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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO:
HWY-DS 2.5472

January 10, 2014

TO: THE HONORABLE GARY L. GILL
ACTING DIRECTOR OF HEALTH

ATTN: HERMAN TUIOLOSEGA, ACTING DIRECTOR
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

FROM: GLENN M. OKIMOTO, PH.D.
DIRECTOR OF TRANSPORTATION

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (DEA) FOR KAHULUI BAY SHORELINE PROTECTION PROJECT, DISTRICT OF WAILUKU, ISLAND OF MAUI, PROJECT NO. 3400(006), TMK: (3) 3-07:7, 22, & 23

The State Department of Transportation has reviewed the DEA for the subject project and anticipates a Finding of No Significant Impact determination. Please publish notice of availability for this project in the next available Office of Environmental Quality Control (OEQC) Environmental Notice.

We have enclosed the OEQC Bulletin publication form, a CD with a copy of the DEA (pdf) and Publication Form (MS Word) and two hard copies of the DEA. Simultaneous with this memo, we have submitted the summary of the action in a text file by electronic mail to your office.

Should you have any questions, please contact our Project Manager, Eddie Chiu, at 692-7547, Technical Design Services Office, Design Branch, Highways Division or by email at eddie.k.chiu@hawaii.gov.

Enclosures: One (1) CD with a copy of the OEQC publication form, DEA
HDOT Acceptance letter (hard copy)
OEQC Bulletin Publication Form (hard copy)
Two (2) DEA (Hard Copies)

AGENCY ACTIONS
SECTION 343-5(B), HRS
PUBLICATION FORM (JANUARY 2014 REVISION)

Project Name:	Draft Environmental Assessment Kahului Bay Shoreline Protection Project; Federal Aid Project No. STP-3400(006)
Island:	Maui
District:	Wailuku
TMK:	(3)3-07-01: 07, 22 & 23
Permits:	CDUP; Section 401 Water Quality Permit; SMA Permit; SSV Permit; CZM Permit; Maui County Grading Permit; USACE Section 10/404 Clean Water Certification Permit; OCCL Permit and NPDES Permit
Proposing/ Determination Agency:	State of Hawaii, Department of Transportation 869 Punchbowl Street Honolulu, Hawaii 96813 Contact: Eddie Chiu, P.E., Project Manager Phone: (808) 692-7547
Consultant:	Oceanit 828 Fort Street Mall Suite 600 Honolulu, Hawaii 96813 Contact: Derrick Elfalan, P.E., Project Manager Phone: (808) 531-3017

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 State of Hawaii Department of Transportation, Highways Division (HDOT) and the Federal Highway Administration (FHWA) propose to stabilize the shoreline along Kahului Beach Road to prevent further erosion from adversely affecting the structural integrity of Kahului Beach Road. The proposed project involves the construction of a shoreline stabilization structure within the project limits. The project area extends from an existing revetment, roughly in line with Kaihe'e Place, approximately 1730 foot along the shoreline parallel to Kahului Beach Road to the large rock revetment supporting the base of the west harbor jetty; between mile marker 0.1 and mile marker 1.0. The proposed project will be constructed with a portion of a State right-of-way and a remnant parcel, to be acquired, between State Highway and State Harbor's jurisdiction.

The proposed project is consistent with *Maui County General Plan 2030.* Although no roadwork would occur on the highway, the shoreline stabilization and erosion control would benefit the functionality and lifespan of the road. Motorists and pedestrians would be safer as storm waves and surges would be abated at the shoreline.

DRAFT ENVIRONMENTAL ASSESSMENT
KAHULUI BAY SHORELINE PROTECTION PROJECT

KAHULUI, MAUI, HAWAI‘I

JANUARY 2014

DRAFT ENVIRONMENTAL ASSESSMENT

KAHULUI BAY SHORELINE PROTECTION PROJECT
Kahului Beach Road, Route 3400
between Mile Markers 0.1 and 1.0

KAHULUI, MAUI, HAWAI‘I

Submitted Pursuant to the
Hawaii Environmental Policy Act,
Chapter 343 Hawaii Revised Statues, and
Title 11, Chapter 200, Hawaii Department of Health Administration Rules

by the

Department of Transportation, Highways Division
State of Hawai‘i

The following person may be contacted for additional information concerning this document:

