association. This soil association is found in alluvial fans and in the basins mainly of Central Maui. Pulehu-Ewa-Jaucas soils are well drained to excessively drained with medium, moderately fine and coarse textured soils (Foote, et al. 1972:8). More specifically, the soils of the lands surrounding the project area are of the Waiakoa Soil Series (WID2 soil units), the Pulehu (PpA soil units), Dune Land (DL), Keālia (KMW), Beaches (BS), and Alee (Ahab soil units), while the Soil Series within the project area are Pulehu (PpA soil units) (Figure 4).

The Waiakoa Soil Series consists of well drained, gently sloping to moderately steep soils located on the upland areas. The upper part of the Waiakoa Series is influenced by volcanic ash and developed from material weathered from basic igneous rock (Foote, et al. 1972:12). The Pulehu Soil Series consists of well-drained soils on alluvial fans, stream terraces, and basins and are developed in alluvium washed from basic igneous rock (Foote, et al. 1972:115). The soils of the Ewe Series are nearly level to moderately sloping and characterized by well-drained soils found in basins and on alluvial fans. These soils have developed in alluvium derived from basic igneous rock (Foote, et al. 1972:28). The Alee Series consists of excessively drained soils on alluvial fans that have developed in the volcanic ash and recent alluvium derived from basic volcanic igneous rock. For the most part, the soils of this series are nearly level to gently sloping with cobblestones covering most of the surface (Foote, et al. 1972:14). Finally, the Jaucas Soil Series is characterized by excessively drained, calcareous soils of the coastal area next to the ocean. These soils are developed from coral and shells deposited by wind and wave action. They are level to strongly sloping (Foote, et al. 1972:48).

Rainfall accumulation within the project area averages less than 15 to 19 inches annually with the heaviest rainfall occurring during the winter months (December through February) and little to no rainfall during the summer months (June through August) (Giambelluca, et al. 1986; Stearns and MacDonald 1942). This pattern of rainfall and low annual precipitation rate once sustained a lowland, dry shrubland, and grassland native ecosystem (Pratt and Gon 1998). The majority of the landscape within the project area, however, has been heavily modified by historic era sugar cultivation and currently consists of active and fallow sugarcane.

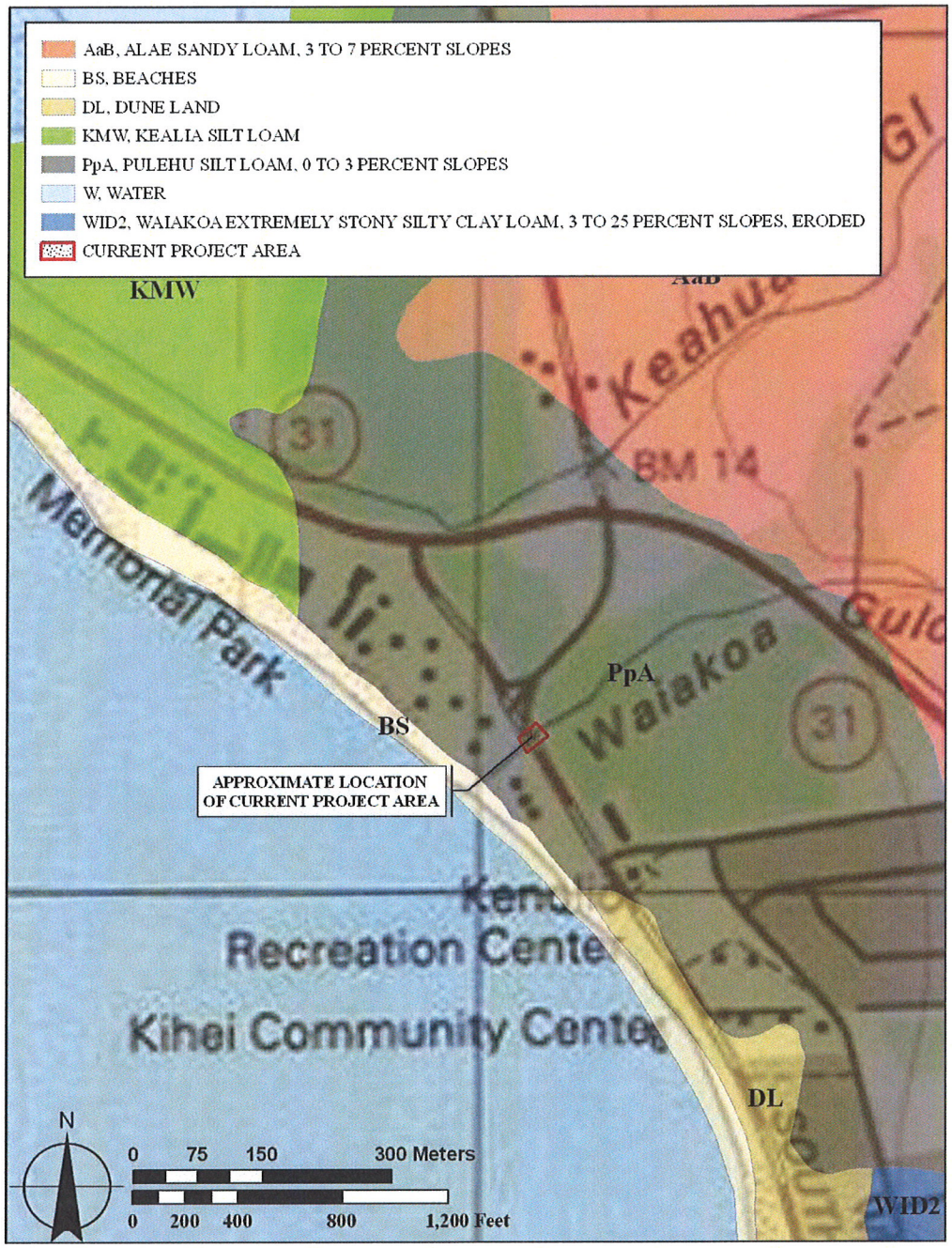


Figure 4. Mā'alaea (1996) 7.5 minute USGS topographic quadrangle showing soils of and surrounding project area.

2.3.2 Built Environment

The project area is located along South Kīhei Road at Waiakoa Gulch. The Kihei Beach Condominium is located to the south of the project area and the Maalaea Surf is located to the northwest of the project area. The surrounding area has been built up and includes several other oceanfront condominium developments. The project area is near the Mokulele-Pi'ilani Highway junction.

Figure 5. Google Earth aerial image showing approximate project area location in relation to the surrounding built environment

Section 3 Methods

An archaeological field inspection of the project area was conducted by CSH archaeologist Colleen P. Medeiros, B.S., under the general supervision of Hallett H. Hammatt, Ph.D. The fieldwork was conducted on May 01, 2012. The field investigation required 1 hour to complete.

3.1 Field Methods

The project area includes the Waiakoa Stream drainageway which South Kīhei Road crosses, and the limited land area immediately surrounding the drainageway. The field inspection method involved a pedestrian inspection of the land areas on the northern side of the Waiakoa Stream and the southern side of the stream. Photographs were taken and a photo log completed. The project area was inspected for evidence of traditional cultural architecture and/or cultural materials present, vegetation and general surroundings noted.

3.2 Document Review

A variety of resources devoted to historical perspectives of the region and traditional stories and accounts were reviewed. Research venues included the Hawai'i State Historic Preservation Division of the Department of Land and Natural Resources and the Survey Office of the Department of Accounting and General Services. Mapping and cartography services were provided by the engineering division of the Hawaiian Commercial & Sugar Company, as well as the survey offices of Alexander & Baldwin Properties, Inc. All relevant Land Commission Awards (LCAs) and Royal Patents were researched using resources associated with the Waihona 'Aina online database (Waihona 'Aina 2002).

Section 4 Background Research

4.1 Traditional and Historic Background

The division of Maui's lands into political districts occurred during the rule of Kaka'alaneo, under the direction of his *kahuna*, Kalaiha'ōhi'a (Beckwith 1970:383). This division resulted in twelve districts or *moku* during traditional times: Honua'ula, Kahikinui, Kaupō, Kīpahulu, Hana, Ko'olau, Hāmākua Loa, Hāmākua Poko, Ka'anapali, Lahaina, and Kula. The current project area is located on the leeward flank of Haleakalā in the *moku* of Kula and *ahupua'a* of Pūlehu Nui (Figure 6) at a place commonly known as Kīhei.

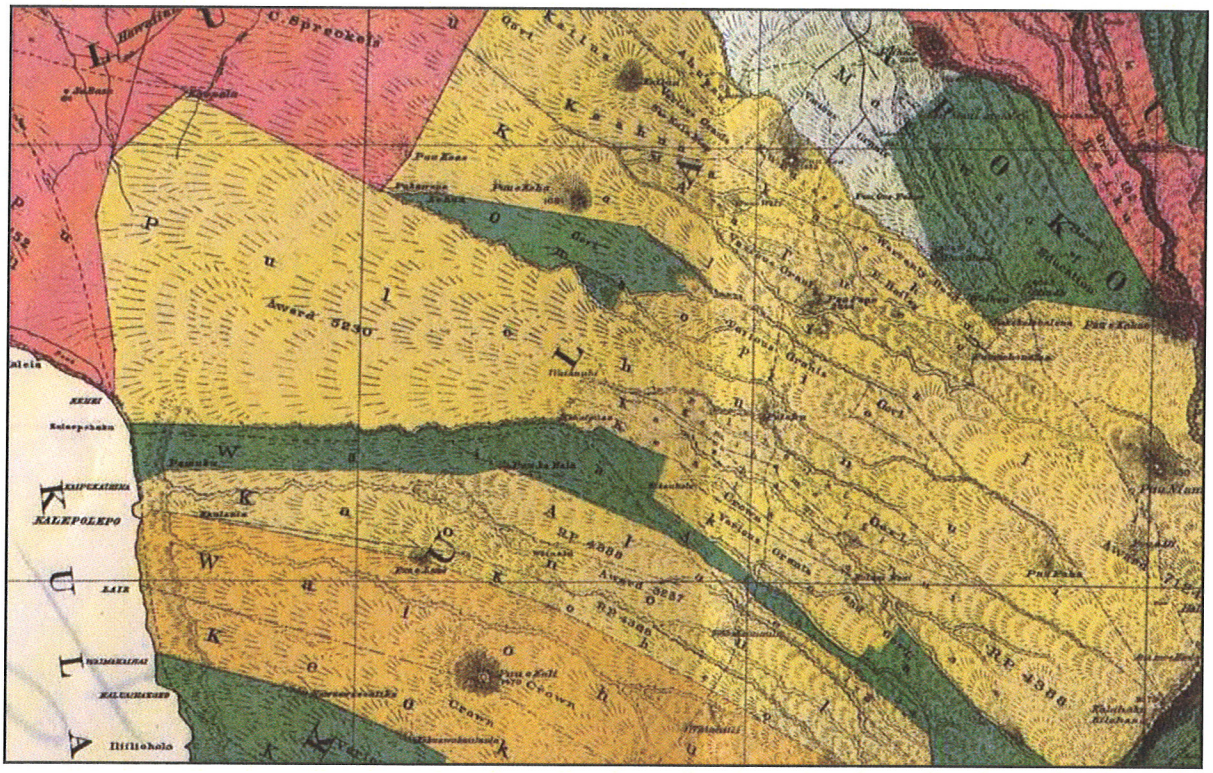


Figure 6. A portion of the F.S Dodge map (1885) showing Pūlehu Nui Ahupua'a in relation to the traditional *moku* of Kula (crown lands in yellow, government lands in green)

4.2 Traditional and Historical Background

4.2.1 Mythological and Traditional Accounts

While the mythological and traditional accounts of the Kīhei area are relatively scarce, an analysis of the place name meanings for the region surrounding the project area may yield some insight into the patterns of life in an area. Literal translations of several of the place names for land areas and divisions near to the project area are listed below. Unless otherwise noted, the translations are taken from Pukui et al. (1974):

Table 1. Place Names

Kula (*moku*)	literally translated as "plain"; always an arid region (Handy in Sterling 1995:242)
Pūlehu Nui (*ahupua'a*)	large *pūlehu* where *pūlehu* is literally translated as "broiled"
Kīhei	literally "cape or cloak"; sandy point and boundary marker between Pūlehu Nui and Waikapu (Sterling 1998:255); commonly used place name for the South Maui area
Kīheipūko'a	*kīhei* literally translates as "cape or cloak" and *pūko'a* literally translates as "coral head"; Kīheipūko'a was a place near Keālia between Kalepolepo and Mā'alaea (Sterling 1998:257)
Keālia	literally "salt encrustation"; a pond near Kīhei and major salt pan location (Sterling 1998:95)
Kale'ia	literally "the abundance", possibly in reference to the resources available from the fishponds and offshore fishing grounds
Kalepolepo	literally "the dirt"
Ka'ie'ie	"a plaything for floating in the rapids", ancient name of Kalepolepo (Sterling 1998:252)
Kaopala	literally "the rubbish"; dividing line between Pūlehu Nui and Waikapu
Waiakoa	literally "water (used) by warrior"; the name of the gulch of the project area
Keāhuaiwi	literally "the bone pile"; the name of a gulch immediately adjacent to and north of Waiakoa Gulch
Kalaepohaku	"the stony promontory"
Pohaku Ki'i	"tilted stone"; a resting place for travelers
Alakoa	"soldiers street"
Kohemalamalama	"the vagina"; also the ancient name for Kaho'olawe

The above place names, together with the environmental data, suggest that the lands of and surrounding coastal Pūlehu Nui were fairly dry and barren in an agricultural sense but rich in marine resources. Previous research on pre-contact occupation in Kula District (Kolb et al. 1997) has suggested that most permanent habitations were in the uplands with a smaller permanent population located along the coastline. While a reconstruction of the coastal and archaeological landscape of Kula Moku underscores the importance of the uplands as a focus of agriculture and habitation, Hawaiian traditions and the presence of four fishponds are evidence that the coastal environs were also a focus of settlement and marine exploitation. The relative scarcity of recorded coastal place names, however, may be an indication of a smaller population that was

widely spread out across the leeward coastal line. The vicinity surrounding the current project area was also a site of conflict between the Hawai'i Island chief Kalaniopu'u and Maui Island chief Kahekili and is perhaps the origins for such place names as "Waiakoa" and "Keāhuaiwi".

4.2.2 Traditional Accounts

The earliest account concerning Kīhei and Hawaiian politics is given by Kamakau (1961) during the time of Alapa'i and Kekaulike:

> Alapa'i sailed from Kohala on Hawai'i...But when he landed at Mokulau in Kaupō (Maui) and heard that Ke-kau-like was dying, he gave up all thought of war and wished only to meet Ke-kau-like and his (half) sister Ke-ku'i-apo-iwa-nui...He landed at Kīheipuko'a with all his chiefs and fighting men...While he was at Kīhei, Alapa'i heard that the ruling chief of Oahu was making war upon Molokai. Most of the chiefs of Molokai...were of Hawai'i...Alapa'i's sympathy was aroused, for these were his own brothers and children (relatives), and he made ready to go to their help on Molokai. [1961:70]

Other accounts involve the continuing conflict between Kahekili of Maui Island and Kalani'opu'u of Hawai'i Island during the late 18th century. Following a losing battle at Kaupō in 1775, Kalani'opu'u dedicated several war *heiau* on Hawai'i Island to aid in the defeat of Kahekili. Upon hearing this news Kahekili sent for the *kahuna* (priest) Kaleopu'upu'u who directed construction of the *heiau* of Kaluli and Pu'uohala on the north side of Wailuku. When Kaluli Heiau was completed Kaleopu'upu'u said to Kahekili:

> This is the house of your god; open the sluice gate that the fish may enter. [Kamakau 1961: 85].

In the year 1776, the army of Kalani'opu'u landed at Keoneo'o'io with their war canoes extending to Makena at Honua'ula and proceeded to ravage the countryside. Kalani'opu'u landed with additional forces at Kīheipūko'a at Kealia to Kapa'ahu, 800 strong and eager to drink the waters of Wailuku:

> Across the plains of Pu'u'ainako (Can-trash-hill) and Kama'oma'o shone the feather cloaks of the soldiers ... Ka-hekili was at Kalanihale just below Kihahale and above the plateau of Ka'ilipoe at Pohakuaokahi ... Kaleopu'upu'u [said] to Ka-hekili, "The fish have entered the sluice; draw in the net." [Kamakau 1961:85]

The forces of Kahekili descended on and destroyed the soldiers of Kalani'opu'u, slaying the Alapa (elite soldiers of Kalani'opu'u) on the sandhills at the southeast of Kalua. Only two men escaped to Kīheipūko'a to tell Kalani'opu'u the news of their defeat. After a second day of warfare, Kalani'opu'u sued for peace and was granted such by Kahekili and his messengers at Kīheipūko'a (Kamakau 1961:88-89).

4.2.3 Early Historic Period

Kīhei was one of the locations visited by Captain George Vancouver. A monument at Mai Poina 'Oe Ia'u Beach Park in Kīhei commemorates Vancouver's on-shore expedition in 1792, when he first met the ruling chief Kahekili. With its sheltered coastline and easy access to

upcountry resources over a vast slope, Kīhei would continue to be a common stop for visiting ships.

During the early and middle 1800s, the Hawaiian demography was affected by two dramatic factors: radical depopulation resulting from Western disease; and nucleation around the developing port towns. The traditionally Hawaiian population was largely dispersed and, although there were royal centers and areas of more concentrated population, these areas never came close to rivaling the populations of the historic port towns that developed on Hawai'i's shorelines during the 1800s. In this regard, Kuykendall (1938:313) notes that in the period from 1830 to 1854:

> The commercial development during this period, by magnifying the importance of a few ports, gave momentum and direction to a townward drift of population; the population of the kingdom as a whole was steadily going down, but the population of Honolulu, Lahaina and Hilo was growing.

We believe that Kuykendall's observation was most likely the demographic pattern at the Kalepolepo entrepot, a hub of early historic activity for Kīhei and eventually all of Kula Moku (Kolb et al. 1997:69), located approximately one mile to the south of the current project area. The development of Kalepolepo as an entrepot and a focus of Christian life in the 1840s and 1850s most likely increased the population in the immediate vicinity above the pre-contact population figures, contrary to the island-wide trend of depopulation. That the population and areal extent of the Kalepolepo community reached its zenith during the mid 1800's appears to be supported by Kolb (*et al.* 1997:68):

> The ancient village of Kalepolepo was relatively small, and was built around an economy primarily based upon the exploitation of ocean resources--primarily the excellent fishing grounds as well as three large fishponds. However, as the number of visiting ships increased, Kalepolepo soon became an important provisioning area. By 1850 we know that the economic opportunities were attracting a number of European entrepreneurs.

In 1820, the whaling industry was introduced in Hawai'i. Although the whaling trade centered on Lahaina, mainly affecting the Kula/Kīhei area through agricultural demands, Clark (1980:47) notes that "From the 1840s to the 1860s a small whaling station was maintained at Kalepolepo [Kīhei]." The introduction of whaling to the Maui community brought with it an increased demand for foodstuffs and in particular the long-lasting Irish potato. After 1830, dryland agriculture in the old Kula District expanded with a focus on Irish potato cultivation. The California Gold Rush of 1849 further intensified the demand as a California-Hawai'i potato trade began to flourish. Kula became the area of highest potato production and was known as "the potato district" (the area between 2000 and 5000 ft. amsl). During this time period sugar cultivation and ranching were established in the Kula region. Sugar was present prior to 1846, with six sugar producers operating on the slopes of Haleakalā (Wong Smith in Brown and Haun 1989:C-7). As Wong Smith points out (Brown and Haun 1989: C-6), ranching was present in the area prior to the 1840s. Much of the produce, sugar and livestock moved down the Kalepolepo and Kekuawaha'ula'ula Trails to the landing at Kalepolepo, just south of the project area. Donham (1992:5) notes that the inundation of land clearing and cultivation associated with the Gold Rush resulted in "deforestation [which] adversely affect[ed] the amount of rainfall in the district, and periods of drought became more common."