Eddie Chiu, Project Manager
Department of Transportation
Technical Design Services Office, Design Branch
Highways Division
601 Kamokila Boulevard
Kapolei, HI 96707
(808) 692-7547

Table of Contents

Acronyms and Abbreviations

AIS	Archaeological Inventory Survey
BMP	Best Management Practice(s)
CAA	Clean Air Act
CDUP	Conservation District Use Permit
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CIA	Cultural Impact Assessment
CWA	Clean Water Act
CZM	Coastal Zone Management
dBA	A-weighted decibels
DLNR	Department of Land and Natural Resources
EA	Environmental Assessment
EO	Executive Order
EPA	Environmental Protection Agency
FONSI	Finding of No Significant Impact
ft	foot/feet
GIS	Global Information System
HDOH	Hawai‘i Department of Health
HDOT	Hawai‘i Department of Transportation
MASW	Multichannel Analysis of Surface Waves
MBTA	Migratory Bird Treaty Act
mm	millimeter
msl	mean sea level
NEPA	National Environmental Policy Act
OEQC	Office of Environmental Quality Council
OHA	Office of Hawaiian Affairs
NPDES	National Pollution Discharge Elimination System
OCCL	Office of Conservation and Coastal Lands
PM2.5	suspended particulate matter ≤ microns aerodynamic diameter
PM10	suspended particulate matter ≤ 10 microns aerodynamic diameter
ppt	parts per trillion
SHPD	State Historic Preservation Division
SMA	Special Management Area
SSV	Shoreline Setback Variance
STWAVE	Steady-state spectral wave model
µg/m3	Micrograms per cubic meter
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WQC	Water Quality Certification

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General Information Summary

Applicant:	State of Hawai‘i Department of Transportation, Highways Division Ali‘iaimoku Building 869 Punchbowl Street Honolulu, HI 96813
Owner:	Department of Transportation
Consultant/Preparer:	Oceanit 828 Fort Street Mall Suite 600 Honolulu, HI 96813
Approving Agency:	State of Hawai‘i Department of Transportation Ali‘iaimoku Building 869 Punchbowl Street Room 513 Honolulu, HI 96813
Project Description:	Kahului Beach Road Protection project is located on the north side of the island of Maui in the Wailuku District. The project site is the shoreline area situated between the Kahului Beach Road, Route 3400 and the southwest of Kahului Harbor. The shoreline embankment of the road is currently vulnerable to erosion. The proposed project involves the construction of a shoreline stabilization structure within the project limits and a restoration of area’s cobble beach. The project area extends from an existing revetment, roughly in line with Kaihe‘e Place, approximately 1730 foot along the shoreline parallel to Kahului Beach Road to the large rock revetment supporting the base of the west harbor jetty; between mile marker 0.1 and mile marker 1.0. The proposed project would be constructed with a portion of a State right-of-way and a remnant parcel, to be acquired, between State Highway and State Harbor’s jurisdiction.
Anticipated Determination:	Finding of No Significant Impact (FONSI)
Agencies Consulted:	U.S. Army Corps of Engineers State Department of Land and Natural Resources, Office of Conservation and Coastal Lands State Department of Health, Clean Water Branch State Department of Transportation, Highways Division State Department of Transportation, Harbors Division State Department of Business, Economic Development, Tourism and Management, Office of Planning

	State Department of Land and Natural Resources, Commission on Water Resource Management State Department of Land and Natural Resources, Historic Preservation Office State Department of Land and Natural Resources, Division of Boating and Oceanic Recreation State Department of Land and Natural Resources, Division of Aquatic Resources State Department of Land and Natural Resources, Division of Forestry and Wildlife State Department of Land and Natural Resources, Land Division State Department of Hawaiian Home Lands Office of Hawaiian Affairs U.S. Fish & Wildlife U.S. Coast Guard National Oceanic and Atmospheric Administration County of Maui, Planning Department County of Maui, Department of Public Works County of Maui, Department of Transportation County of Maui, Department of Parks and Recreation Alexander & Baldwin, Inc., Meredith Ching Alexander & Baldwin, Inc., Jason K. Koga Maui Redevelopment Agency Surfrider Foundation, Maui Chapter University of Hawai‘i Center, Maui Hawaiian Canoe Club Wailuku Main Street Association, Inc. Kahului Town Association Waihe‘e Community Association Young Brothers Maui Maui Beach Hotel Harbor Lights Condominium Mayor of Maui County, Alan M. Arakawa Maui County Councilmember, Donald Couch, Jr. Maui County Councilmember, Elle Cochran Maui County Councilmember, Robert Carroll Maui County Councilmember, Gladys Coelho Baisa Maui County Councilmember, Michael P. Victorino Maui County Councilmember, G. Riki Hokama Maui County Councilmember, Mike White Maui County Councilmember, Joseph Pontanilla Maui County Councilmember, Danny A. Mateo Maui Canoe & Kayak Club
Tax Map Key:	(3) 3-07-01: 07, 22 & 23
State Land Use:	Urban
County General Plan:	Urban
County Zoning:	Open Space (OS)

1 Introduction

The State of Hawaii Department of Transportation, Highways Division (HDOT) and the Federal Administration (FHWA) propose to stabilize the shoreline along Kahului Beach Road to prevent further erosion from adversely affecting the structural integrity of Kahului Beach Road. The proposed project involves the construction of a shoreline stabilization structure within the project limits. The proposed project area extends from an existing revetment, roughly in line with Kaihe'e Place, approximately 1730 foot along the shoreline parallel to Kahului Beach Road to the large rock revetment supporting the base of the west harbor jetty; between mile marker 0.1 and mile marker 1.0. The proposed project would be constructed with a portion of a State right-of-way and a remnant parcel, to be acquired, between State Highway and State Harbor's jurisdiction.

Kahului Harbor is exposed to wind and wave erosion from the north and northeast. Two large breakwaters protect the harbor; however, during intense winter storms, high-energy waves cause a wave surge which attacks the breakwaters and shoreline. Commercial piers are located in the eastern part of Kahului Harbor which services barges, container ships, passenger cruise ships, and tug boats. The Bay also offers popular recreational resources for surfing, boating, fishing, kayaking, and other water activities to the public.

Kahului Beach Road is a four lane, divided arterial highway serving residential areas and the Kahului Beach Park. For several years, the shoreline parallel to Kahului Beach Road has been eroding due to strong wave energy that typically occurs during the winter season. Originally, Kahului Beach Road was located closer to the shoreline, where the shoulder lane is currently located today. Continuous wave interaction with the road has caused beach erosion, requiring the relocation of the road mauka (landward) of the shoreline. Due to the erosion along the shoreline undermining the roadway, the HDOT plans to implement erosion control measures by proposing to construct a shoreline protection structure.

The proposed project is consistent with *Maui County General Plan 2030.* Although no roadwork would occur on the highway, the shoreline stabilization and erosion control would benefit the functionality and lifespan of the road. Motorists and pedestrians would be safer as storm waves and surges would be abated at the shoreline.

Photos showing the existing shoreline condition are shown in Figure 1-3 through Figure 1-6. The tax map key number for this proposed project is (3) 3-07:001. The State is the owner of this parcel. Federal funds are also being used to construct the proposed project; therefore a National Environmental Policy Act (NEPA) document is also being prepared for the Environmental Protection Agency (EPA).

Special environmental studies conducted for this EA include: 1) Archaeological Reconnaissance Survey; 2) Cultural Impact Assessment; 3) Biological Surveys (Flora/Fauna); 4) Benthic Survey; 5) Geophysical Survey; and 6) Geotechnical Reconnaissance Survey. A summary of these studies are provided in this EA and a copy of the detailed reports are included in the Appendices.

Government agencies, nearby landowners, and community organizations were invited to attend a Public Informational Meeting on June 22, 2011 to review alternatives for the proposed project and provide concerns and issues they had on the proposed project. On October 28, 2013, government agencies, nearby landowners, and community organizations were invited to attend a Public Informational Meeting for National Environmental Policy Act (NEPA), Chapter 343, Hawaii Revised Status (HRS) and Section 106 of the National Historic Preservation Act of 1966 as amended (2006). The community indicated that they wanted a long lasting structure that would preserve the shoreline and maintain the existing cobble stone beach.