Around 1849 John Halstead built the Koa House at Kalepolepo in Kīhei. The building, part store and part residence, thrived on both the trade of the whaling industry and the then thriving potato industry. During the Gold Rush years, the store became "an emporium for Irish potatoes" and served as a gathering place for the whaling sailors. David Malo created a balance for the boisterous whaling crowd by constructing the Kilolani Church at Kalepolepo around 1852. Potato production thrived in Kula from 1830-1850 until successful potato cultivation and production in California and Oregon resulted in a decline in the Hawai'i trade (Burgett and Spear 1995:6-7). Halstead ran his store until 1876, closing shop when the potato industry diminished and moved to Ulupalakua (Janion 1977:25-31).

4.2.4 Mid- to late-1800s

The most significant change in land-use patterns and allocation came with The Great Mahele of 1848 and the privatization of land in Hawai'i. This action hastened the shift of the Hawaiian economy from that of a subsistence-based economy to that of a market-based economy. During the Mahele, all of the lands in the Kingdom of Hawai'i were divided between *mō'ī* (king), *ali'i* and *konohiki* (overseer of an *ahupua'a*), and *maka'āinana* (tenants of the land) and passed into the Western land tenure model of private ownership. On March 8, 1848, Kauikeaouli (Kamehameha III) further divided his personal holdings into lands he would retain as private holdings and parcels he would give to the government. This act paved the way for government land sales to foreigners, and in 1850 the legislature granted resident aliens the right to acquire fee simple land rights (Moffat and Fitzpatrick 1995: 41-51).

Native Hawaiians who desired to claim the lands on which they resided were required to present testimony before the Board of Commissioners to Quiet Land Titles. Upon acceptance of a claim the Board granted a Land Commission Award (LCA) to the individual. The awardee was then required to pay in cash an amount equal to one-third of the total land value or to pay in unused land. Following this payment, a Royal Patent was issued that gave full title of ownership to the tenant. But by 1850, the government of Hawaii was offering land for sale to both Native Hawaiians and foreigners. Such lands were referred to as Royal Patent Grants or as Grants.

A total of 13 land commission claims were made in Pūlehu Nui and nine were awarded (Table 2). A portion of the 1889 Monsarrat and Dodge map of Kula shows that this area was awarded to Keaweamahi as a part of LCA 5230 and supporting testimony given to the land commissioners indicate that the land of Pulehu (Pūlehu Nui) was given to Keaweamahi by the King in 1843 and never disputed (Waihona 'Aina 2000). The testimony given by Kaauwai and Kaiakekaua additionally maintained that there were a great many natives that lived within the *ahupua'a* of Pūlehu Nui (Waihona 'Aina 2000). As indicated in Table 1, the majority of the lands that were awarded were *kula* lands used for potato (both sweet potato and Irish potato) cultivation and primarily located along the upper elevations of Kula Moku. Only one land claim, made by Kapono (LCA 9018), made mention of fishing rights and access to a *loko*. Land commission claim # 9018 was not awarded.

Table 2. Land Commission Awards Within Pulehu Nui Ahupua'a

LCA	Royal Patent Number	Claimant	Award Type	Acreage
0327B	7691	Preveer, John	Apana	6.03
9671	2202	Kekahuna	2 kula, 1 Irish potato	5.78
9019	6330	Helehua	3 kula	9.08
4672	6560	Poonui	6 kula, 3 sweet potato plots, 1 Irish potato	4.09
9672	5190	Napoko	2 kula, 3 Irish potato	12.56
9673	6329	Lonoaea	2 kula	4.06
8866	5168	Kaniho and Pakeau	2 kula, 1 house lot, 1 mala of Irish potatoes	14.9
4567	7484, 7896	Wahine	11 kula, 10 sweet potato	7896
5230	8140	Keaweamahi	ahupua'a	1668.78

By the time John Halstead closed shop in 1876, the boom years of Kalepolepo had passed. By 1880 the government survey of the Kula area showed the demarcation of only a few Land Commission Awards and who had received awards had replaced them with grants. Lower Kula consisted primarily of pastureland for ranching (Wong Smith in Donham 1990b:B-6). Kennedy (1992:7) notes that at this point *kiawe* was imported to feed cattle and provide wood.

Regarding the settlement at Kalepolepo and the impact of the changes associated with the change to ranching on the general area known as Kīhei, Clark comments:

> Halstead finally closed his store in 1876, as demands for his goods had steadily decreased, and moved to Ulupalakua . . . By this time the once thriving Hawaiian village at Kalepolepo had been almost totally abandoned as well. The slopes of Haleakala had gradually become denuded of their forests and torrential rains had caused heavy soil runoffs into the Kalepolepo shoreline. Cattle had trampled down the brush and grassy fields, causing sand dunes to drift and fill up the pond. Clouds of dust filed the air instead of cooling winds. Except for a handful of fishing families, Kalepolepo (and likely the Kīhei area in general) was deserted. (Clark 1980:48).

Sugar would soon fill the void and in 1898 the Kīhei Plantation Company (KPC) was founded. The KPC began sugar operations in Kīhei and the plain above.

4.2.5 Early to Mid-1900s

The Kihei Plantation Company, Ltd. was organized late in 1898 with a capitalization of 60,000 shares at $50 par value. Water was the most critical component in the decision to locate sugar cultivation along the leeward shores of Maui's arid coastline. The discovery of an ample supply of irrigation water early in 1898 led to the drilling of a large, successful well, but the supply of water was limited (Stearns 1942). Over the next four years, two ditches were

developed to supplement the water needs of the 4,873 acres of sugar under cultivation at Kīhei (Gilmore 1936).

The history of the Kīhei Plantation Company begins with the annexation of the Hawaiian Islands by the United States in 1898. With annexation came political stability for Hawai'i. Sugar prices were rising due to the outbreak of war between the United States and Spain over the colonies in Cuba, Puerto Rico and the Philippines. Henry P. Baldwin, of the Maui plantation of HC&S, entered into a partnership with O'ahu businessman Benjamin F. Dillingham to convert Lorrin A. Thurston's landholdings in Kīhei into a sugar enterprise.

Up to that time, sugar cultivation within the central isthmus of Maui was centered around the main towns of Wailuku and Kahului. Water tunneled from springs in the West Maui Mountains flowed through ditches in Wailuku to irrigate fields as far away as Mā'alaea. Water from the windward rain belt of Kailua ran through a network of ditches from East Maui to Pā'ia, to irrigate fields in Pu'unēnē.

The McCandless Brothers drilled a successful Maui-Type well (U.S.Geological Survey Well 14 / Hawaiian Commercial & Sugar Well K1) in 1899. It was located just inland from the coast in North Kīhei, between Keālia Pond and the Waiakoa Homestead Lands. This well was drilled vertically to approximately 60 feet through the Honomanū basalts, and tunneled laterally over 1,500 feet in order to skim 10 million gallons of fresh irrigation water per day from sources beneath the Kīhei plains (McCandless 1936).

The Kihei Plantation Company had the McCandless Brothers drill two or three additional Maui-Type wells on the north side of reservoir K2 at the discharge end of the existing pipeline of Well 14. The plantation in Kīhei failed in 1908 before the well site was able to be developed. It would have been named the HC&S K2 well, and would have included a large pumping station (Stearns 1942).

The plantation company in Kīhei built bridges to span streams and gulches flowing through the company fields. The plantation had planned the construction of a mill in North Kīhei, and ordered a plant to be built. It was decided that the new HC&S mill under construction at Pu'unēnē would have more than enough capacity to mill all the cane from the Kīhei fields. The order for the mill was transferred to the 'Ōla'a Sugar Company in Hawai'i, in exchange for a supply of steel rails for new railway requirements at Pu'unēnē. A large scale Kona storm hit the plantation on November 15th, 1900, and caused immense damage to both Kīhei and the HC&S fields in Pu'unēnē (Dean 1950). Bridges were knocked out, buildings were flattened, and washouts filled irrigation ditches with silt. Repairs were effected immediately, with the new HC&S mill at Pu'unēnē commencing operations January 29, 1902.

4.2.5.1 Railway Operations

The Kihei Plantation Company planned to construct a railway to move their cane. The sugar agency of William Dimond & Company placed an order for a locomotive from the Baldwin Locomotive Works in Philadelphia. The order was placed April 1899, and the plantation locomotive "Haleakala" was built and sent on to Maui (Conde 1973).

By March of 1900, the first annual report of the Kihei Sugar Company stated, "It was our intention to complete the main [rail]road only as far as Camp #2, or for about 2 miles, but as the

development of Camp #3 required pushing on of the road one and a half miles further, this has been done, having been completed the 15th of February." An additional six miles of track connected the Kīhei wharf to the various well pumping stations, and north to meet up with HC&S track (Conde and Best 1973). Establishing the railroad at Kīhei made it possible to harvest and transport over two thousand tons of sugar in a single year (Dean 1950).

The laying of the railroad and the cultivation of the sugar cane was performed primarily by Japanese field labor (Figure 7). Kīhei's plantation Camp #1 was set up inland of the Kīhei wharf and mooring pier. Two stables and a plantation store were located at Camp #1. Hospital services were provided by HC&S in Pu'unēnē. Kīhei Camp #3 was located 2 ½ miles north of Kīhei Camp #1 at Kolaloa Gulch, along the North Kīhei line of the HC&S railroad (Figure 8).

The 3-foot gauge track for the Kihei Plantation Company railroad was built to the same specifications as the railway linking the HC&S mill at Spreckelsville to its fields; and to the sugar warehouses at the Kahului wharf. By 1902, with the new Pu'unēnē mill completed, a new milling contract with HC&S provided that all cane loaded by the Kihei Plantation Company was to be ground and manufactured into sugar by HC&S.

4.2.5.2 Water Source Development

The Lowrie Ditch project, named for former HC&S manager William J. Lowrie, brought an additional source of water to the Kīhei plains. His plan was to begin the ditch at the Pāpa'a'ea Reservoir, at the 1,000 ft. elevation, and maintain a four-foot drop per mile following the ditch's initial plunge from the Kailua reservoir. Steep mountain gulches were traversed using the force of the constant weight of water flowing in a series of siphons. The Halehaku Gulch, at 250 feet deep, and the Māliko Gulch, at over 350 feet deep, were both crossed by giant siphons fabricated of three-eighths-inch iron, and set in place by Japanese laborers. At a weir located above Pā'ia, the allocation of water began. The first tenth of the water flow in the Lowrie Ditch was divided out to the Pā'ia Plantation (an 11/20ths share) and the Haikū Plantation (a 9/20ths share). The distance traveled, from Kailua to the plantation's Kīhei boundary, was 21.9 miles (Thrum 1900).

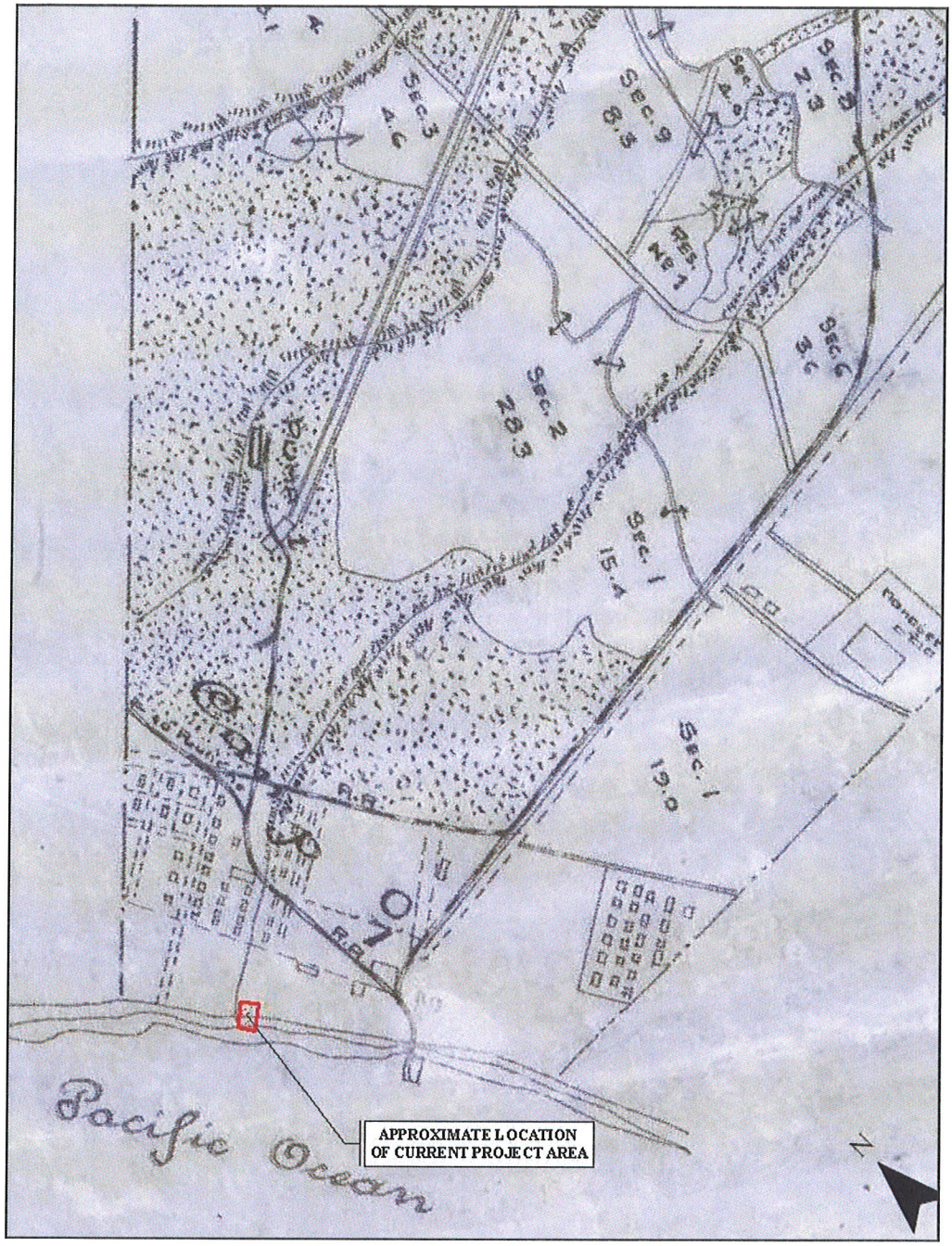


Figure 7. Shoemaker Kihei Plantation map (1907) with project area shown in red

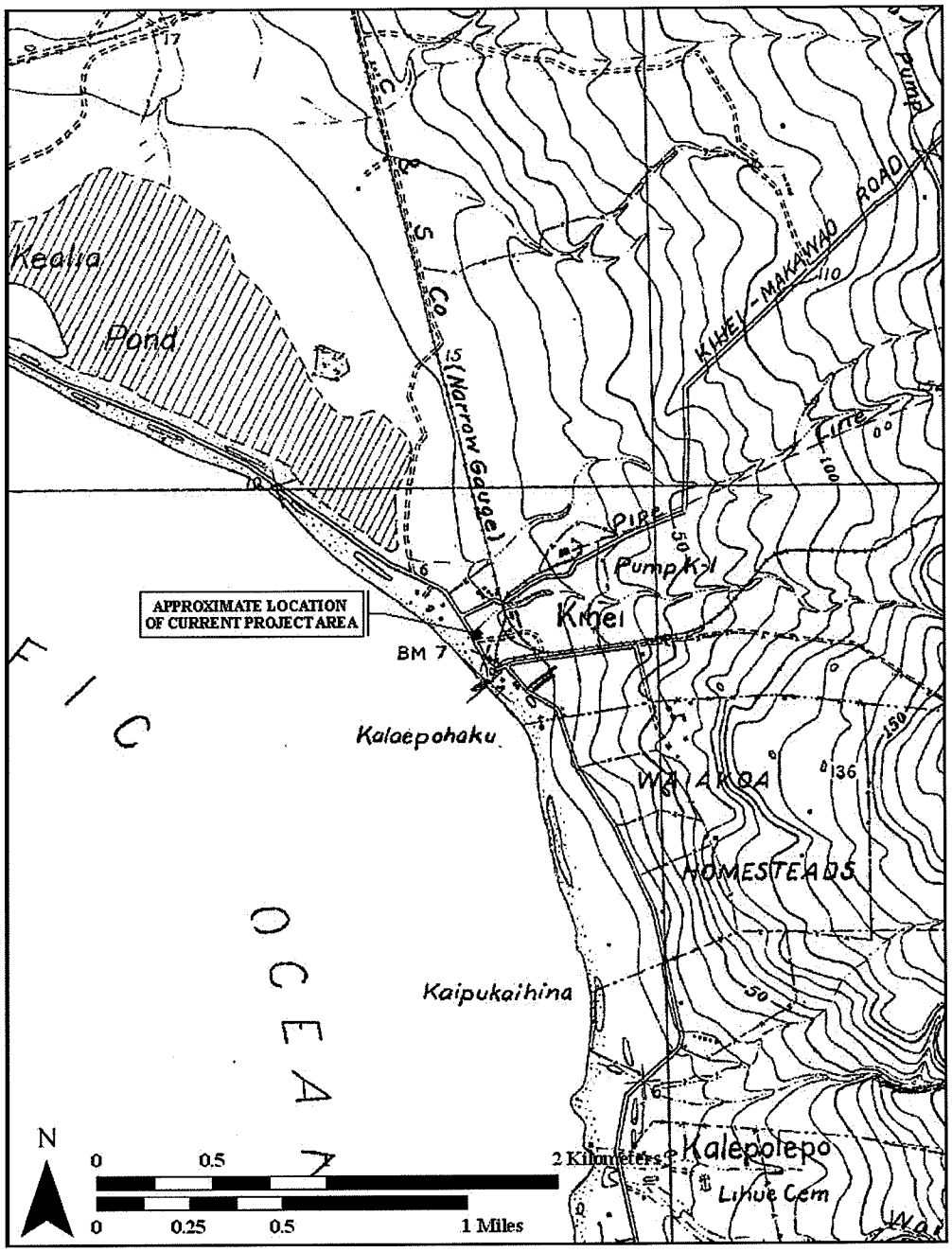
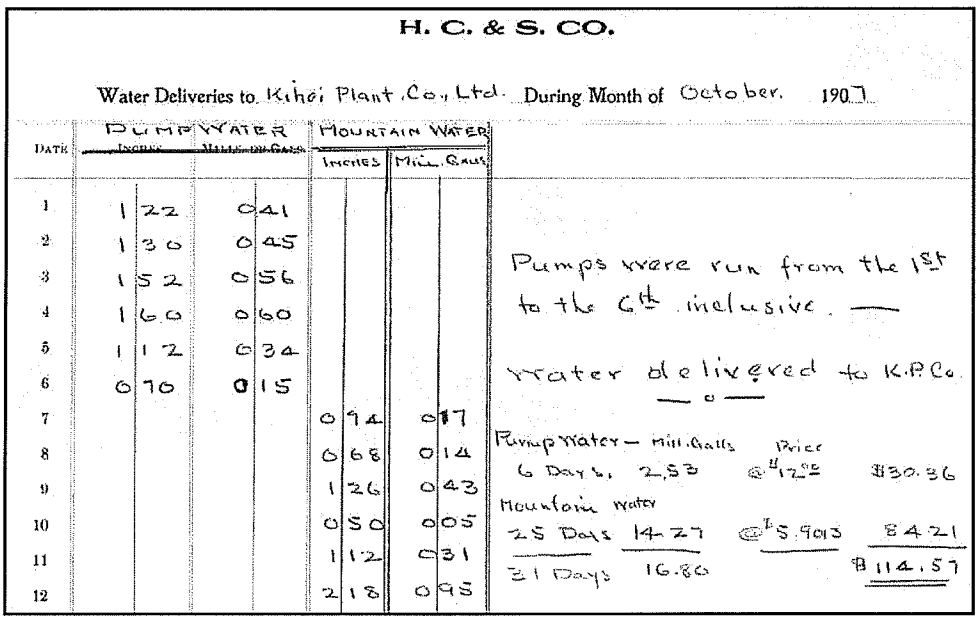


Figure 8. A portion of the 1922 USGS Map, Kihei Quadrangle showing location of current project area in relation to the railroad to Kīhei

More water was required, both from wells and from the East Maui water shed. The manager for the Kihei Plantation Company, W.F. Pogue, asked the management of HC&S for an even larger allocation of water for the Kīhei lands. In 1901, Samuel T. Alexander ordered the construction of a new ditch, tapping the water sources from Nāhiku to Honomanū. It was determined that the Kihei Plantation Company would receive 2/9^{ths} of the capacity from the enterprise (See Figure 9) (Dean 1950).



H. C. & S. CO.

Water Deliveries to. Kihei Plant. Co., Ltd. During Month of October. 1907

Date	Pump Water Inches	Pump Water Mill. Gals.	Mountain Water Inches	Mountain Water Mill. Gals.
1	122	041		
2	130	045		
3	152	056		
4	160	060		
5	112	034		
6	070	015		
7			094	017
8			068	014
9			126	043
10			050	005
11			112	031
12			218	095

Pumps were run from the 1st to the 6th inclusive. —

Water delivered to K.P.Co.

— o —

	Mill. Galls	Price	
Pump Water — 6 Days.	2.53	@ $12.00	$30.36
Mountain Water 25 Days	14.27	@ $5.9013	$84.21
31 Days	16.80		$114.57

Figure 9. A portion of an accounting statement for water delivered to the Kihei Plantation Company in 1907.

The Kihei Plantation Company failed to live up to the expectations of its promoters with an inadequate water supply as the key difficulty. With the waters of the Ko'olau Ditch flowing to the Kīhei fields, production appeared to have hit its peak. Although 5,609 tons of sugar was delivered in 1903, high costs required a change of managers in Kīhei, and a reduction of the HC&S milling charge to $7 per ton. The incoming HC&S manager, Frank Fowler Baldwin, determined that the best course of action was to buy out the company for $375,000 (Conde 1973).

In 1908, the lands of the Kihei Plantation Company were divided up between five new major business entities of HC&S. The Kahului Railroad, which had already been absorbed by HC&S, acquired the rail lines to Kīhei and the rolling stock of the plantation. The Kailua Plantation Company (994 acres), the Kalialinui Plantation Company (923 acres), the Kula Plantation Company (996 acres), the Makawao Plantation Company (982 acres), and the Pulehu Plantation Company (978 acres) acquired the remaining acreage not included in the railroad right-of-way. Water rights reverted to HC&S, and were reapportioned between the new plantations. Sugar operations continued in North Kīhei until circa 1968, when HC&S leased lands to a corn research farm.

4.2.6 Modern Land Use

Beginning in the 1960's, development of the project area shifted from sugar plantation and related railroad operations to vacation condominium development. Between 1970 and 1996 vacation rental units increased from 2,641 to 17,442. The leeward coasts, including Kihei, became popular tourist destinations (Juvik 1998:14). Today, the Kihei Beach Condominium is located to the south of the project area and the Sugar Beach Resort is located to the north of the project area. The project area is also near the Mokulele-Pi'ilani Highway junction, a main roadway junction in South Maui. The existing drainageway and associated culverts due for repairs are along Waiakoa Gulch, one of the major drainages of East Maui.

4.2.7 Waiakoa Stream and Gulch

As a natural drainage, and as the soils of the area illustrate (see Section 2.3.1 Natural Environment), Waiakoa Gulch has experienced natural periodic flooding events throughout history and into the modern era. Like the storm on November 15th, 1900 (see Section 4.2.5 Early to Mid-1900s), a similar event occurred in Jan of 1971 causing major damages in Kihei, Paukukalo and Paia. Descriptions of Kihei from the Jan 30th Maui News article titled, "*Storm Damage Heavy In Paia, Paukukalo, Kihei Communities,*" included reports of water rushing down the hillside, breaching diversion ditches, and undermining sections of Kihei Road, particularly near the Mokulele Highway Intersection. The article goes on to state that residents of Waiakoa and Ulupalakua were without water as a result of breaks in a water line (Maui News 1971). Mr. Robert Hill, a longtime resident of Kihei, remembers this storm and specifically recalls the culvert located in the project area being completely washed out by heavy floodwaters (personal communication May 22, 2012).

More recently there have been three major flooding episodes since 2007. All the flooding events were the result of winter storms which occurred in early December 2007, late December 2010, and January 2011. In all instances, flood waters from the *mauka* reaches of Waiakoa Gulch, overwhelmed the drainage culvert that is the subject of the currently proposed project. Flood water volume coupled with debris that blocks the culvert and prevents water from draining into the ocean, has caused major overflowing and subsequent flooding of surrounding roads and condominiums (Maui News 2011; Tanji 2007, 2011a, b; 2010).

4.3 Previous Archaeological Research

The majority of archaeological reconnaissance and inventory surveys in the North Kīhei area (Figure 10 and Table 3) have produced relatively little significant information in the way of archaeological data. While this may be due in large measure to changes on the land associated with sugar cane cultivation, ranching, and military use, as well as resort and housing construction, it still seems inescapable that there are only few areas in the Hawaiian Islands abutting sandy beaches that have less in the way of documented Hawaiian cultural deposits than Kīhei. Archaeological projects in the vicinity identified both pre-contact and post-contact site types. Many of which were associated with the sugar plantation era and plantation Camps, ranching and WWII periods in history. Pre-contact archaeological sites including dry stacked basalt walls, alignments, possible burial mounds and sites associated with traditional Hawaiian agriculture have also been discovered in the vicinity surrounding the project area.

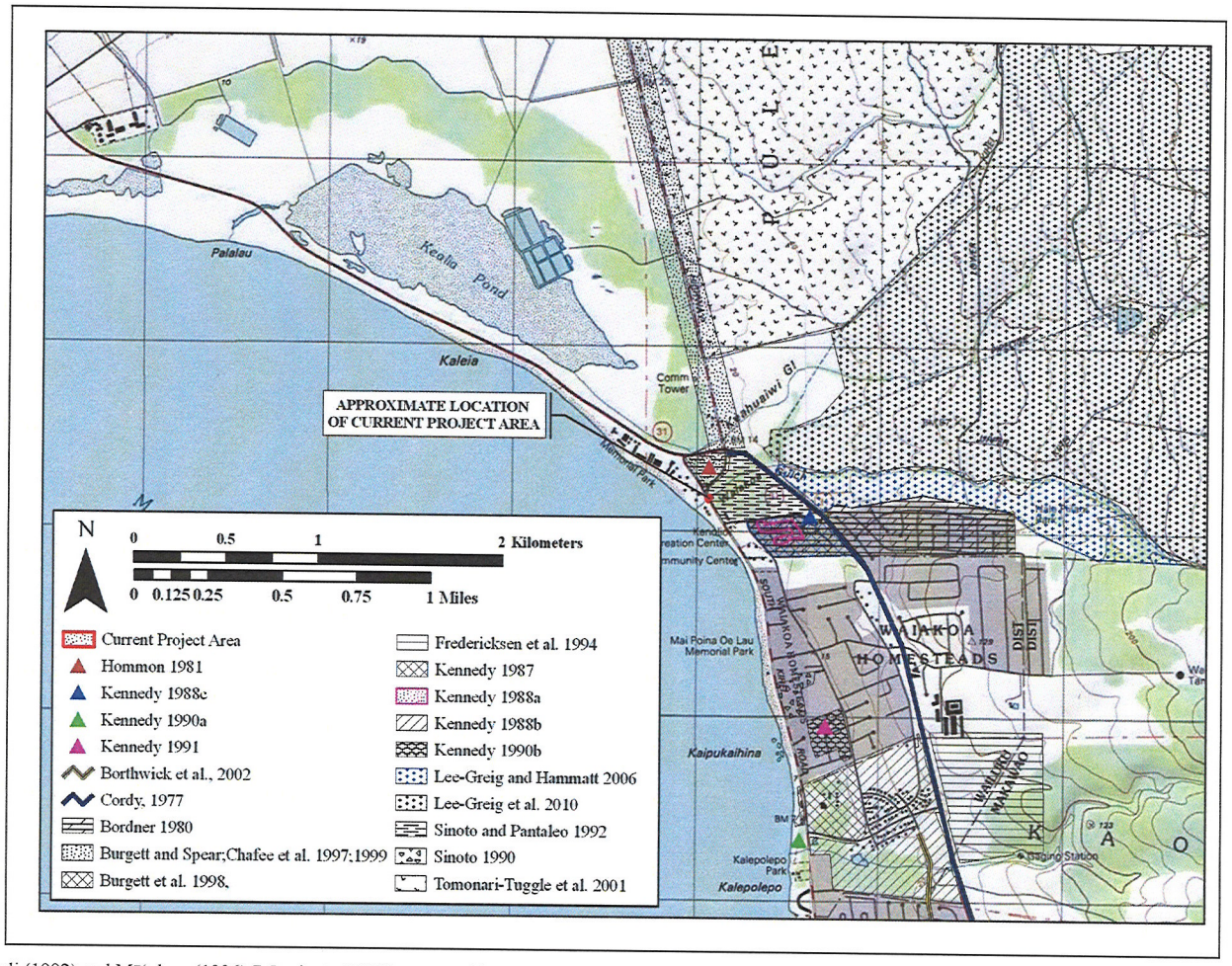


Figure 10. Portions of the Pu'u o Kali (1992) and Mā'alaea (1996) 7.5-minute USGS topographic quadrangles, showing the current project area relative to adjacent areas of previous archaeological study.

Table 3. Previous Archaeological Studies

Date	Ahupua'a	Nature of Study	Findings
(Cordy 1977)	Pūlehu Nui to Paeahu	Reconnaissance	Identified 38 sites: 30 in Waiohuli, 0 in Ka'ono'ulu, and 8 in Kēōkea
(Bordner 1980)	Pūlehu Nui	Inventory Survey	Identified historic era markers, remnant alignments, a stone wall, and a mound with an upright slab
(Hommon 1981)	Coastal Waiakoa	Reconnaissance	No archaeological findings
(Neller and Keau 1981)	Ka'ono'ulu	Reconnaissance	Finds include two historic sites and a platform of indeterminate function. Further archaeological data recovery was recommended.
(Kennedy 1987)	Coastal Pūlehu Nui	Inventory Survey	Kihei Villages Condominium site; six pre-contact Hawaiian sites which included an ahupua'a boundary wall 300m long, two rock mounds, one upright stone, series of low parallel rock alignments associated with sweet potato cultivation, large possible burial mound/dune.
(Kennedy 1988b)	Coastal Ka'ono'ulu	Reconnaissance	No archaeological findings
(Kennedy 1988a)	Pūlehu Nui	Monitoring Report	No archaeological findings
(Kennedy 1988c)	Pūlehu Nui	Reconnaissance	No archaeological findings
(Riford and Cleghorn 1989)	Pūlehu Nui	Archaeological Assessment	No archaeological findings
(Kennedy 1990b)	Coastal Waiakoa	Survey	No archaeological findings
(Sinoto 1990)	Coastal Waiakoa	Survey & Testing	No archaeological findings (other than two pieces of midden)
(Kennedy 1990a)	Ka'ono'ulu	Monitoring Report	
(Kennedy 1991)	Coastal Waiakoa	Field Inspection	Inadvertent burial find
(Sinoto and Pantaleo 1992)	Coastal Pūlehu Nui	Inventory Survey	No archaeological findings other than a bridge foundation (site - 3131)
(Fredericksen, et al. 1994)	Ka'ono'ulu, *mauka* of Pi'ilani Highway	Inventory Survey	21 sites were identified, some military and some pre-contact
(Chaffee, et al. 1999)	Pūlehu Nui and Wailuku	Addendum II Inventory Survey	No archaeological findings
(Burgett and Spear 1997)	and Wailuku	Inventory Survey	No archaeological findings

Date	Ahupua'a	Nature of Study	Findings
(Tomonari-Tuggle, et al. 2001)	Pūlehu Nui	Archaeology, Architecture, Oral History	This study documented the existing sites and features of NAS Pu'unene, cattle ranching operations, the remains of pre-war Camp 6, the HC & S sugar plantation, and the Kīhei railroad line.
(Borthwick, et al. 2002)	Waiohuli	Inventory Survey	No archaeological findings
(Lee-Greig and Hammatt 2006)	Pūlehu Nui	Inventory Survey	Document Site 50-50-09-5744, remnant Kihei Railroad trestle re-furbished for use as a water flume, and Site 50-50-09-5745, historic water well
(Lee-Greig, et al. 2011)	Pūlehu Nui	Inventory Survey	Documentation of 90 historic properties associated with the sugar plantation, ranching and WWII periods in history.

Cordy (1977) identified a total of 38 single component and multi-component archaeological sites within the then proposed Pi'ilani Highway road corridor. Bordner (1980) conducted an archaeological investigation southeast of the present project area and identified primarily historic era properties. Bordner's study area covered the residential subdivision currently known as the Hale Pi'ilani Subdivision located *mauka* or west of the Pi'ilani Highway, as well as a section *makai* or east of the Pi'ilani Highway that was later developed into the Kihei Villages Condominium Complex. During the course of the inventory survey, Bordner relocated SIHP Nos. -0219, -0220, and -0221, originally identified by Cox (1976), as well as six new historic properties within the *mauka* section of the study area. The six new sites consisted of historic era *ahu,* two remnant alignments of an indeterminate age, a historic stacked stone wall and an elongate basalt mound with an upright slab of an indeterminate age. Bordner reports no surface findings in the *makai* portion of the project area. In 1987, Kennedy revisited the *makai* portion of the Bordner project area in anticipation of the Kihei Villages development and identified six new early Hawaiian pre-contact era archaeological sites. These sites consisted of a stacked *ahupua'a* boundary wall separating Pūlehu Nui and Waiakoa. This wall was approximately 300m long. Additionally the following sites were also recorded; two rock mounds, one upright stone thought to be associated with *kapu* system worship practice, a series of low parallel rock alignments attributed to sweet potato agriculture, and one large mound or dune with possible burials.

Sinoto and Pantaleo (1992) conducted an archaeological inventory survey of approximately 38.5 acres which included lands of the present project area near the former location of Kihei Camp One. Only one historic property, the remains of concrete footings from a bridge crossing Waiakoa Gulch, was recorded. Due to the considerable ground disturbances, which included several bulldozing events, Sinoto and Pantaleo did not undertake a subsurface testing program.

Tomonari-Tuggle and others (2000) conducted an intensive archaeological inventory survey of the area that encompassed the former location of NAS Pu'unene north of the present project area. This inventory survey resulted in the recordation a total of four multi-component archaeological complexes (50-50-09-4164, -4801, -4803, and -4800), as well as one single component site noted as the Kīhei Railroad Bed (SIHP -4802). SIHP -4164 consists of 165 features, all of which are associated with NAS Pu'unene. SIHP -4800 and -4803 were representative of the sugar plantation use of the central isthmus and consisted of seven plantation era features for the former site number and remnants of the Haiku ditch and reservoir (n=5) for the latter. Historic properties reflecting post-war ranching activities (SIHP -4801) were also recorded during the course of this inventory survey.

Xamanek Researches (Fredericksen, et al. 1994) conducted an inventory survey in Ka'ono'ulu Ahupua'a south of the current project area and east of Pi'ilani Highway. A total of 21 archaeological features reflecting pre-contact use of the area, as well as post-contact military and ranch use were recorded. The pre-contact or Early Hawaiian archaeological features included five stone piles possibly representing agricultural use, five surface scatters representing pre-contact temporary habitation, and one petroglyph. Military use of the area is represented by five stone cairns, three alignments, and one enclosure. A single feature, interpreted as an erosion containment area, was recorded in association with ranching activities.

North of the project area, Chaffee and others (1997) identified three historic properties that were interpreted as agricultural features. Further south of the current project area Kennedy (1991) preformed a field inspection for an inadvertent burial find.

Cultural Surveys Hawai'i (CSH) conducted an archaeological inventory survey east of the current project area and covering approximately 93-acres in the southernmost section (Lee-Greig and Hammatt 2006). A total of two historic era archaeological sites was identified during the course of this study. Both historic era properties were likely originally associated with the Kihei Plantation Company and the early sugar venture in the North Kīhei area. Based on the construction technique of SIHP 50-50-09-5744, and the considerable attention apparently paid to the reinforcement of the abutments and piers, it was evident that a significant amount of cost, time, and effort went into the initial construction of the bridge components (Lee-Greig and Hammatt 2006:34-40). Sinoto and Pantaleo (1992) recorded the remains of a similar structure, 50-50-09-3131, during an inventory survey of a parcel covering the mouth of Waiakoa Stream very near the current project area, and postulated a railroad/transportation function. SIHP 50-50-09-5745 was interpreted as an early historic to historic era open hand-dug well recorded in a portion of HC&S Field 20 (Lee-Greig and Hammatt 2006:41-42). In an archaeological survey of 3165 acres in Pūlehu Nui, northeast of the current project area and extending *mauka*, Lee-Greig (2011) documented 90 historic properties associated with the sugar plantation, ranching and WWII period.

Until recently, the few available radiocarbon dates from the Kīhei area were consistent in their rather broad, later prehistoric age determinations, most commonly post A.D. 1500 (Fredericksen, et al. 1993; Fredericksen and Fredericksen 1995a, b). This fits with the model that the more intensive use of the Kīhei area was a later pre contact development that corresponded with the expansion of upland permanent habitation, ceremonial constructions, and agricultural clearing after A.D. 1400-1500 (Kolb, et al. 1997:281-282).

Without a doubt, coastal habitation along with more populous inland/upland settlement was firmly established by A. D. 1400-1500. The majority of permanent habitation would have been in the uplands, concentrated in the well-watered and fertile agricultural areas. Coastal permanent habitations were likely less numerous and centered on the ceremonial structures and fish ponds at Kalepolepo. While the fish ponds of the Kula coastline are thought to date to the 1500s (Kolb et al. 1997:66), the chronological timeline for initial settlement of the Kīhei area is still under debate. Based on the results of relatively recent studies (McDermott 2001; McDermott, et al. 2000), habitation in the coastal areas may date to as early as A.D. 600-900. Evidence of earlier coastal habitation in the Kīhei area has recently come to light at excavations adjacent to the site of the Kalepolepo Church. Cultural layers described in the work of McDermott and others (2000) and McDermott (2001), in conjunction with those of Pepalis and Kolb (2002), provide some evidence in the form of charcoal concentrations, midden deposits, 14C dates, and palynomorph identification, that settlement in the vicinity of an inland pond feature had occurred by circa A.D. 600-900.

4.4 Background Summary and Predictive Model

Previous archaeological studies have led to archaeological site interpretation based on the division of the settlement pattern for Maui into three zones: 1) coastal; 2) barren or transitional; and 3) Inland (Cordy 1977; Cox 1976; Walton 1972). The coastal zone is an approximately one-fourth of a mile wide band running along the shoreline. The inland zoned begins approximately five to seven miles from the shore and is characterized by larger rainfall accumulation and more lush vegetation. The transitional or barren zone is classified as the area between the edge of the coastal zone and beginning of the inland zone and characterized by brush/scrub vegetation and low annual rainfall accumulation.

Based on available archaeological evidence and interpretations, and as a result of the settlement pattern, site types expected for coastal zones, where temporary habitations related to marine exploitation may be present may include stacked-stone enclosures, and possibly smaller ceremonial structures, such as stacked-stone fishing shrines. It is possible that human burials would have been interred in the coastal sand dunes where present.

With that said, the current project area has experienced extensive and prolonged ground disturbances as a result of 100 plus years of sugar cane cultivation and due to the effects of periodic flooding events. Flooding events have required the dredging and clearing of debris and heavy sedimentation from Waiakoa Gulch which further disturbs the soils in the area. As a result of the heavy disturbances caused by both sugar cane cultivation and the clearing of flood debris from the gulch, the area has be heavily disturbed and the likelyhood of locating intact cultural deposits or archaeological remains would be low.