1.1 Purpose for this Document

The purpose of this proposed project is to stabilize the shoreline to prevent further erosion from adversely affecting the structural integrity of Kahului Beach Road. During times of high surf, the waves overtop the shoreline, causing debris to wash up onto the roadway. If the proposed rock revetment is not implemented, the shoreline would continue to erode and undermine the existing Kahului Beach Road.

The proposed project requires environmental review in accordance with Hawaii Revised Statues (HRS) Chapter 343 due to the use of State funds and land for its construction. Therefore, the environmental review must comply with Hawaii Administrative Rules (HAR) Title 11, Chapter 200.

The Draft EA discloses the foreseeable environmental impacts that could result from the proposed project's implementation and commits to the employment of specific measures to avoid, minimize, or mitigate impacts to the environment. Additionally, this Draft EA contains a record of the consultation activities that have been conducted to date as part of project planning.

Federal laws such as the National Environmental Policy Act (NEPA), Section 7 of the Endangered Species Act, and Section 106 of the National Historic Preservation Act apply to the proposed project because Federal funds would be used. Compliance with these Federal environmental regulations is either ongoing or has been completed, and it documented in this Draft EA. Pursuant to NEPA, a Categorical Exclusion (CA) is anticipated for this proposed project.

Figure 1-1. Location of Kahului Beach Road. (USGS 1999)