Due to the proximity of the project area to the Kīhei Camp#1 site, there may be a possibility for other plantation camp cultural material to be present as this camp was located northeast of the project area. In their archaeological inventory survey (1992) Sinoto and Pantaleo recorded one historic property in the vicinity of the current project area, State Site #50-50-09-3131. State Site #50-50-09-3131 is a historic concrete bridge footing, likely related to Kīhei Camp#1 or the railroad. This site is located along the Waiakoa Gulch and no further work was recommended for this site. Additionally, because of the coastal location, human remains could be present in sandy deposits of the project area. Historic properties associated with early plantation infrastructure (e.g. water control features and transportation features), as well as ranch activities (e.g. animal husbandry walls or corrals), are also probable.

Section 5 Results of Fieldwork

5.1 Field Inspection Findings

An archaeological field inspection was conducted by archaeologist Colleen P. Medeiros, B.S., under the general supervision of Principal Archaeologist Hallett H. Hammatt, Ph.D., on May 01, 2012. The project area is the Waiakoa drainageway located at the mouth of the Waiakoa Stream. As described above (see Section 4.2.5 Early to Mid-1900s) the lands surrounding the Waiakoa Stream in this area had been heavily modified by sugar plantation activities, namely the occupation of Kīhei Camp #1 from approximately 1899 into the 1960's. In recent history the area has been transformed by the development of vacation condominiums along the shoreline and today the project area sits immediately between the Kihei Beach Condominium, to the south, and the Maalaea Surf, to the north (Figure 5, Figure 11, and Figure 12).

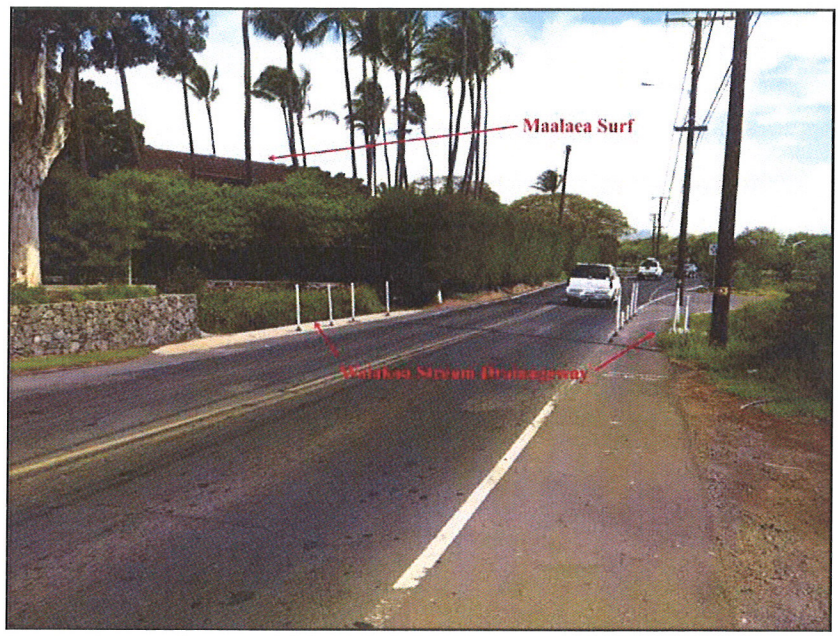


Figure 11. South Kīhei Road view north toward the Maalaea Surf

Figure 12. South Kīhei Road view south, toward the Kihei Beach Condominium

A rock wall exists on the southern boundary of the Maalaea Surf Condominium (also the northern bank of the Waiakoa Stream) (Figure 13). This wall appears to consist of a primary wall with a secondary wall, which appears to be a recent addition, built on top of it. Likely constructed in conjunction with the Maalaea Surf, analysis of aerial photos of the area indicates a construction timeframe of between 1963 and 1975 (Figure 14 and Figure 15). The 1963 aerial shows that the Maalaea Surf was not yet constructed and there appears to be no visible evidence of a wall, whereas the 1975 photo shows the Maalaea Surf fully constructed with a wall in place. Based on wall construction materials coupled with the photographic evidence, it has been determined that this wall is less than 50 years old and therefore not eligible as a historic property. Research regarding the age of the concrete culvert and associated Waiakoa drainage construction was also conducted. Through storm documentation (see Section 4.2.7 Waiakoa Stream and Gulch), construction materials and personal communication with Mr. Robert Hill, it was found that the culvert that is the subject of the proposed project was likely replaced, repaired or otherwise altered since 1962, and therefore not a historic property.

Figure 13. Waiakoa Stream and drainageway showing both northern and southern banks of the stream, view west.

Figure 14. Aerial photo of the project area circa 1963 showing the undeveloped Maalaea Surf lot. Rock wall is not present in this photo (SOEST 2012)

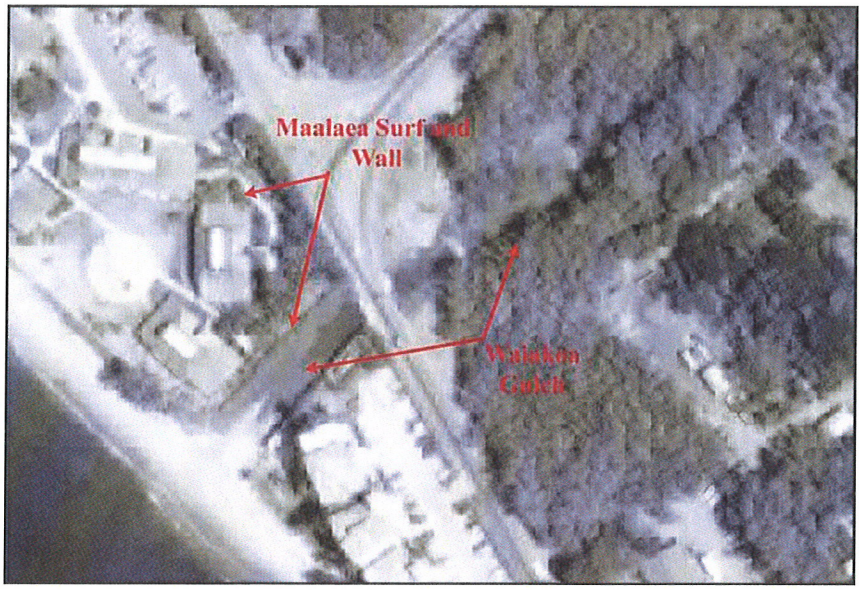


Figure 15. Aerial photo of the project area circa 1975. Maalaea Surf has been constructed and rock wall is visible (SOEST 2012)

At the time of the field inspection there was standing water in the stream. Along the stream banks on the northeastern side of the drainage vegetation includes *akulikuli* (*Sesuvium portulacastrum*), *kiawe* trees (*Prosopis pallida*), Indian fleabane (*Pluchea indica*), and a single tree tobacco (*Nicotiana glauca*) and mangrove tree (*Rhizohpora mangle*) were observed (Figure 16). It is important to note that although tree tobacco is not an indigenous or endemic Hawaiian plant, it has become the host plant of the endemic Blackburn's Sphinx Moth (*Manduca blackburni*), which has been on the United States Fish and Wildlife Service endangered species list since 2000 . Although *M. blackburni* caterpillar, eggs or chrysalis were not observed on the tree tobacco plant, some of its leaves had been eaten.

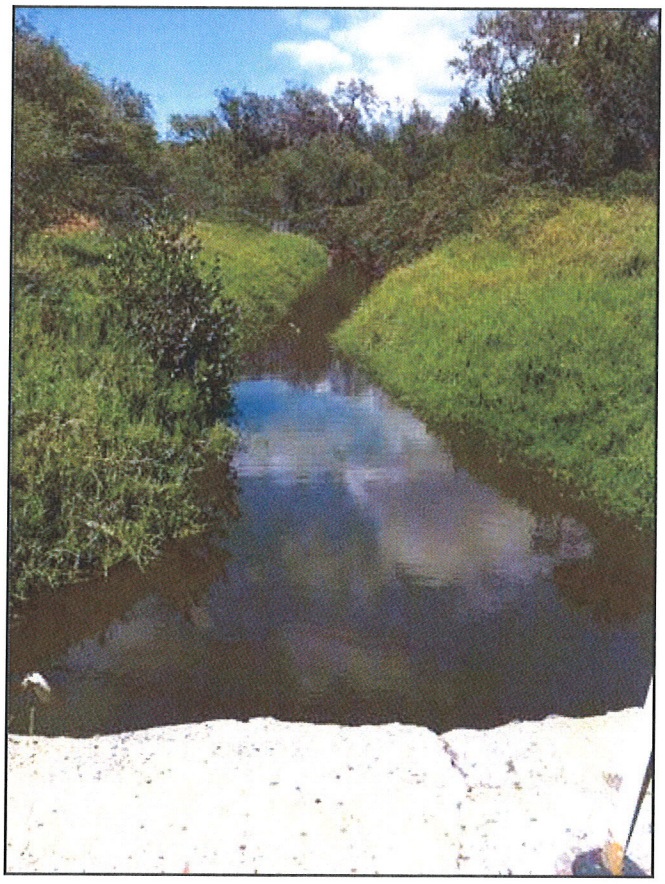


Figure 16. Waiakoa Stream from South Kīhei Road, view northeast

On the western, or *makai*, side of the drainage, the southern stream bank has been modified with erosion control material consisting of a gunite casting holding the soil in place, and therefore no vegetation was observed growing there. The condominium landscaping extends up to the stream banks (on the western, or *makai*, side of the drainage) where fencing and a rock wall delineate their property lines. On the northern stream bank vegetation includes *akulikuli* (*Sesuvium portulacastrum*) and *pōhuehue* (*Ipomoea pes-caprae subsp. brasiliensis*) (Figure 13). The stream empties into the ocean on the western side of the drainage during heavy rains. There is evidence of damage to the existing culvert in the form of undercut from heavy rains and flooding (Figure 17).

At the time of the field inspection the steam was blocked by beach sand and it was not draining into the ocean. Where the ground surface was visible, soils appeared to be consistent with fill material consisting of asphalt, gravel, and coral fragments. There were no historic properties or cultural materials observed on the ground surface in the project area during the field inspection.

Figure 17. Existing culvert, Waiakoa Stream view southwest

Section 6 Summary and Recommendations

6.1 Summary

A review of the historic documentation indicates that not far from the current project area, great events of Maui's pre-history unfolded. It was at Kiheipuko'a that great chiefs such as Alapa'i and Kalani'opu'u of Hawaii Island landed, came ashore finding Kīheipūko'a (fronting Kealia Pond) an ideal canoe landing site. Alapa'i, who abandoned his plan for war, came ashore hoping to see the ailing Kekaulike, and Kalani'opu'u who landed his army of elite soldiers here, most of whom met their demise in the legendary battle, *Ahulau ka Pi'ipi'i i Kakanilua*, the battle in the sandhills of Kalua (Section 4.2.2 Traditional Accounts). As a result of its sheltered coast line, plentiful fishing resources and access to upcountry food resources, Kīhei then became a regular port for visiting ships. Soon after the time of Capt. Vancouver's visit in 1792, activities revolved around the Kalepolepo entrepot and thus became a major hub for Kīhei and Kula Moku. Kalepolepo housed a small whaling station and remained a busy port while the whaling industry in Hawaii was at its peak (Section 4.2.3 Early Historic Period). Simultaneously, during the mid 1800's, the *Mahele 'Āina*, the Great dividing of the land, began and introduced the private ownership of lands. The Great Mahele, as it was also called, transformed Hawaii's economy from one that was subsistence-based to a market-based economy and was a catalyst for major cultural shifts. Native tenants had the right to claim their *kuleana* lands and 13 such claims were made in Pūlehu Nui Aupua'a and nine of these were awarded (see Section 4.2.4 Mid- to late-1800s). With large tracts of land now available for purchase, lands throughout Hawai'i were purchased for use as sugar cane plantations. In 1899 the Kīhei Plantation Company (KPC) was founded and sugar cane dominated the lands surrounding the current project area from this time into the 1960's. Historically, Kīhei was a specific location, a narrowly defined spot fronting the current project area. The town of Kīhei was later founded as a result of both the whaling industry, then the sugar industry having used Kalepolepo (just south of the Kīhei local) as the main hub of early activity and commerce. Kīhei Town is now a popular vacation area and residential town.

In addition to the events and activities of human history impacting lands of the project area, natural flooding events associated with Waiakoa Gulch have also altered the project area over time. Kona storms, like the storm recorded on November 15th, 1900, have caused major damage to the Kihei area, specifically this study area. More recent storms have been documented by The Maui News, such as the one in January of 1971. Per a telephone conversation with longtime Kihei resident, Mr. Robert Hill, he recalls that this storm washed out the road and culvert at the current project area. More recently, there have been three major flooding episodes between 2007 and 2012, all of which were the result of winter storms which occurred in December 2007, late December 2010, and January 2011. In all instances, flood waters from the *mauka* reaches of Waiakoa Gulch, overwhelmed the current drainage culvert at the project area location and flood water volume coupled with debris, which blocks the culvert (and water from draining into the ocean) altogether, has caused major overflowing and subsequent flooding of surrounding roads and condominiums.

Therefore, the background research coupled with the results of the field inspection lead to the conclusion that the area has been heavily disturbed and modified by historic and modern activities as well as natural flooding events.

6.2 Potential Project Effect and Recommendations

Based on the field inspection findings and background research there is a low potential for the discovery of previously unidentified historic properties. Yet, while impacts of flooding episodes and modification associated with road construction and maintenance have greatly altered sediments of the project area, the possibility of encountering intact subsurface cultural deposits including human burials should not be underestimated. Because the project area is located in a region where sandy soils exist, there is a possibility for encountering pre-contact cultural deposits as well as human burials in intact sandy deposits. Additionally, Kīhei Camp #1 was located nearby and cultural materials associated with this historic plantation camp may also be encountered. Furthermore, an archaeological inventory survey was previously performed at the current project area by Sinoto and Pantaleo in 1992, and therefore archaeological monitoring for all ground disturbing activities is recommended in addition to close consultation with the Archaeological Branch of SHPD.

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APPENDIX E.

Archaeological Monitoring Plan for Drainage Repair on South Kihei Road

An Archaeological Monitoring Plan for Drainage Repair on South Kihei Road at the Waiakoa Drainageway Pūlehunui Ahupua'a, Wailuku District, Maui Island

TMK: (2) 3-8-013: 999 and 005-006 and (2) 3-8-077:009 and (2) 3-8-005:034 and 002

Prepared for

Munekyo & Hiraga, Inc.

DRAFT

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Management Summary

Reference	An Archaeological Monitoring Plan for Drainage Repair on South Kihei Road at the Waiakoa Drainageway, Pūlehunui Ahupua'a, Wailuku District, Maui Island TMK: (2) 3-8-013: 999 and 005-006 and (2) 3-8-077:009 and (2) 3-8-005:034 and 002 (Lee-Greig and Hammatt 2012)
Date	April 2012 (DRAFT)
Project Number (s)	Maui County Department of Public Works (DPW) Job No: 11-20 Cultural Surveys Hawai'i (CSH) Job Code: PULEHUNUI 9
Project Location	At the intersection of South Kīhei Road and Waiakoa Gulch, Pūlehunui Ahupua'a, Wailuku District, Maui Island TMK: (2) 3-8-013: 999 and 005-006 and (2) 3-8-077:009 and (2) 3-8-005:034 and 002. This area is depicted on the Ma'alaea USGS 7.5-minute topographic quadrangle.
Project Funding and Land Jurisdiction	Project Funding: Maui County Land Jurisdiction: Private and County
Agencies	County: Maui County DPW State: Department of Land and Natural Resources State Historic Preservation Division (SHPD)
Project Description	The proposed drainage repairs will include the installation of temporary culvert repairs by replacing the existing culverts within twin 10-foot x 3-foot box culverts. Other improvements will consist of inlet and outlet structures and a ford crossing over the box culverts.
Project Acreage	Approximately 0.15 acres
Project Related Ground Disturbance	Anticipated ground disturbance includes removal of the existing pavement to facilitate repairs, grubbing and grading associated with project site prep, and trench excavation associated with removal of existing culverts and installation of new culverts.
Historic Preservation Regulatory Context	This document was prepared to facilitate the proposed project's historic preservation review under Hawai'i Revised Statutes (HRS) Chapter 6E-8 and written to fulfill the requirements for monitoring plans as set forth in Hawai'i Administrative Rules (HAR) Chapter 13-279. This plan is intended for review and approval by the County and SHPD.
Historic Properties Potentially Affected	According to historical research and the results of previous archaeological investigations in the vicinity, excavations may encounter remnant cultural materials from the historic Kihei Camp 1 site, subsurface cultural deposits associated with pre-contact or early historic habitation and/or human burial remains.
Recommended Monitoring	Onsite archaeological monitoring for all project related ground disturbance.

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Section 1 Introduction

1.1 Project Background

At the request of Munekiyo & Hiraga, Inc., Cultural Surveys Hawai'i, Inc. (CSH) has prepared this Archaeological Monitoring Plan (AMP) for the proposed drainage culvert repairs located at the intersection of South Kīhei Road and Waiakoa Gulch in the Pūlehunui Ahupua'a, Wailuku District, Maui Island TMK: (2) 3-8-013: 999 and 005 and (2) 3-8-77:009 (Figure 1 and Figure 2). In 1992 Sinoto and Pantaleo performed an archaeological inventory survey that included lands of the current project area. One historic site, SIHP # 50-50-09-3131, remnant bridge footings from a bridge that crossed over Waiakoa Stream, likely associated with Kihei Camp #1 and/or the railroad, was recorded and no further work was recommended. Medeiros and Hammatt (In Press) conducted a Literature Review and Field Inspection (LRFI) for the current project area. SIHP # 50-50-09-3131 was not relocated as it was outside of the project area. Based on the findings of the LRFI monitoring of all ground disturbing activities was recommended.

The Waiakoa Stream and Gulch is one of several drainage channels of South Maui that experiences flooding during the heavy *nāulu* or winter rains. The flooding is often accompanied by debris carried down from the *mauka,* or *kula*, reaches of this gulch. Maui County has proposed repairs to the culverts located near the Waiakoa Stream mouth, where South Kihei Road crosses Waiakoa Gulch. Expected work would include the installation of temporary culvert, replacement of the existing culverts with twin 10-foot by 3-foot box culverts, construction of inlet and outlet structures, and a ford crossing over the box culverts. Anticipated associated ground disturbance includes removal of the existing pavement to facilitate repairs, grubbing and grading for project site prep, and trench excavation associated with removal of existing culverts and installation of new culverts.

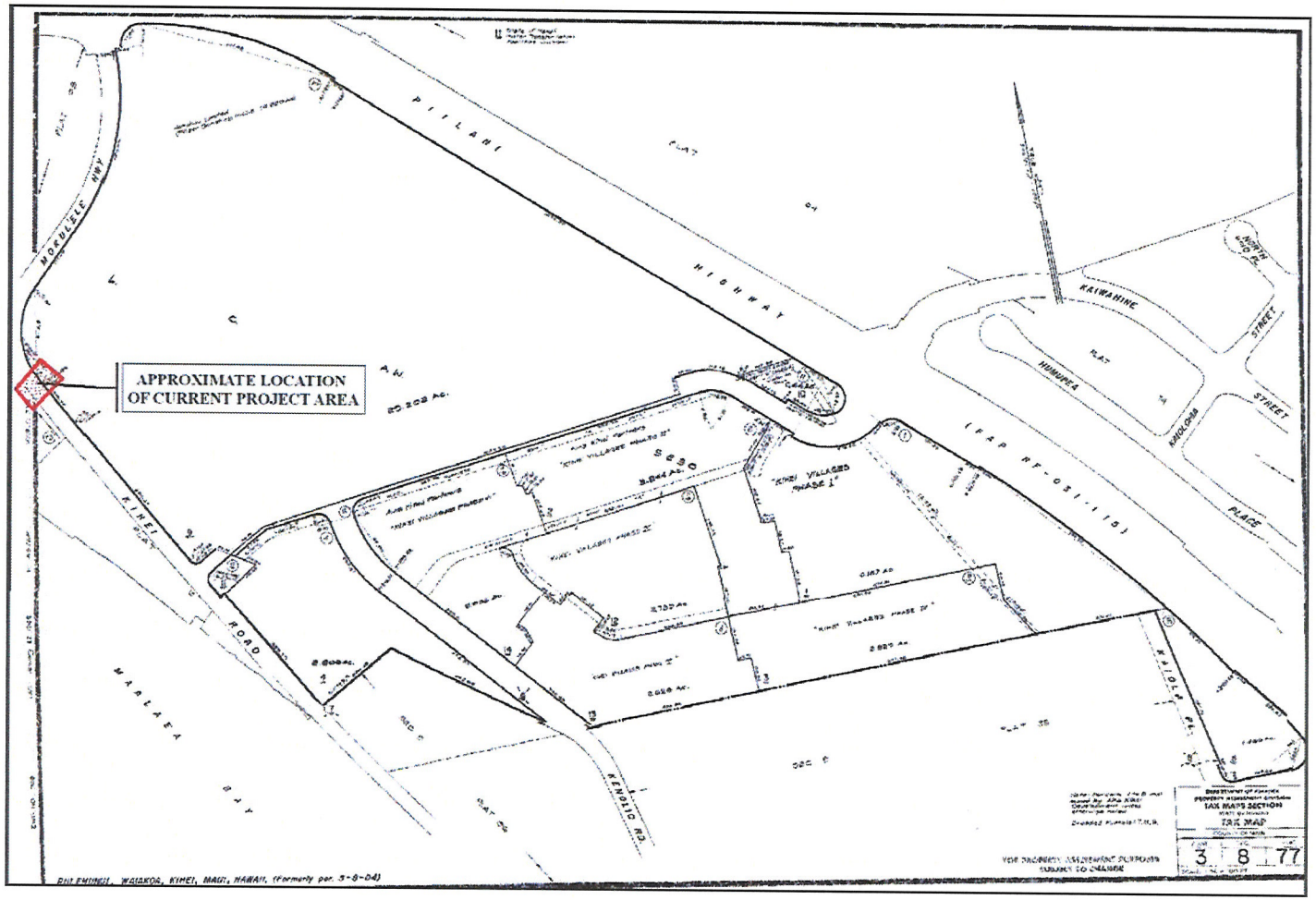


Figure 1. TMK map showing project area.

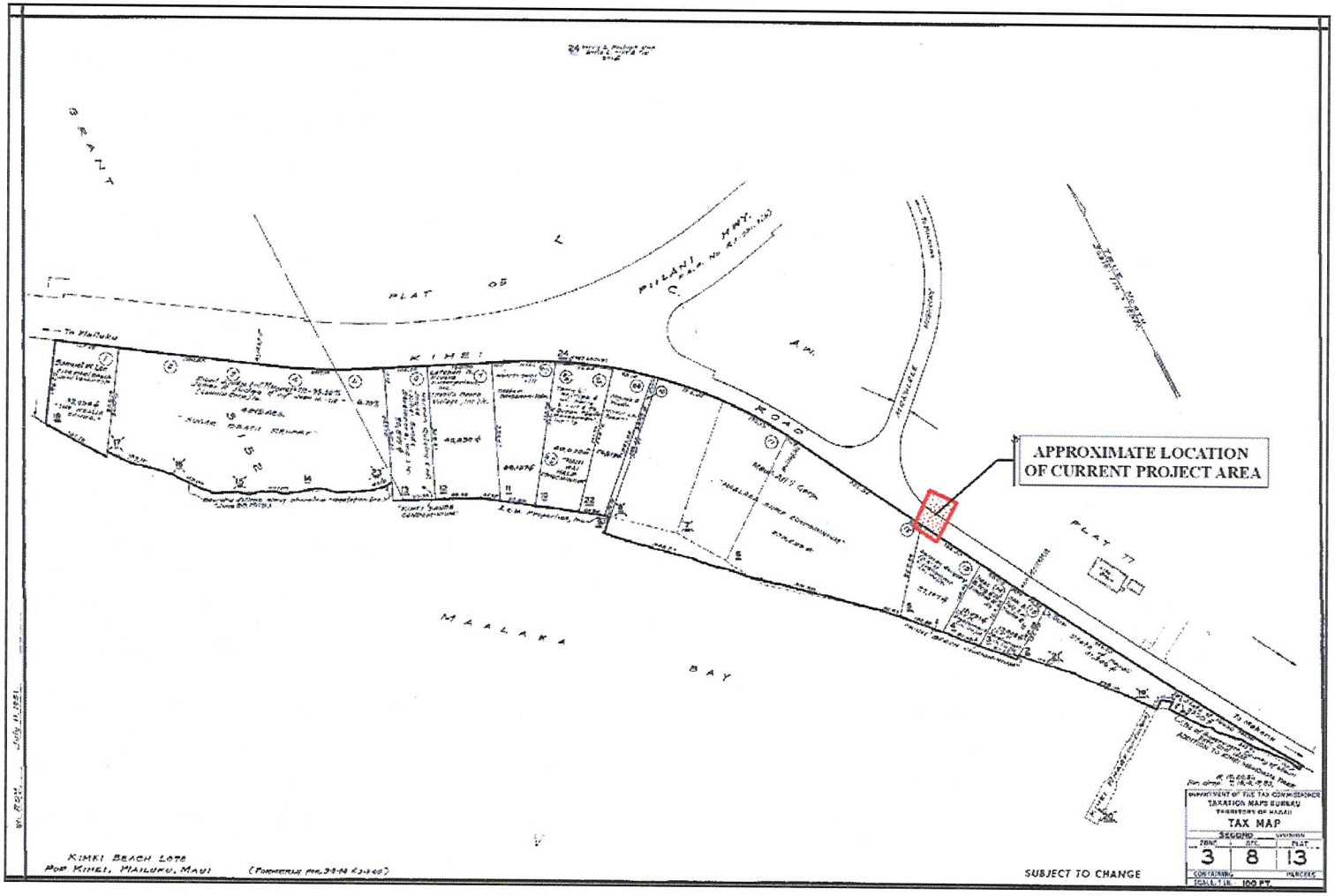


Figure 2. TMK map depicting project area.

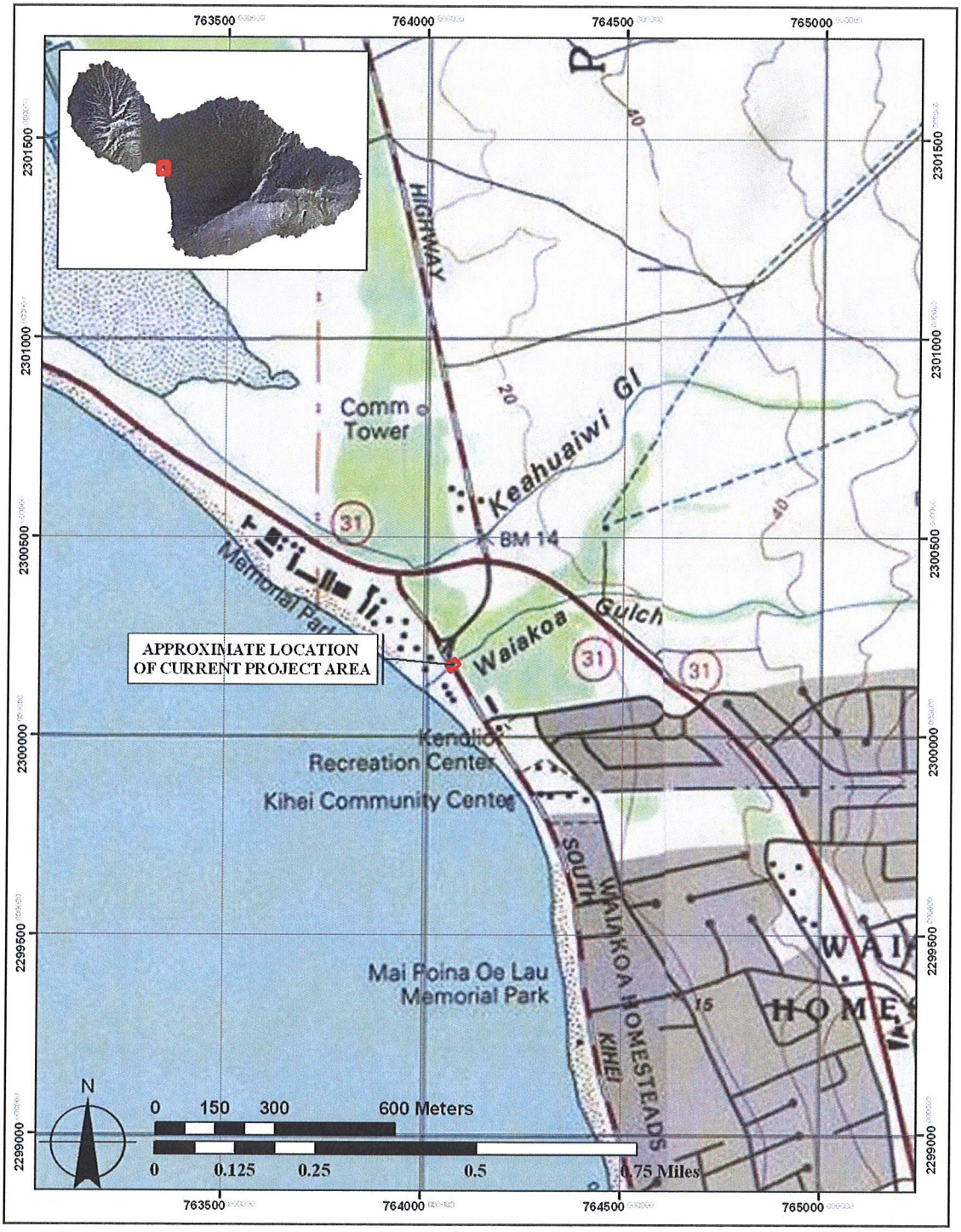


Figure 3. Ma'alaea (1996) 7.5 minute USGS topographic map depicting project area.

1.2 Environmental Setting

1.2.1 Natural Environment

Located on the leeward facing slopes of Haleakala, the current project area is approximately located 0.1 miles from the Kihei coastline near mean sea level. The overall topography of the lands comprising the project area consists of flat to gently sloping alluvium drained by Pulehu, Keahuaiwi, and Waiakoa Gulches. The main soils within the project area are of the Pulehu-Ewa-Jaucas association. This soil association is found in alluvial fans and in the basins mainly of Central Maui. Soils are well drained to excessively drained with medium, moderately fine and coarse textured soils (Foote, et al. 1972:8). More specifically, the soils within the project area are of the Waiakoa Soil Series (WID2 soil units), the Pulehu (PpA soil units), Dune Land (DL), Kealia (KMW), Beaches (BS), and Alae (AaB soil units), Soil Series in the immediate project area are Pulehu (PpA soil units) (Figure 4).

The Waiakoa Soil Series consists of well drained, gently sloping to moderately steep soils located on the upland areas. The upper part of the Waiakoa Series is influenced by volcanic ash and developed from material weathered from basic igneous rock (Foote, et al. 1972:12). The Pulehu Soil Series consists of well-drained soils on alluvial fans, stream terraces, and basins and are developed in alluvium washed from basic igneous rock (Foote, et al. 1972:115). The soils of the Ewa Series are nearly level to moderately sloping and characterized by well-drained soils found in basins and on alluvial fans. These soils have developed in alluvium derived from basic igneous rock (Foote, et al. 1972:28). The Alae Series consists of excessively drained soils on alluvial fans that have developed in the volcanic ash and recent alluvium derived from basic volcanic igneous rock. For the most part, the soils of this series are nearly level to gently sloping with cobblestones covering most of the surface (Foote, et al. 1972:14). Finally, the Jaucas Soil Series is characterized by excessively drained, calcareous soils of the coastal area next to the ocean. These soils are developed from coral and shells deposited by wind and wave action. They are level to strongly sloping (Foote, et al. 1972:48).

Rainfall accumulation within the project area averages less than 15 to 19 inches annually with the heaviest rainfall occurring during the winter months (December through February) and little to no rainfall during the summer months (June through August) (Giambelluca, et al. 1986; Stearns and MacDonald 1942). This pattern of rainfall and low annual precipitation rate once sustained a lowland, dry shrubland, and grassland native ecosystem (Pratt and Gon 1998). The majority of the landscape within the project area, however, has been heavily modified by historic era sugar cultivation and currently consists of active and fallow sugarcane.

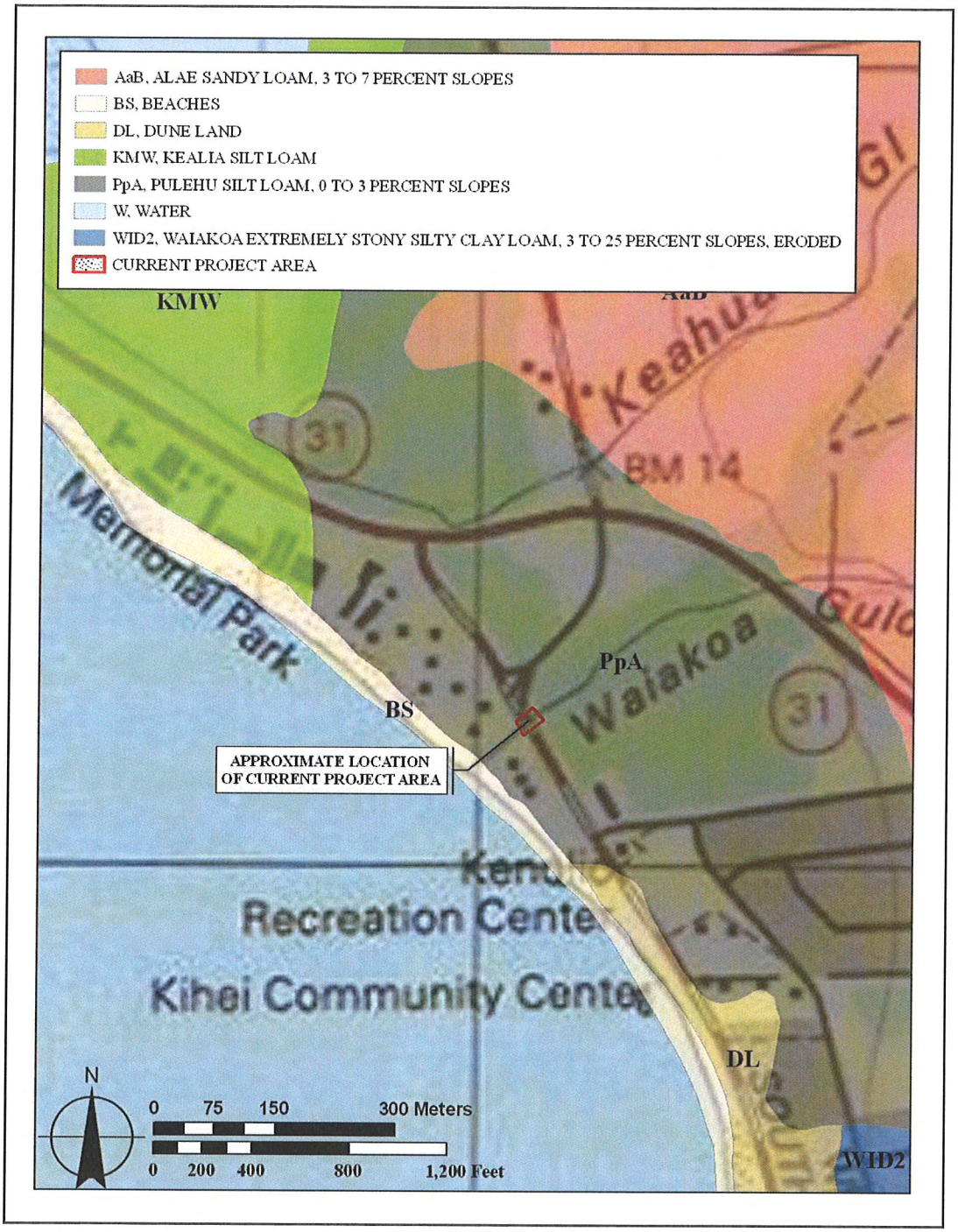


Figure 4. Maalaea (1996) 7.5 minute USGS topographic quadrangle showing soils of and surrounding project area.

1.2.2 Built Environment

The project area is located along South Kīhei Road at Waiakoa Gulch. The Kihei Beach Condominium is located to the south of the project area and the Maalaea Surf Condominium is located to the northwest of the project area. The surrounding area has been built up and includes several other oceanfront condominium developments. The project area is near the Mokulele-Pi'ilani Highway junction.

Figure 5. Google Earth aerial image showing approximate project area location in relation to the surrounding built environment.

Section 2 Background Research

The division of Maui's lands into political districts occurred during the rule of Kaka'alaneo, under the direction of his *kahuna*, Kalaiha'ōhi'a (Beckwith 1970:383). This division resulted in twelve districts or *moku* during traditional times: Honua'ula, Kahikinui, Kaupō, Kīpahulu, Hana, Ko'olau, Hāmākua Loa, Hāmākua Poko, Ka'anapali, Lahaina, and Kula. The current project area is located on the leeward flank of Haleakalā in the *moku* of Kula and *ahupua'a* of Pūlehu Nui (Figure 6) at a place commonly known as Kīhei.