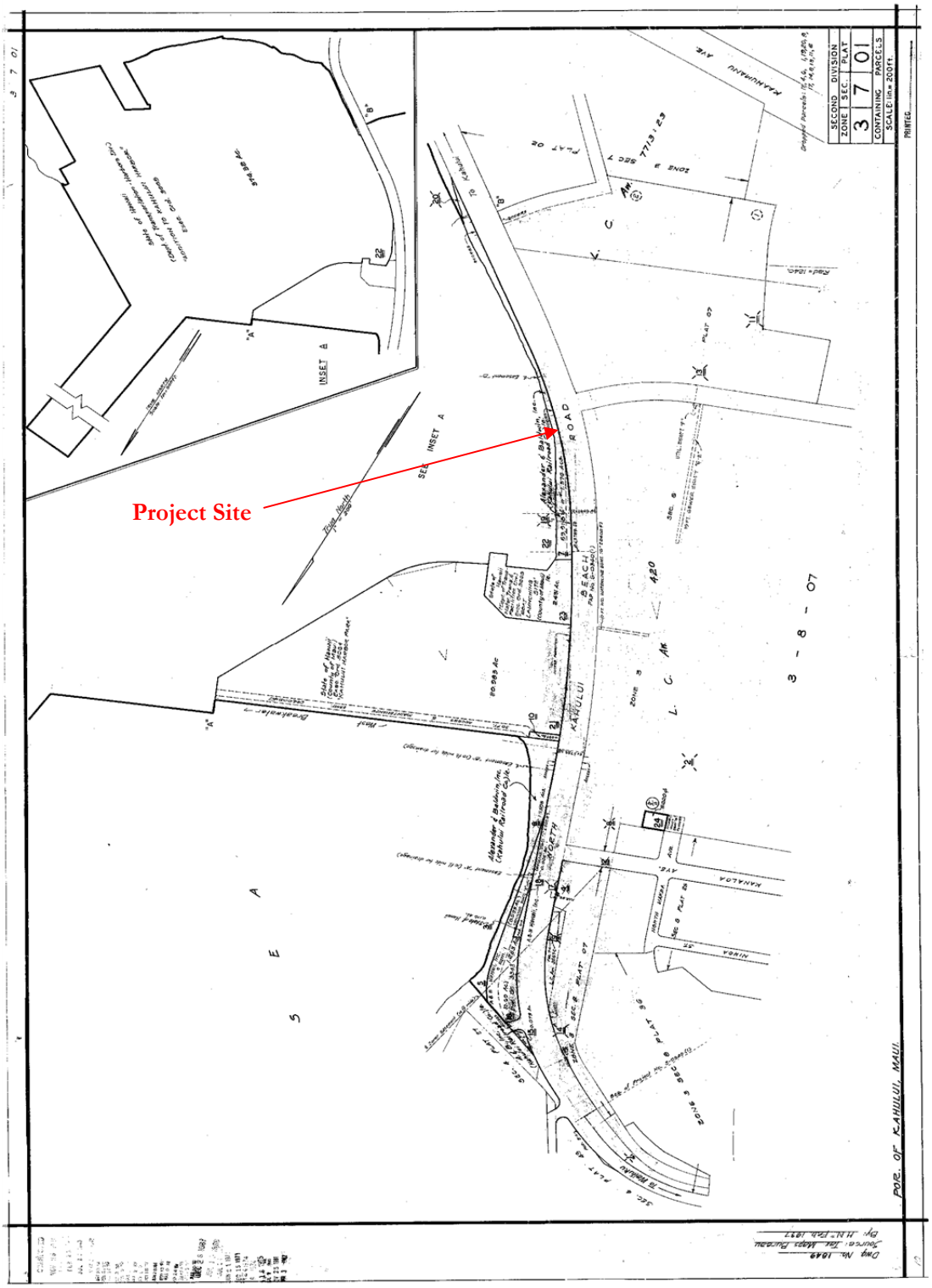

Figure 1-2. Tax Map Key of Project Site

Figure 1-3. View of the beach and the undermined Highway Shoulder

Figure 1-4. View of the Highway Shoulder

Figure 1-5. Highway Shoulder in Close Proximity to the Ocean

Figure 1-6. View of Undermined Old Highway which acts as the Highway Shoulder

1.2 Historical Erosion

Kahului Harbor was constructed by the Kahului Railroad Company in 1900. The original harbor consisted of a berthing area, a dredged channel and a 400-foot long east breakwater. In 1919, the U.S. Army Corps of Engineers (USACE) constructed the west breakwater to a length of 1,950 feet and in 1931, extended it to the current length of 2,315 feet (Sargent, et al, 1988).

Shoreline erosion problem at the beach within the Kahului Harbor basin has been a long-term issue since the construction of the harbor. Historical aerial photo analysis shows that the shoreline has been receding at an average rate of 2 inches per year since 1899 (Fletcher, et al, 2003). Figure 1-8 shows the shoreline locations through an analysis of historical aerial photo-mosaics since 1899 according to shoreline Global Information System (GIS) data provided by the Coastal Geology Group, University of Hawai‘i at Mānoa (Barbee, 2010). From 1899 to 1929, the shoreline retreated moderately along the beach in Kahului Harbor.

A groin field was constructed in 1960 along the south-east area of the harbor, effectively provided controlled shoreline erosion in this part of the beach. However, the beach next to the Kahului Beach Road has incurred more serious erosion problems since then. The shoreline in 1997 shows a small amount of seaward movement in some places. This may be attributed to the Kahului Beach Road improvement project in 1994, which refilled some material at the road embankment. The beach is typically covered by cobblestones and small rocks with a typical slope of 1:5. The beach is generally stable under light wave conditions, but is still vulnerable to erosion damage during heavy sea conditions. The current condition of the shoreline is shown in Figure 1-7. The eroding beach road embankment is a hazard and will eventually erode the road shoulder completely and adversely affect the stability and safety of the road.

Figure 1-7. Typical beach profile and the beach materials

It is therefore considered both economically and socially important to control continued beach erosion and prevent subsequent damage to the road. A long-term erosion control scheme is essential to prevent damage to the Kahului Beach Road and stabilize the shoreline.

An engineering solution for the shoreline erosion would analyze the existing littoral conditions that cause beach instability including surge levels; wave conditions in the harbor; and shoreline erosion patterns and trends. Once the causes for erosion are established, conceptual shoreline protection alternatives need to be developed and further evaluated to select the optimal solution.

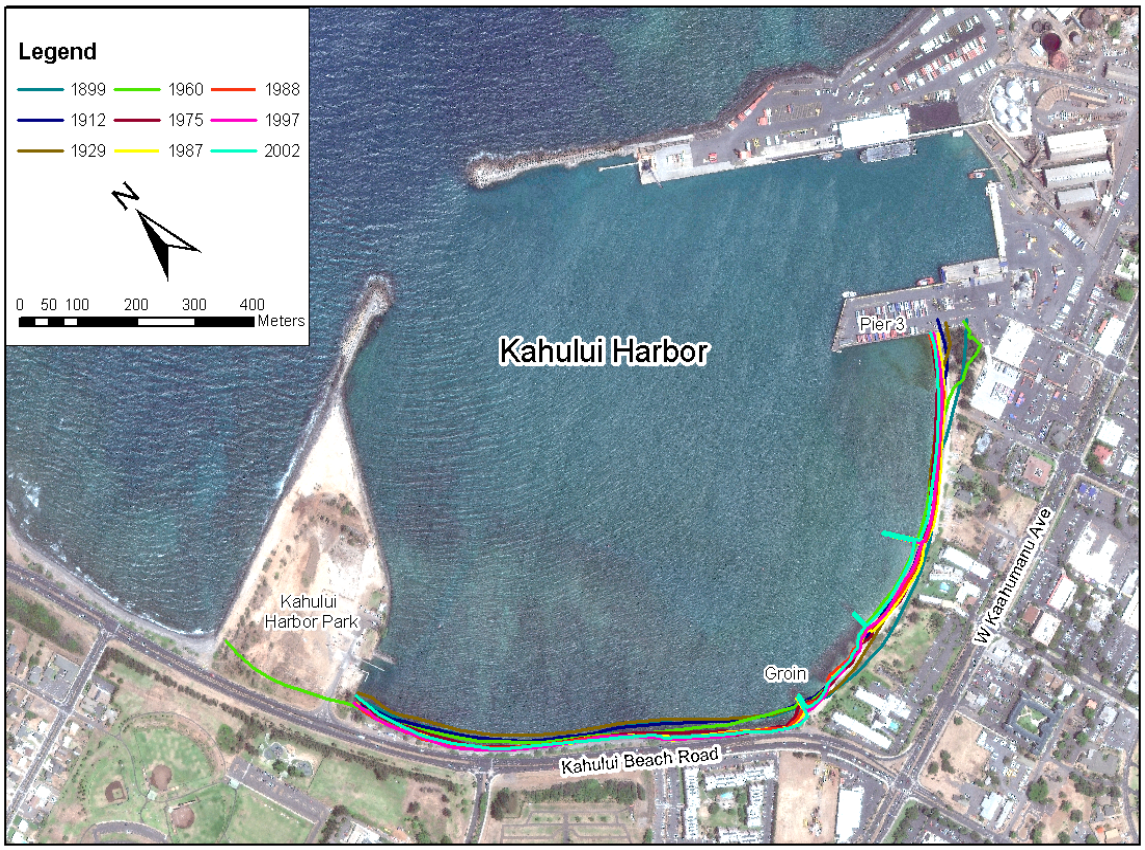

Figure 1-8. Kahului Harbor shoreline trends since 1899

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2 Project Description

2.1 Location of Project and Description

Kahului Beach Road, Route 3400, is located on the island of Maui on the north side of the island in the Wailuku District. Kahului Harbor is located in a small open embayment on the north shore of Maui and protected from offshore swells by the construction of two half-mile long jetties roughly perpendicular to each other with the harbor opening facing due north. Kahului Beach Road, Route 3400 meets the shoreline near the mid-point of the harbor and turns to the north running parallel to the pre-existing shoreline along the south-west interior border of the harbor. To the east of Kahului Beach Road, the shoreline consists of a flat silty sand beach stabilized by three rock groins fronting two small hotels. To the west of the Kahului Beach Road, and the third rock groin, the shoreline has been previously stabilized with a rock revetment extending approximately 850 feet along the shore to the intersection of Kaihe‘e Place. The proposed project area extends from this point (roughly in line with Kaihe‘e Place) approximately 1700 feet along the shoreline parallel to Kahului Beach Road to the large rock revetment supporting the base of the west harbor jetty; between mile marker 0.1 to mile marker 1.0. An aerial photo of the proposed project site is shown below.

Figure 2-1. Aerial Photo of Kahului Harbor, Maui. (Google Map, 2011)

2.2 Existing Land Use Classifications

Kahului Beach Road is located within the Urban area of Maui County in the Wailuku District. The State Land Use Commission has zoned 28,619 acres in Maui County as "U" (Urban). *Maui County Community Plan* and *Wailuku-Kahului District Community Plan* also designate the roadway area in the Urban district. The proposed project site is located within the Urban District as shown on the State Land Use Map in Figure 2-2. The coastline is designated Open Space in the *Wailuku-Kahului District Community Plan*. The open space designation is intended to limit development on certain urban and non-urban designated lands, which may be inappropriate for intensive development due to environmental, physical, or scenic constraints. See Figure 2-3.