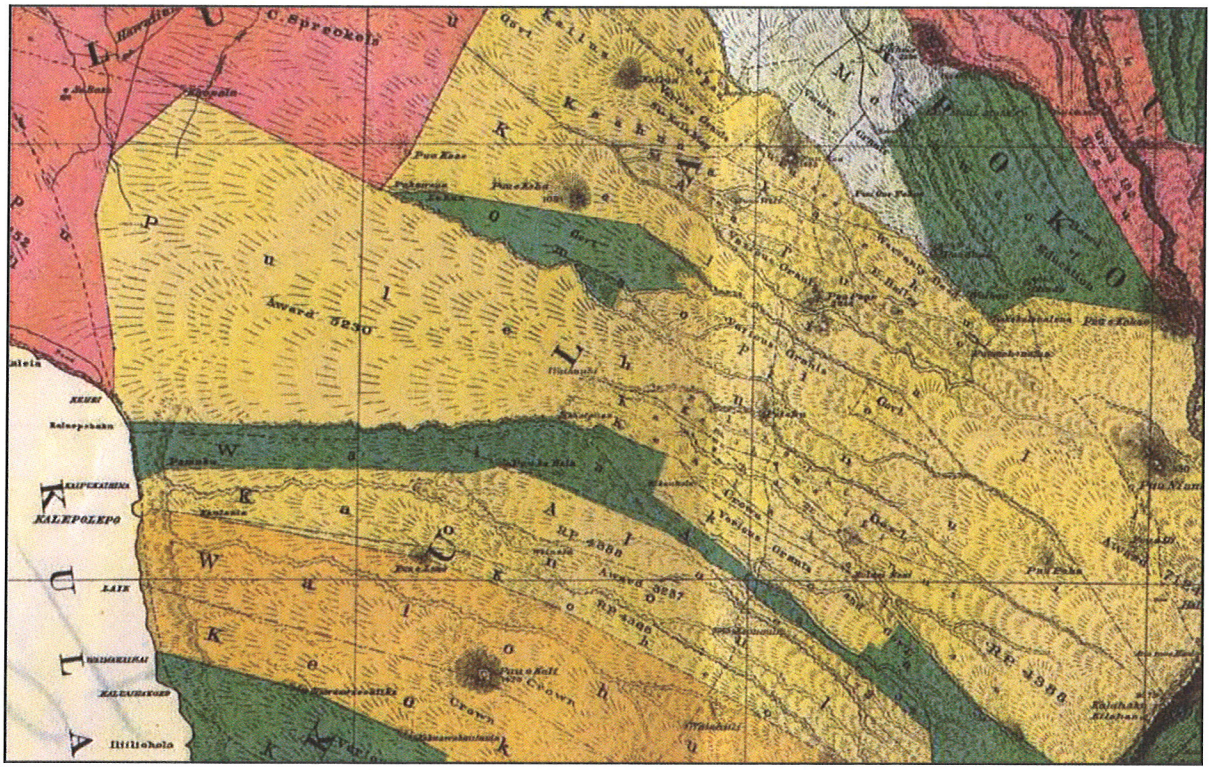


Figure 6. A portion of the F.S Dodge map (1885) showing Pūlehu Nui Ahupua'a in relation to the traditional *moku* of Kula (crown lands in yellow, government lands in green)

2.1 Traditional and Historical Background

2.1.1 Mythological and Traditional Accounts

While the mythological and traditional accounts of the Kīhei area are relatively scarce, an analysis of the place name meanings for the region surrounding the project area may yield some insight into the patterns of life in an area. Literal translations of several of the place names for land areas and divisions near to the project area are listed below. Unless otherwise noted, the translations are taken from Pukui et al. (1974):

Table 1. Place Names

Kula (*moku*)	literally translated as "plain"; always an arid region (Handy in Sterling 1995:242)
Pūlehu Nui (*ahupua'*)	large *pūlehu* where *pūlehu* is literally translated as "broiled"
Kīhei	literally "cape or cloak"; sandy point and boundary marker between Pūlehu Nui and Waikapu (Sterling 1998:255); commonly used place name for the South Maui area
Kīheipūko'a	*kīhei* literally translates as "cape or cloak" and *pūko'a* literally translates as "coral head"; Kīheipūko'a was a place near Keālia between Kalepolepo and Ma'alaea (Sterling 1998:257)
Keālia	literally "salt encrustation"; a pond near Kīhei and major salt pan location (Sterling 1998:95)
Kale'ia	literally "the abundance", possibly in reference to the resources available from the fishponds and offshore fishing grounds
Kalepolepo	literally "the dirt"
Ka'ie'ie	"a plaything for floating in the rapids", ancient name of Kalepolepo (Sterling 1998:252)
Kaopala	literally "the rubbish"; dividing line between Pūlehu Nui and Waikapu
Waiakoa	literally "water (used) by warrior"; the name of the gulch of the project area
Keāhuaiwi	literally "the bone pile"; the name of a gulch immediately adjacent to and north of Waiakoa Gulch
Kalaepohaku	"the stony promontory"
Pohaku Ki'i	"tilted stone"; a resting place for travelers
Alakoa	"soldiers street"
Kohemalamalama	"the vagina"; also the ancient name for Kaho'olawe

The above place names, together with the environmental data, suggest that the lands of and surrounding coastal Pūlehu Nui were fairly dry and barren in an agricultural sense but rich in marine resources. Previous research on pre-contact occupation in Kula District (Kolb et al. 1997) has suggested that most permanent habitations were in the uplands with a smaller permanent population located along the coastline. While a reconstruction of the coastal and archaeological landscape of Kula Moku underscores the importance of the uplands as a focus of agriculture and habitation, Hawaiian traditions and the presence of four fishponds are evidence that the coastal environs were also a focus of settlement and marine exploitation. The relative scarcity of recorded coastal place names, however, may be an indication of a smaller population that was widely spread out across the leeward coastal line. The vicinity surrounding the current project

area was also a site of conflict between the Hawai'i Island chief Kalaniopu'u and Maui Island chief Kahekili and is perhaps the origins for such place names as "Waiakoa" and "Keāhuaiwi".

2.1.2 Traditional Accounts

The earliest account concerning Kīhei and Hawaiian politics is given by Kamakau (1961) during the time of Alapa'i and Kekaulike:

> Alapa'i sailed from Kohala on Hawai'i...But when he landed at Mokulau in Kaupō (Maui) and heard that Ke-kau-like was dying, he gave up all thought of war and wished only to meet Ke-kau-like and his (half) sister Ke-ku'i-apo-iwa-nui...He landed at Kīheipukoa with all his chiefs and fighting men...While he was at Kīhei, Alapa'i heard that the ruling chief of Oahu was making war upon Molokai. Most of the chiefs of Molokai...were of Hawai'i...Alapa'i's sympathy was aroused, for these were his own brothers and children (relatives), and he made ready to go to their help on Molokai. [1961:70]

Other accounts involve the continuing conflict between Kahekili of Maui Island and Kalani'opu'u of Hawai'i Island during the late 18th century. Following a losing battle at Kaupō in 1775, Kalani'opu'u dedicated several war *heiau* on Hawai'i Island to aid in the defeat of Kahekili. Upon hearing this news Kahekili sent for the *kahuna* (priest) Kaleopu'upu'u who directed construction of the *heiau* of Kaluli and Pu'uohala on the north side of Wailuku. When Kaluli Heiau was completed Kaleopu'upu' said to Kahekili:

> This is the house of your god; open the sluice gate that the fish may enter. [Kamakau 1961: 85].

In the year 1776, the army of Kalani'opu'u landed at Keoneo'o'io with their war canoes extending to Makena at Honua'ula and proceeded to ravage the countryside. Kalani'opu'u landed with additional forces at Kīhepuko'a at Kealia to Kapa'ahu, 800 strong and eager to drink the waters of Wailuku:

> Across the plains of Pu'u'ainako (Can-trash-hill) and Kama'oma'o shone the feather cloaks of the soldiers ... Ka-hekili was at Kalanihale just below Kihahale and above the plateau of Ka'ilipoe at Pohakuaokahi ... Kaleopu'upu'u [said] to Ka-hekili, "The fish have entered the sluice; draw in the net." [Kamakau 1961:85]

The forces of Kahekili descended on and destroyed the soldiers of Kalani'opu'u, slaying the Alapa (elite soldiers of Kalani'opu'u) on the sandhills at the southeast of Kalua. Only two men escaped to Kīheipuko'a to tell Kalani'opu'u the news of their defeat. After a second day of warfare, Kalani'opu'u sued for peace and was granted such by Kahekili and his messengers at Kīheipuko'a (Kamakau 1961:88-89).

2.1.3 Early Historic Period

Kīhei was one of the locations visited by Captain George Vancouver. A monument at Mai Poina 'Oe Ia'u Beach Park in Kīhei commemorates Vancouver's on-shore expedition in 1792, when he first met the ruling chief Kahekili. With its sheltered coastline and easy access to

upcountry resources over a vast slope, Kīhei would continue to be a common stop for visiting ships.

During the early and middle 1800s, the Hawaiian demography was affected by two dramatic factors: radical depopulation resulting from Western disease; and nucleation around the developing port towns. The traditionally Hawaiian population was largely dispersed and, although there were royal centers and areas of more concentrated population, these areas never came close to rivaling the populations of the historic port towns that developed on Hawai'i's shorelines during the 1800s. In this regard, Kuykendall (1938:313) notes that in the period from 1830 to 1854:

> The commercial development during this period, by magnifying the importance of a few ports, gave momentum and direction to a townward drift of population; the population of the kingdom as a whole was steadily going down, but the population of Honolulu, Lahaina and Hilo was growing.

We believe that Kuykendall's observation was most likely the demographic pattern at the Kalepolepo entrepot, a hub of early historic activity for Kīhei and eventually all of Kula Moku (Kolb et al. 1997:69), located approximately one mile to the south of the current project area. The development of Kalepolepo as an entrepot and a focus of Christian life in the 1840s and 1850s most likely increased the population in the immediate vicinity above the pre-contact population figures, contrary to the island-wide trend of depopulation. That the population and areal extent of the Kalepolepo community reached its zenith during the mid 1800's appears to be supported by Kolb (*et al.* 1997:68):

> The ancient village of Kalepolepo was relatively small, and was built around an economy primarily based upon the exploitation of ocean resources--primarily the excellent fishing grounds as well as three large fishponds. However, as the number of visiting ships increased, Kalepolepo soon became an important provisioning area. By 1850 we know that the economic opportunities were attracting a number of European entrepreneurs.

In 1820, the whaling industry was introduced in Hawai'i. Although the whaling trade centered on Lahaina, mainly affecting the Kula/Kīhei area through agricultural demands, Clark (1980:47) notes that "From the 1840s to the 1860s a small whaling station was maintained at Kalepolepo [Kīhei]." The introduction of whaling to the Maui community brought with it an increased demand for foodstuffs and in particular the long-lasting Irish potato. After 1830, dryland agriculture in the old Kula District expanded with a focus on Irish potato cultivation. The California Gold Rush of 1849 further intensified the demand as a California-Hawai'i potato trade began to flourish. Kula became the area of highest potato production and was known as "the potato district" (the area between 2000 and 5000 ft. amsl). During this time period sugar cultivation and ranching were established in the Kula region. Sugar was present prior to 1846, with six sugar producers operating on the slopes of Haleakalā (Wong Smith in Brown and Haun 1989:C-7). As Wong Smith points out (Brown and Haun 1989: C-6), ranching was present in the area prior to the 1840s. Much of the produce, sugar and livestock moved down the Kalepolepo and Kekuawaha'ula'ula Trails to the landing at Kalepolepo, just south of the project area. Donham (1992:5) notes that the inundation of land clearing and cultivation associated with the

Gold Rush resulted in "deforestation [which] adversely affect[ed] the amount of rainfall in the district, and periods of drought became more common."

Around 1849 John Halstead built the Koa House at Kalepolepo in Kīhei. The building, part store and part residence, thrived on both the trade of the whaling industry and the then thriving potato industry. During the Gold Rush years, the store became "an emporium for Irish potatoes" and served as a gathering place for the whaling sailors. David Malo created a balance for the boisterous whaling crowd by constructing the Kilolani Church at Kalepolepo around 1852. Potato production thrived in Kula from 1830-1850 until successful potato cultivation and production in California and Oregon resulted in a decline in the Hawai'i trade (Burgett and Spear 1995:6-7). Halstead ran his store until 1876, closing shop when the potato industry diminished and moved to Ulupalakua (Janion 1977:25-31).

2.1.4 Mid- to late-1800s

The most significant change in land-use patterns and allocation came with The Great Mahele of 1848 and the privatization of land in Hawai'i. This action hastened the shift of the Hawaiian economy from that of a subsistence-based economy to that of a market-based economy. During the Mahele, all of the lands in the Kingdom of Hawai'i were divided between *mō'ī* (king), *ali'i* and *konohiki* (overseer of an *ahupua'a*), and *maka'āinana* (tenants of the land) and passed into the Western land tenure model of private ownership. On March 8, 1848, Kauikeaouli (Kamehameha III) further divided his personal holdings into lands he would retain as private holdings and parcels he would give to the government. This act paved the way for government land sales to foreigners, and in 1850 the legislature granted resident aliens the right to acquire fee simple land rights (Moffat and Fitzpatrick 1995: 41-51).

Native Hawaiians who desired to claim the lands on which they resided were required to present testimony before the Board of Commissioners to Quiet Land Titles. Upon acceptance of a claim the Board granted a Land Commission Award (LCA) to the individual. The awardee was then required to pay in cash an amount equal to one-third of the total land value or to pay in unused land. Following this payment, a Royal Patent was issued that gave full title of ownership to the tenant. But by 1850, the government of Hawaii was offering land for sale to both Native Hawaiians and foreigners. Such lands were referred to as Royal Patent Grants or as Grants.

A total of 13 land commission claims were made in Pulehunui and nine were awarded (Table 2). A portion of the 1889 Monsarrat and Dodge map of Kula shows that this area was awarded to Keaweamahi as a part of LCA 5230 and supporting testimony given to the land commissioners indicate that the land of Pulehu (Pulehunui) was given to Keaweamahi by the King in 1843 and never disputed (Waihona 'Aina 2000). The testimony given by Kaauwai and Kaiakekaua additionally maintained that there were a great many natives that lived within the *ahupua'a* of Pulehunui (Waihona 'Aina 2000). As indicated in Table 1, the majority of the lands that were awarded were *kula* lands used for potato (both sweet potato and Irish potato) cultivation and primarily located along the upper elevations of Kula Moku. Only one land claim, made by Kapono (LCA 9018), made mention of fishing rights and access to a *loko*. Land commission claim # 9018 was not awarded.

Table 2. Land Commission Awards Within Pulehu Nui Ahupua'a

LCA	Royal Patent Number	Claimant	Award Type	Acreage
0327B	7691	Preveer, John	Apana	6.03
9671	2202	Kekahuna	2 kula, 1 Irish potato	5.78
9019	6330	Helehua	3 kula	9.08
4672	6560	Poonui	6 kula, 3 sweet potato plots, 1 Irish potato	4.09
9672	5190	Napoko	2 kula, 3 Irish potato	12.56
9673	6329	Lonoaea	2 kula	4.06
8866	5168	Kaniho and Pakeau	2 kula, 1 house lot, 1 mala of Irish potatoes	14.9
4567	7484, 7896	Wahine	11 kula, 10 sweet potato	7896
5230	8140	Keaweamahi	ahupua'a	1668.78

By the time John Halstead closed shop in 1876, the boom years of Kalepolepo had passed. By 1880 the government survey of the Kula area showed the demarcation of only a few Land Commission Awards and who had received awards had replaced them with grants. Lower Kula consisted primarily of pastureland for ranching (Wong Smith in Donham 1990b:B-6). Kennedy (1992:7) notes that at this point *kiawe* was imported to feed cattle and provide wood.

Regarding the settlement at Kalepolepo and the impact of the changes associated with the change to ranching on the general area known as Kīhei, Clark comments:

> Halstead finally closed his store in 1876, as demands for his goods had steadily decreased, and moved to Ulupalakua . . . By this time the once thriving Hawaiian village at Kalepolepo had been almost totally abandoned as well. The slopes of Haleakala had gradually become denuded of their forests and torrential rains had caused heavy soil runoffs into the Kalepolepo shoreline. Cattle had trampled down the brush and grassy fields, causing sand dunes to drift and fill up the pond. Clouds of dust filed the air instead of cooling winds. Except for a handful of fishing families, Kalepolepo (and likely the Kīhei area in general) was deserted. (Clark 1980:48).

Sugar would soon fill the void and in 1898 the Kīhei Plantation Company (KPC) was founded. The KPC began sugar operations in Kīhei and the plain above.

2.1.5 Early to Mid-1900s

The Kihei Plantation Company, Ltd. was organized late in 1898 with a capitalization of 60,000 shares at $50 par value. Water was the most critical component in the decision to locate sugar cultivation along the leeward shores of Maui's arid coastline. The discovery of an ample supply of irrigation water early in 1898 led to the drilling of a large, successful well, but the supply of water was limited (Stearns 1942). Over the next four years, two ditches were

developed to supplement the water needs of the 4,873 acres of sugar under cultivation at Kīhei (Gilmore 1936).

The history of the Kīhei Plantation Company begins with the annexation of the Hawaiian Islands by the United States in 1898. With annexation came political stability for Hawai'i. Sugar prices were rising due to the outbreak of war between the United States and Spain over the colonies in Cuba, Puerto Rico and the Philippines. Henry P. Baldwin, of the Maui plantation of HC&S, entered into a partnership with O'ahu businessman Benjamin F. Dillingham to convert Lorrin A. Thurston's landholdings in Kīhei into a sugar enterprise.

Up to that time, sugar cultivation within the central isthmus of Maui was centered around the main towns of Wailuku and Kahului. Water tunneled from springs in the West Maui Mountains flowed through ditches in Wailuku to irrigate fields as far away as Mā'alaea. Water from the windward rain belt of Kailua ran through a network of ditches from East Maui to Pā'ia, to irrigate fields in Pu'unēnē.

The McCandless Brothers drilled a successful Maui-Type well (U.S.Geological Survey Well 14 / Hawaiian Commercial & Sugar Well K1) in 1899. It was located just inland from the coast in North Kīhei, between Keālia Pond and the Waiakoa Homestead Lands. This well was drilled vertically to approximately 60 feet through the Honomanū basalts, and tunneled laterally over 1,500 feet in order to skim 10 million gallons of fresh irrigation water per day from sources beneath the Kīhei plains (McCandless 1936).

The Kihei Plantation Company had the McCandless Brothers drill two or three additional Maui-Type wells on the north side of reservoir K2 at the discharge end of the existing pipeline of Well 14. The plantation in Kīhei failed in 1908 before the well site was able to be developed. It would have been named the HC&S K2 well, and would have included a large pumping station (Stearns 1942).

The plantation company in Kīhei built bridges to span streams and gulches flowing through the company fields. The plantation had planned the construction of a mill in North Kīhei, and ordered a plant to be built. It was decided that the new HC&S mill under construction at Pu'unēnē would have more than enough capacity to mill all the cane from the Kīhei fields. The order for the mill was transferred to the 'Ōla'a Sugar Company in Hawai'i, in exchange for a supply of steel rails for new railway requirements at Pu'unēnē. A large scale Kona storm hit the plantation on November 15th, 1900, and caused immense damage to both Kīhei and the HC&S fields in Pu'unēnē (Dean 1950). Bridges were knocked out, buildings were flattened, and washouts filled irrigation ditches with silt. Repairs were effected immediately, with the new HC&S mill at Pu'unēnē commencing operations January 29, 1902.

2.1.5.1 Railway Operations

The Kihei Plantation Company planned to construct a railway to move their cane. The sugar agency of William Dimond & Company placed an order for a locomotive from the Baldwin Locomotive Works in Philadelphia. The order was placed April 1899, and the plantation locomotive "Haleakala" was built and sent on to Maui (Conde 1973).

By March of 1900, the first annual report of the Kihei Sugar Company stated, "It was our intention to complete the main [rail]road only as far as Camp #2, or for about 2 miles, but as the development of Camp #3 required pushing on of the road one and a half miles further, this has been done, having been completed the 15th of February." An additional six miles of track connected the Kīhei wharf to the various well pumping stations, and north to meet up with HC&S track (Conde and Best 1973). Establishing the railroad at Kīhei made it possible to harvest and transport over two thousand tons of sugar in a single year (Dean 1950).

The laying of the railroad and the cultivation of the sugar cane was performed primarily by Japanese field labor (Figure 7). Kīhei's plantation Camp #1 was set up inland of the Kīhei wharf and mooring pier. Two stables and a plantation store were located at Camp #1. Hospital services were provided by HC&S in Pu'unēnē. Kihei Camp #3 was located 2 ½ miles north of Kihei Camp 1 at Kolaloa Gulch, along the North Kīhei line of the HC&S railroad (Figure 8).

The 3-foot gauge track for the Kihei Plantation Company railroad was built to the same specifications as the railway linking the HC&S mill at Spreckelsville to its fields; and to the sugar warehouses at the Kahului wharf. By 1902, with the new Pu'unēnē mill completed, a new milling contract with HC&S provided that all cane loaded by the Kihei Plantation Company was to be ground and manufactured into sugar by HC&S.

2.1.5.2 Water Source Development

The Lowrie Ditch project, named for former HC&S manager William J. Lowrie, brought an additional source of water to the Kīhei plains. His plan was to begin the ditch at the Pāpa'a'ea Reservoir, at the 1,000 ft. elevation, and maintain a four-foot drop per mile following the ditch's initial plunge from the Kailua reservoir. Steep mountain gulches were traversed using the force of the constant weight of water flowing in a series of siphons. The Halehaku Gulch, at 250 feet deep, and the Māliko Gulch, at over 350 feet deep, were both crossed by giant siphons fabricated of three-eighths-inch iron, and set in place by Japanese laborers. At a weir located above Pā'ia, the allocation of water began. The first tenth of the water flow in the Lowrie Ditch was divided out to the Pā'ia Plantation (an 11/20ths share) and the Haikū Plantation (a 9/20ths share). The distance traveled, from Kailua to the plantation's Kīhei boundary, was 21.9 miles (Thrum 1900).

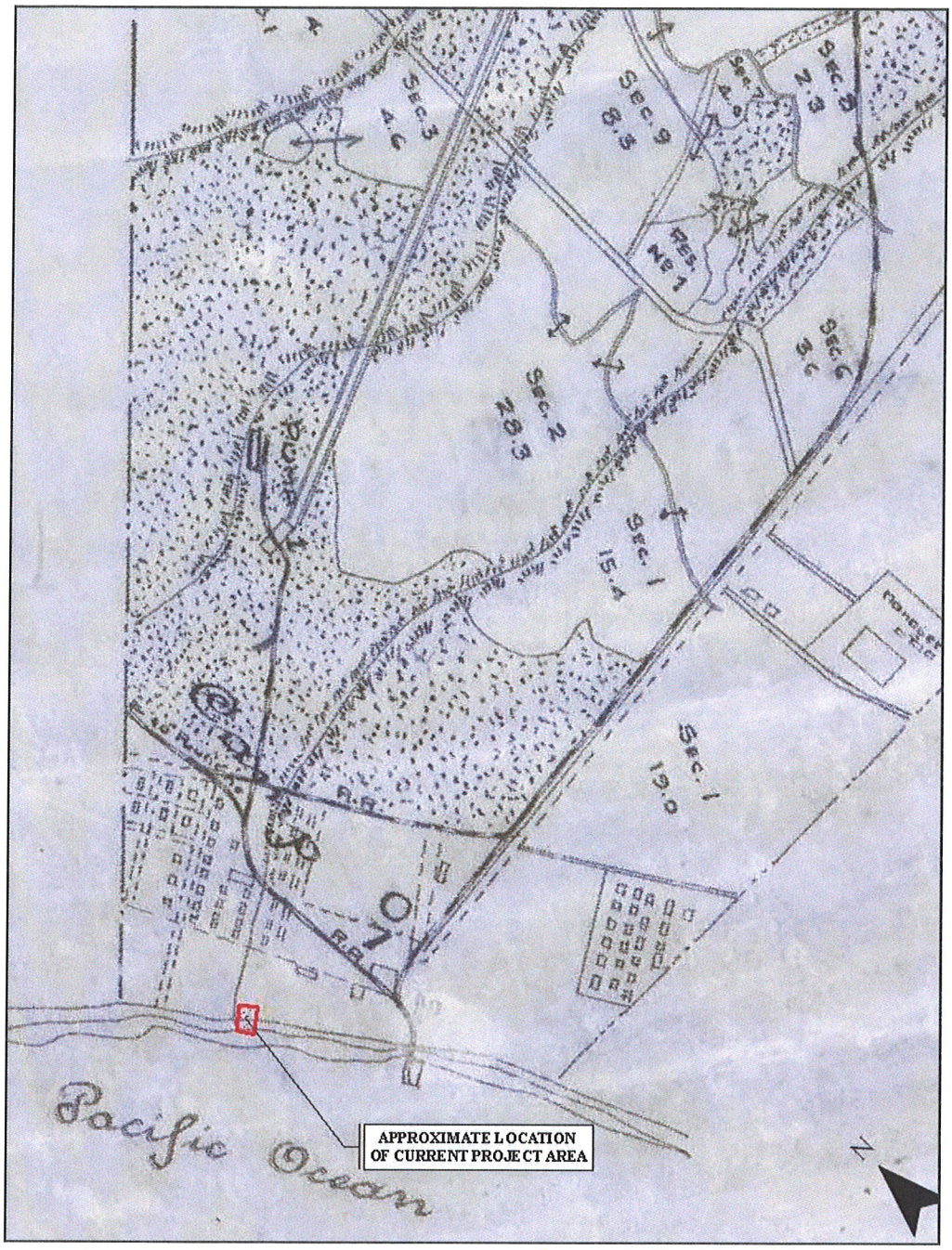


Figure 7. Shoemaker Kihei Plantation map (1907) with project area shown in red

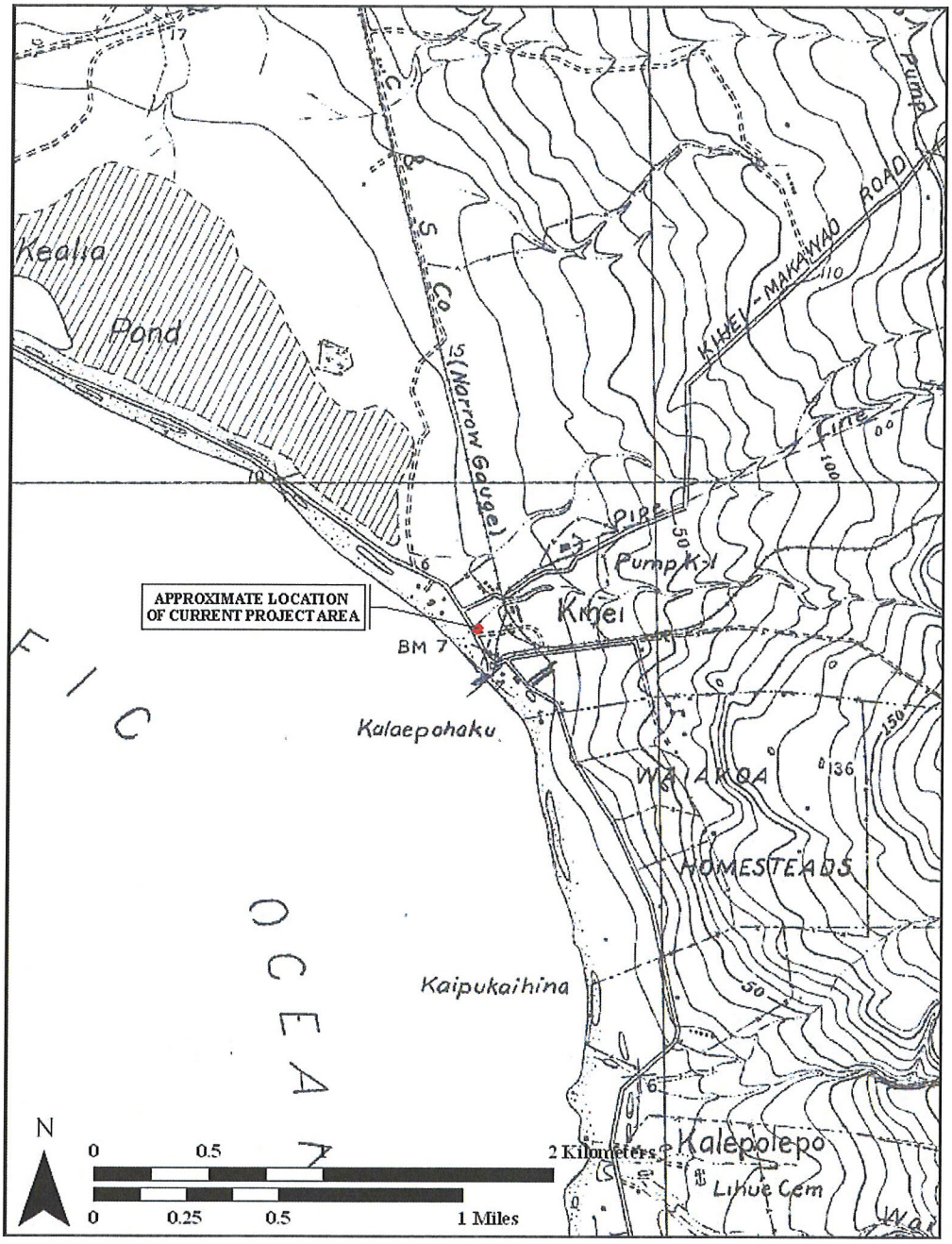
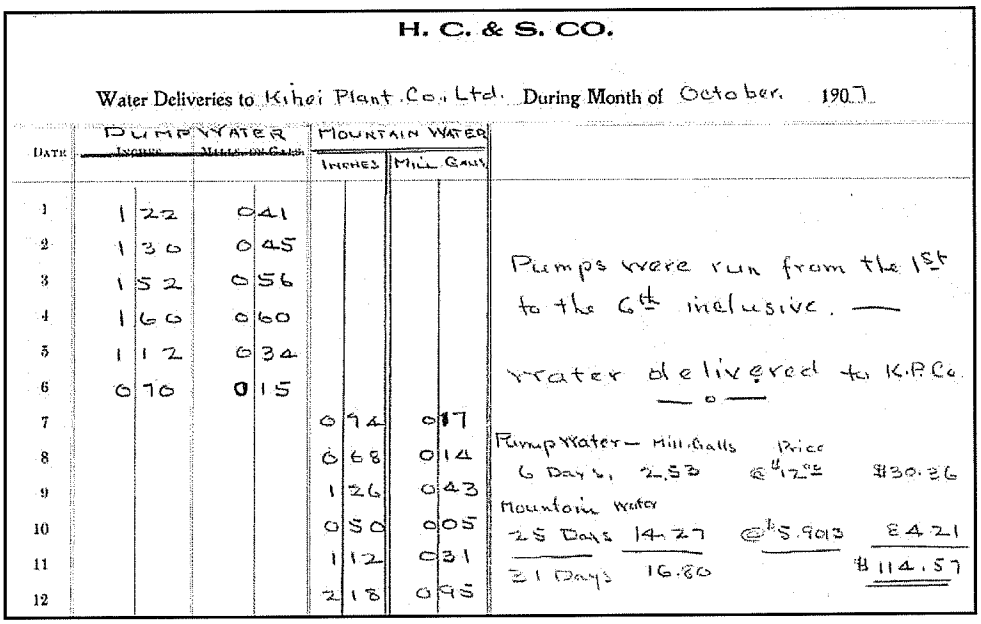


Figure 8. A portion of the 1922 USGS Map, Kihei Quadrangle showing location of current project area in relation to the railroad to Kīhei

More water was required, both from wells and from the East Maui water shed. The manager for the Kihei Plantation Company, W.F. Pogue, asked the management of HC&S for an even larger allocation of water for the Kīhei lands. In 1901, Samuel T. Alexander ordered the construction of a new ditch, tapping the water sources from Nāhiku to Honomanū. It was determined that the Kihei Plantation Company would receive 2/9^{ths} of the capacity from the enterprise (See Figure 9) (Dean 1950).



H. C. & S. CO.

Water Deliveries to Kihei Plant. Co. Ltd. During Month of October 1907

Date	Pump Water Inches	Pump Water Mill. Gals.	Mountain Water Inches	Mountain Water Mill. Gals.
1	122	041		
2	130	045		
3	152	056		
4	160	060		
5	112	034		
6	070	015		
7			074	017
8			068	014
9			126	043
10			050	005
11			112	031
12			218	095

Pumps were run from the 1st to the 6th inclusive. —

water delivered to K.P.Co.

— o —

	Mill. Gallons	Price	
Pump Water — 6 Days	2.53	@ 12.2	$30.86
Mountain Water 25 Days	14.27	@ 5.903	84.21
21 Days	16.80		$114.57

Figure 9. A portion of an accounting statement for water delivered to the Kihei Plantation Company in 1907.

The Kihei Plantation Company failed to live up to the expectations of its promoters with an inadequate water supply as the key difficulty. With the waters of the Ko'olau Ditch flowing to the Kīhei fields, production appeared to have hit its peak. Although 5,609 tons of sugar was delivered in 1903, high costs required a change of managers in Kīhei, and a reduction of the HC&S milling charge to $7 per ton. The incoming HC&S manager, Frank Fowler Baldwin, determined that the best course of action was to buy out the company for $375,000 (Conde 1973).

In 1908, the lands of the Kihei Plantation Company were divided up between five new major business entities of HC&S. The Kahului Railroad, which had already been absorbed by HC&S, acquired the rail lines to Kīhei and the rolling stock of the plantation. The Kailua Plantation Company (994 acres), the Kalialinui Plantation Company (923 acres), the Kula Plantation Company (996 acres), the Makawao Plantation Company (982 acres), and the Pulehu Plantation Company (978 acres) acquired the remaining acreage not included in the railroad right-of-way. Water rights reverted to HC&S, and were reapportioned between the new plantations. Sugar operations continued in North Kīhei until circa 1968, when HC&S leased lands to a corn research farm.

2.1.6 Modern Land Use

Beginning in the 1960's, development of the project area shifted from sugar plantation and related railroad operations to vacation condominium development. Between 1970 and 1996 vacation rental units increased from 2,641 to 17,442. The leeward coasts, including Kihei, became popular tourist destinations (Juvik 1998:14). Today, the Kihei Beach Condominium is located to the south of the project area and the Maalaea Surf Condominium is located to the northwest of the project area. The existing bridge and associated culverts due for repairs are along Waiakoa Gulch, one of the major drainages of East Maui.

2.2 Previous Archaeological Research

The majority of archaeological reconnaissance and inventory surveys in the North Kīhei area (Figure 10 and Table 3) have produced relatively little significant information in the way of archaeological data. While this may be due in large measure to changes on the land associated with sugar cane cultivation, ranching, and military use, as well as resort and housing construction, it still seems inescapable that there are only few areas in the Hawaiian Islands abutting sandy beaches that have less in the way of documented Hawaiian cultural deposits than Kīhei. Archaeological projects in the vicinity identified both pre-contact and post-contact site types. Many of which were associated with the sugar plantation era and plantation Camps, ranching and WWII periods in history. Pre-contact archaeological sites including dry stacked basalt walls, alignments, possible burial mounds and sites associated with traditional Hawaiian agriculture have also been discovered in the vicinity surrounding the project area.

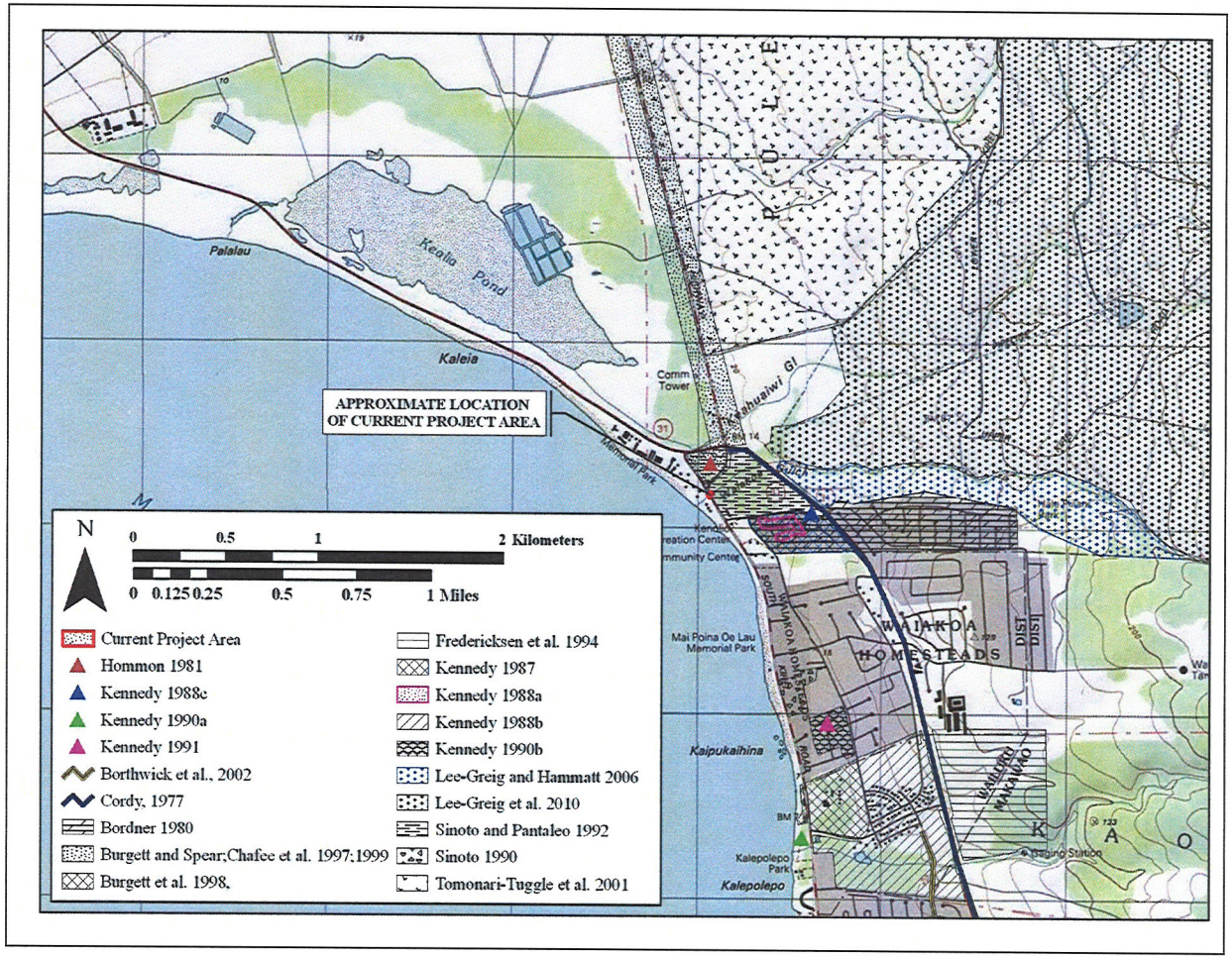


Figure 10. Portions of the Puu o Kali (1992) and Ma'alaea (1996) 7.5-minute USGS topographic quadrangles, showing the current project area relative to adjacent areas of previous archaeological study.

Table 3. Previous Archaeological Studies

Date	Ahupua'a	Nature of Study	Findings
(Cordy 1977)	Pūlehu Nui to Paeahu	Reconnaissance	Identified 38 sites: 30 in Waiohuli, 0 in Ka'ono'ulu, and 8 in Kēōkea
(Bordner 1980)	Pūlehu Nui	Inventory Survey	Identified historic era markers, remnant alignments, a stone wall, and a mound with an upright slab
(Hommon 1981)	Coastal Waiakoa	Reconnaissance	No archaeological findings
(Neller and Keau 1981)	Ka'ono'ulu	Reconnaissance	Finds include two historic sites and a platform of indeterminate function. Further archaeological data recovery was recommended.
(Kennedy 1987)	Coastal Pūlehu Nui	Inventory Survey	Kihei Villages Condominium site; six pre-contact Hawaiian sites which included an ahupua'a boundary wall 300m long, two rock mounds, one upright stone, series of low parallel rock alignments associated with sweet potato cultivation, large possible burial mound/dune.
(Kennedy 1988b)	Coastal Ka'ono'ulu	Reconnaissance	No archaeological findings
(Kennedy 1988a)	Pūlehu Nui	Monitoring Report	No archaeological findings
(Kennedy 1988c)	Pūlehu Nui	Reconnaissance	No archaeological findings
(Riford and Cleghorn 1989)	Pūlehu Nui	Archaeological Assessment	No archaeological findings
(Kennedy 1990b)	Coastal Waiakoa	Survey	No archaeological findings
(Sinoto 1990)	Coastal Waiakoa	Survey & Testing	No archaeological findings (other than two pieces of midden)
(Kennedy 1990a)	Ka'ono'ulu	Monitoring Report	
(Kennedy 1991)	Coastal Waiakoa	Field Inspection	Inadvertent burial find
(Sinoto and Pantaleo 1992)	Coastal PūlehuNui	Inventory Survey	No archaeological findings other than a bridge foundation (site - 3131)
(Fredericksen, et al. 1994)	Ka'ono'ulu, *mauka* of Pi'ilani Highway	Inventory Survey	21 sites were identified, some military and some pre-contact
(Chaffee, et al. 1999)	PūlehuNui and Wailuku	Addendum II Inventory Survey	No archaeological findings

Date	Ahupua'a	Nature of Study	Findings
(Burgett and Spear 1997)	PūlehuNui and Wailuku	Inventory Survey	No archaeological findings
(Tomonari-Tuggle, et al. 2001)	PūlehuNui	Archaeology, Architecture, Oral History	This study documented the existing sites and features of NAS Pu'unene, cattle ranching operations, the remains of pre-war Camp 6, the HC & S sugar plantation, and the Kihei railroad line.
(Borthwick, et al. 2002)	Waiohuli	Inventory Survey	No archaeological findings
(Lee-Greig and Hammatt 2006)	Pūlehu Nui	Inventory Survey	Document Site 50-50-09-5744, remnant Kihei Railroad trestle re-furbished for use as a water flume, and Site 50-50-09-5745, historic water well
(Lee-Greig, et al. 2011)	Pūlehu Nui	Inventory Survey	Documentation of 90 historic properties associated with the sugar plantation, ranching and WWII periods in history.

Cordy (1977) identified a total of 38 single component and multi-component archaeological sites within the then proposed Pi'ilani Highway road corridor. Bordner (1980) conducted an archaeological investigation southeast of the present project area and identified primarily historic era properties. Bordner's study area covered the residential subdivision currently known as the Hale Pi'ilani Subdivision located *mauka* or west of the Pi'ilani Highway, as well as a section *makai* or east of the Pi'ilani Highway that was later developed into the Kihei Villages Condominium Complex. During the course of the inventory survey, Bordner relocated SIHP Nos. -0219, -0220, and -0221, originally identified by Cox (1976), as well as six new historic properties within the *mauka* section of the study area. The six new sites consisted of historic era *ahu,* two remnant alignments of an indeterminate age, a historic stacked stone wall and an elongate basalt mound with an upright slab of an indeterminate age. Bordner reports no surface findings in the *makai* portion of the project area. In 1987, Kennedy revisited the *makai* portion of the Bordner project area in anticipation of the Kihei Villages development and identified six new early Hawaiian pre-contact era archaeological sites. These sites consisted of a stacked *ahupua'a* boundary wall separating Pūlehu Nui and Waiakoa. This wall was approximately 300m long. Additionally the following sites were also recorded; two rock mounds, one upright stone thought to be associated with kapu system worship practice, a series of low parallel rock alignments attributed to sweet potato agriculture, and one large mound or dune with possible burials.

Sinoto and Pantaleo (1992) conducted an archaeological inventory survey of approximately 38.5 acres which included lands of the present project area near the former location of Kihei Camp One. Only one historic property, the remains of concrete footings from a bridge crossing Waiakoa Gulch, was recorded. Due to the considerable ground disturbances, which included several bulldozing events, Sinoto and Pantaleo did not undertake a subsurface testing program.

Tomonari-Tuggle and others (2000) conducted an intensive archaeological inventory survey of the area that encompassed the former location of NAS Pu'unene north of the present project area. This inventory survey resulted in the recordation a total of four multi-component archaeological complexes (50-50-09-4164, -4801, -4803, and -4800), as well as one single component site noted as the Kīhei Railroad Bed (SIHP -4802). SIHP -4164 consists of 165 features, all of which are associated with NAS Pu'unene. SIHP -4800 and -4803 were representative of the sugar plantation use of the central isthmus and consisted of seven plantation era features for the former site number and remnants of the Haiku ditch and reservoir (n=5) for the latter. Historic properties reflecting post-war ranching activities (SIHP -4801) were also recorded during the course of this inventory survey.

Xamanek Researches (Fredericksen, et al. 1994) conducted an inventory survey in Ka'ono'ulu Ahupua'a south of the current project area and east of Pi'ilani Highway. A total of 21 archaeological features reflecting pre-contact use of the area, as well as post-contact military and ranch use were recorded. The pre-contact or Early Hawaiian archaeological features included five stone piles possibly representing agricultural use, five surface scatters representing pre-contact temporary habitation, and one petroglyph. Military use of the area is represented by five stone cairns, three alignments, and one enclosure. A single feature, interpreted as an erosion containment area, was recorded in association with ranching activities.

North of the project area, Chaffee and others (1997) identified three historic properties that were interpreted as agricultural features. Further south of the current project area Kennedy (1991) preformed a field inspection for an inadvertent burial find.

Cultural Surveys Hawai'i (CSH) conducted an archaeological inventory survey east of the current project area and covering approximately 93-acres in the southernmost section (Lee-Greig and Hammatt 2006). A total of two historic era archaeological sites was identified during the course of this study. Both historic era properties were likely originally associated with the Kihei Plantation Company and the early sugar venture in the North Kīhei area. Based on the construction technique of SIHP 50-50-09-5744, and the considerable attention apparently paid to the reinforcement of the abutments and piers, it was evident that a significant amount of cost, time, and effort went into the initial construction of the bridge components (Lee-Greig and Hammatt 2006:34-40). Sinoto and Pantaleo (1992) recorded the remains of a similar structure, 50-50-09-3131, during an inventory survey of a parcel covering the mouth of Waiakoa Stream very near the current project area, and postulated a railroad/transportation function. SIHP 50-50-09-5745 was interpreted as an early historic to historic era open hand-dug well recorded in a portion of HC&S Field 20 (Lee-Greig and Hammatt 2006:41-42). In an archaeological survey of 3165 acres in Pūlehu Nui, northeast of the current project area and extending *mauka*, Lee-Greig (2011) documented 90 historic properties associated with the sugar plantation, ranching and WWII period.

Until recently, the few available radiocarbon dates from the Kīhei area were consistent in their rather broad, later prehistoric age determinations, most commonly post A.D. 1500 (Fredericksen, et al. 1993; Fredericksen and Fredericksen 1995a, b). This fits with the model that the more intensive use of the Kīhei area was a later pre contact development that corresponded with the expansion of upland permanent habitation, ceremonial constructions, and agricultural clearing after A.D. 1400-1500 (Kolb, et al. 1997:281-282).

Without a doubt, coastal habitation along with more populous inland/upland settlement was firmly established by A. D. 1400-1500. The majority of permanent habitation would have been in the uplands, concentrated in the well-watered and fertile agricultural areas. Coastal permanent habitations were likely less numerous and centered on the ceremonial structures and fish ponds at Kalepolepo. While the fish ponds of the Kula coastline are thought to date to the 1500s (Kolb et al. 1997:66), the chronological timeline for initial settlement of the Kīhei area is still under debate. Based on the results of relatively recent studies (McDermott 2001; McDermott, et al. 2000), habitation in the coastal areas may date to as early as A.D. 600-900. Evidence of earlier coastal habitation in the Kīhei area has recently come to light at excavations adjacent to the site of the Kalepolepo Church. Cultural layers described in the work of McDermott and others (2000) and McDermott (2001), in conjunction with those of Pepalis and Kolb (2002), provide some evidence in the form of charcoal concentrations, midden deposits, 14C dates, and palynomorph identification, that settlement in the vicinity of an inland pond feature had occurred by circa A.D. 600-900.

2.3 Background Summary and Predictive Model

Previous archaeological studies have led to archaeological site interpretation based on the division of the settlement pattern for Maui into three zones: 1) coastal; 2) barren or transitional; and 3) Inland (Cordy 1977; Cox 1976; Walton 1972). The coastal zone is an approximately one-fourth of a mile wide band running along the shoreline. The inland zoned begins approximately five to seven miles from the shore and is characterized by larger rainfall accumulation and more lush vegetation. The transitional or barren zone is classified as the area between the edge of the coastal zone and beginning of the inland zone and characterized by brush/scrub vegetation and low annual rainfall accumulation.

Based on available archaeological evidence and interpretations, and as a result of the settlement pattern, site types expected for coastal zones, where temporary habitations related to marine exploitation may be present may include stacked-stone enclosures, and possibly smaller ceremonial structures, such as stacked-stone fishing shrines. It is possible that human burials would have been interred in the coastal sand dunes where present.

With that said, the current project area has experienced extensive and prolonged ground disturbances as a result of 100 plus years of sugar cane cultivation and due to the effects of periodic flooding events. Flooding events have required the dredging and clearing of debris and heavy sedimentation from Waiakoa Gulch which further disturbs the soils in the area. As a result of the heavy disturbances caused by both sugar cane cultivation and the clearing of flood debris from the gulch, the area has be heavily disturbed and the likelyhood of locating intact cultural deposits or archaeological remains would be low.

Due to the proximity of the project area to the Kihei Camp 1 site, there may be a possibility for other plantation camp cultural material to be present as this camp was located northeast of the project area. In their archaeological inventory survey (1992) Sinoto and Pantaleo recorded one historic property in the vicinity of the current project area, State Site #50-50-09-3131. State Site #50-50-09-3131 is a historic concrete bridge footing, likely related to Kihei Camp 1 or the railroad. This site is located along the Waiakoa Gulch and no further work was recommended for this site. Additionally, because of the coastal location, human remains could be present in sandy deposits of the project area. Historic properties associated with early plantation infrastructure (e.g. water control features and transportation features), as well as ranch activities (e.g. animal husbandry walls or corrals), are also probable.

Section 3 Archaeological Monitoring Provisions

Under Hawai'i State historic preservation legislation, "Archaeological monitoring may be an identification, mitigation, or post-mitigation contingency measure. Monitoring shall entail the archaeological observation of, and possible intervention with, on-going activities which may adversely affect historic properties" (HAR Chapter 13-279-3). For this project, the proposed monitoring program, as outlined below, will serve as a mitigation measure that insures proper documentation should historic properties be encountered during ground altering activities.

Hawai'i State historic preservation legislation governing archeological monitoring programs requires that each monitoring plan discuss eight specific items (HAR Chapter 13-279-4). The following monitoring provisions address those eight requirements in terms of the archaeological monitoring for the construction within the project area.

1. Anticipated Historic Properties:

   Although the project area has been heavily disturbed by sugar cane cultivation and by periodic flooding events, there continues to be a possibility of encountering cultural material associated with Kihei Camp 1. Additionally, due to the project areas proximity to the coast, human burial remains may be present in sandy deposits.

2. Locations of Historic Properties:

   State Site #50-50-09-3131 is a historic concrete bridge footing, likely related to Kihei Camp 1 or the railroad.

3. Fieldwork:

   On-site monitoring is recommended for all ground disturbance activities. A qualified archaeologist will monitor all ground disturbance associated with the project's construction. Any departure from this will only follow consultation with, and written concurrence from, SHPD/DLNR.

   The monitoring fieldwork will likely encompass the documentation of subsurface archaeological deposits (e.g, trash pits and structural remnants) and will employ current standard archaeological recording techniques. This will include drawing and recording the stratigraphy of excavation profiles where cultural features or artifacts are exposed as well as representative profiles. These exposures will be photographed, located on project area maps, and sampled. Photographs and representative profiles of excavations will be taken even if no historically-significant sites are documented. As appropriate, sampling will include the collection of representative artifacts, bulk sediment samples, and/or the on-site screening of measured volumes of feature fill to determine feature contents.

   If human remains are identified, no further work will take place, including no screening of back dirt, no cleaning and/or excavation of the burial area, and no exploratory work of any kind unless specifically requested by the SHPD. All human skeletal remains that are encountered during construction will be handled in

accordance with HRS Chapter 6E-7 and 6E-8 and HAR Chapter 13-300 and in consultation with SHPD/DLNR.

4. Archaeologist's Role:

   The on-site archaeologist will have the authority to stop work immediately in the area of any findings so that documentation can proceed and appropriate treatment can be determined. In addition, the archaeologist will have the authority to slow and/or suspend construction activities in order to insure that the necessary archaeological sampling and recording can take place.

5. Coordination Meeting:

   Before work commences on the project, the on-site archaeologist shall hold a coordination meeting to orient the construction crew to the requirements of the archaeological monitoring program. At this meeting the monitor will emphasize his or her authority to temporarily halt construction and that all historic finds, including objects such as bottles are the property of the landowner and may not be removed from the construction site. At this time it will be made clear that the archaeologist must be on site during all subsurface excavations.

6. Laboratory work:

   Laboratory work will be conducted in accordance of HAR 13-279-5-(6). Laboratory analysis of non-burial related finds will be tabulated into table form and standard artifact and midden recording will be conducted as follows: artifacts will be documented as to provenience, weight, length, width, type of material, and presumed function. Photographs of representative artifacts will be taken for inclusion into the archaeological monitoring report. Bone and shell midden materials will be sorted down to species, when possible, and then tabulated by provenience.

   As appropriate, collected charcoal material obtained within intact cultural deposits will be analyzed for species identification. Charcoal samples ideal for dating analyses will be sent to Beta Analytic, Inc. for radiocarbon dating. If appropriate, artifacts may be sent to the University of Hawai'i-Hilo Geoarchaeology lab for Energy-Dispersive X-ray Flourescence (EDXRF) analysis in order to identify and possibly geographically locate the source material. All analyzed samples, provenience information, and results will be presented in table form within the archaeological monitoring report.

7. Report Preparation:

   One of the primary objectives of the report will be to present a stratigraphic overview of the project area which will allow for predictive assessments of adjacent properties, which may be the subject of future development. The report will contain a section on stratigraphy, description of archaeological findings, monitoring methods, and results of laboratory analyses. The report will address the requirements of a monitoring report (HAR section 13-279-5). Photographs of excavations will be included in the monitoring report even if no historically-significant sites are documented. Should

burial treatment be completed as part of the monitoring effort, a summary of this treatment will be included in the monitoring report. Should burials and/or human remains be identified, then other letters, memos, and/or reports may be requested by the Burial Sites Program.

8. Archiving and Curation of Collected Materials:

   In the event that human burials are encountered during the course of monitoring and removed at the direction of SHPD, all human skeletal remains and any associated artifacts or *moepū* will be temporarily curated in a clean and secured location at the DLNR Maui Office Annex, 130 Mahalani Street, Wailuku, until a burial treatment plan prepared in accordance with HAR 13-300-33 has been reviewed and approved and re-interment arrangements have been made. Materials not associated with burials will be temporarily stored at the contracted archaeologist's facilities until an appropriate curation facility is selected in consultation with the landowner and/or project proponent.

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APPENDIX F.

Cultural Impact Assessment

SOUTH KIHEI ROAD WAIAKOA CULVERT REPLACEMENT CULTURAL IMPACT ASSESSMENT

Interview with: Paula Kalanikau

Interviewed by: Erin Mukai, Associate
Munekiyo & Hiraga, Inc.

Paula Kalanikau was born on June 17, 1938 on the Big Island of Hawaii, and grew up in Kukaiau, a town so small that if you blinked your eyes while driving past it, chances are you would miss it.

The interview with Paula Kalanikau took place on August 8, 2012 at Starbucks in Piilani Village Shopping Center, Kihei, Maui, Hawaii.

Daughter to Mary Keliipahulio Kauahipaula and Gilbert Manuhoa Travis Sr., Paula is three quarters Native Hawaiian. Her mother, Mary, was pure Hawaiian and her father, Gilbert, *hapa.* Paula is one of seven children.

Paula often came to Maui to visit her sister, who had moved to Maui from the Big Island to marry a Maui man. As fate would have it, Paula met her own husband in the early 1960's on one of her trips to Maui. Paula suspects that her sister had something to do with this, playing matchmaker one night when she had arranged a trip to the bowling alley in Wailuku. There, Paula met Moses Kalanikau better known as "Moki" whom she married in 1961 when she was 25 years old. Together, Moki and Paula would have four children.

After a few years living in Wailuku, Moki and Paula bought a home in Kihei in 1964, known as The Kalanikau Estate, near Maui Lu, not very far from the project site of the Proposed South Kihei Road Waiakoa Culvert Replacement. Paula explained that her children were excited about the move as they would be closer to the ocean. The ocean, Paula described, was much more pristine back then with its glassy surface and beautiful beaches.

Moki and Paula were both very active in the community; staying involved and giving back in the best ways they knew how. For Moki, it seemed his passion rested with helping the children in the community. Co-founding the Kihei Canoe Club, Paula explained that, in part, Moki founded the club in 1973 to give the keiki in the area something to do, as there was not much offered to the youth from a community standpoint at that time. When the club first started, Paula remembered, they did not have a single canoe. However, with the help of the Leis family, the club purchased its first canoe shortly thereafter. Paula remembered how the club, with a membership of about 250 would have to create a schedule so that everyone could use and share the single canoe.

Sadly, Moki passed away in 1986, and Paula, true to her soul mate, never remarried and raised her children as a single parent. Paula credits this to the help of her mother-in-law to whom she expressed her gratitude and appreciation. In Moki's memory, the Kihei Canoe

Club holds an annual canoe race in his name: The Moki Kalanikau Regatta. This regatta, Paula shared, started as a request from the keiki to the board of the club. With the board's approval, the club held the first regatta in Moki's name in 1987.

Today, the Kihei Canoe Club is enjoyed with much popularity by the community with over 300 members and about two dozen canoes. The club is located at the beach not far from the project site in North Kihei, at South Kihei Road's intersection with Uwapo Road. But the club goes beyond just paddling, Paula explained, the club has a mission to revive and perpetuate the Hawaiian culture. Through education offered in club programs that include paddling, as well as other Hawaiian arts and practices such as wood carving, navigation, and chant, the club provides the public an opportunity to learn and live the Hawaiian culture. Paula explained that at the time the club was founded, her husband's focus was to instill leadership in the keiki, to help them make the right choices in their lives, and to teach them how to be contributors of the community. Today, the Kihei Canoe Club continues with this focus and is, as Paula described, a venue whereby the public can participate in cultural practices and art. Paula is still involved with the club, sometimes visiting to talk story or to take a canoe out to paddle. She speaks highly of the coaches and instructors of the club, recognizing the positive impact they have on people's lives. Paula does not believe the proposed project will impact the club, its practices, and use of the ocean.

In speaking of the proposed project, Paula noted that flooding has always been a problem in the area. She explained that the culvert is currently too small and that water often overtops the road. Paula is concerned with the runoff that flows into the ocean. Remembering the pristine waters from several decades ago and the changes that have been brought with a short period of time, Paula questioned what kind of ocean are we to have in the future. Recognizing the larger picture, Paula expressed her wish for the County to work together with the State to protect our waters from pollution. For this project, Paula asked that the County maintain the new culvert regularly. Paula explained that growing up she was taught by her parents to never throw anything in the ocean, to always bring your trash home to recycle as best you could, and to always say thank you and a word of prayer before you leave. Today, some kids are still learning this, Paula concludes.

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SOUTH KIHEI ROAD WAIAKOA CULVERT REPLACEMENT CULTURAL IMPACT ASSESSMENT

Interview with: Leonard Kimokeo Kapahulehua

Interviewed by: Leilani Pulmano, Program Manager (in person)
Munekiyo & Hiraga, Inc.

Date: October 31, 2012

The cultural impact assessment interview with Leonard Kimokeo Kapahulehua took place at the office of Munekiyo & Hiraga, Inc. on October 31, 2012.

Leonard Kimokeo Kapahulehua was born on December 15, 1947 and raised in Kauai. Kimokeo currently lives in Kihei at 938 South Kihei Road and has been a resident of Maui since 1984. He moved to Maui from Kauai in 1970, but his first visit to Maui was in 1963 to dive and fish in Makena when there was only one road in Kihei – South Kihei Road that ended in Wailea. From Wailea on, the road was a dirt road to Makena.

Kimokeo is a native Hawaiian and a Hawaiian cultural practitioner. He is very active in the community paying most of his attention perpetuating the native Hawaiian culture. He is also the president of the Kihei Canoe Club (Club), whose Club is nearby the proposed project site. Since he spends a lot of time at the Club, he has witnessed several flood events at the South Kihei Road culvert crossing of Waiakoa Gulch.

Focusing on Hawaiian cultural practices, Kimokeo explained the importance of water flowing from Kula through the Waiakoa stream from mauka to makai for fishing. He described that the floods attracts the ocean fish such as papio, awa, and sharks to the mouth of Waiakoa gulch to eat the brackish water fish like tilapia. This in turn brought fishermen to catch the ocean fish. Fishing methods in this area included pole fishing, nets, and throw nets predominantly for akule. He added that fishermen also gather limu and hee.

Kimokeo also made clear that the place name of the beach at the mouth of Waiakoa Gulch is called "kalaepohaku" because stones similar to az stones would be found and gather at the mouth. These stones were used to make implements.

Naturally, canoeing is an important native Hawaiian cultural practice happening near the project site because of the location of the nearby Club. However, Kimokeo does not see that the proposed replacement of the culverts will affect canoe activities or the Club.

In speaking about cultural practices at the site or nearby the site, besides fishing and canoeing, Kimokeo did not know of any other cultural practices. He explained that there are no native and/or endangered plants or birds. He had seen barn yard owls but not the native Hawaiian owls. On occasions, he had seen hoary bats at the shoreline but not at the culvert area itself. Kimokeo recognized introduced plants in the area such as akulikuli and aki aki.

Kimokeo surmised that replacing the culvert is a smart management project versus continually flooding of the area. He concluded that there would be no impact to cultural practices and, in fact, could promote more fishing in the area.

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