Since the proposed project is located within the Coastal Zone Management (CZM) area, a CZM certification would be required prior to construction. The proposed project is not within the Special Management Area (SMA) of the County of Maui.

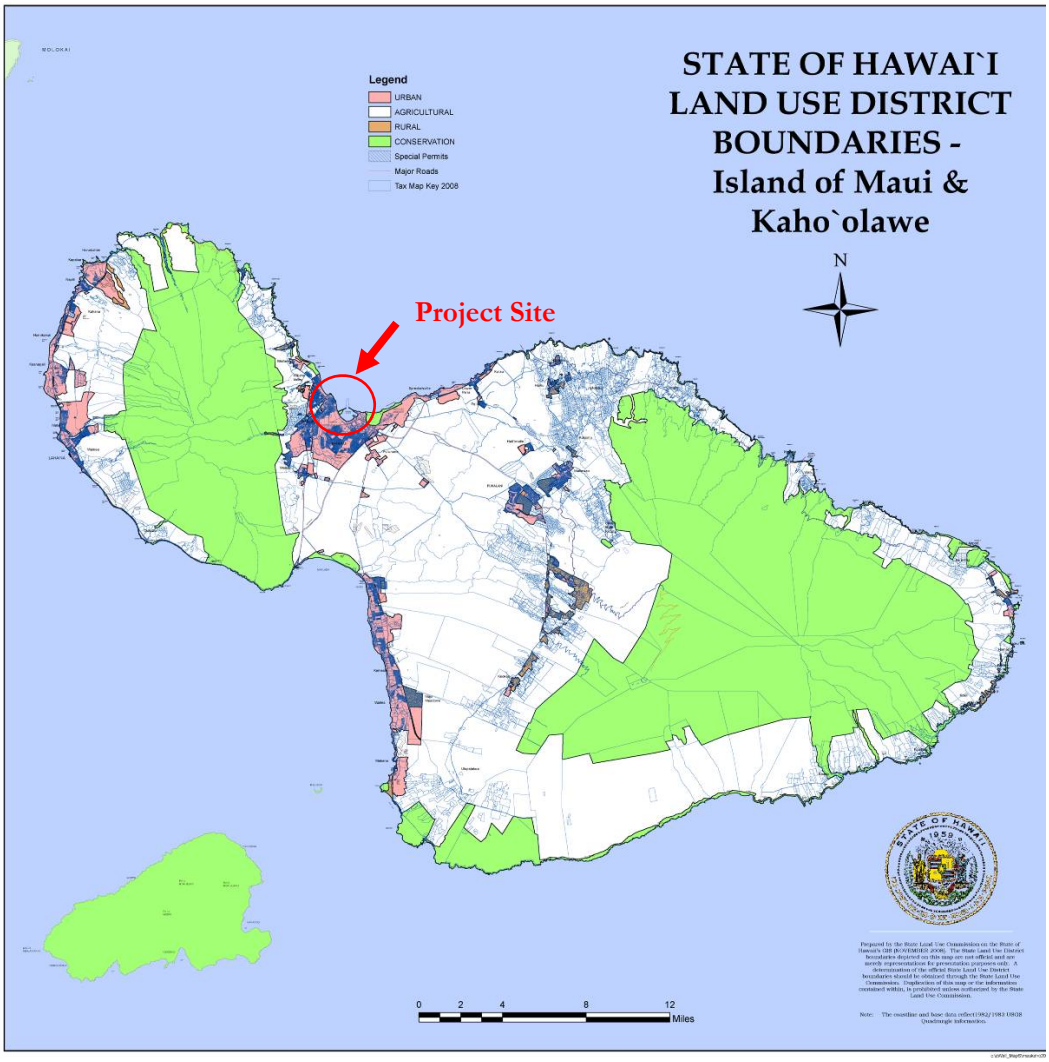

Figure 2-2. State Land Use Map

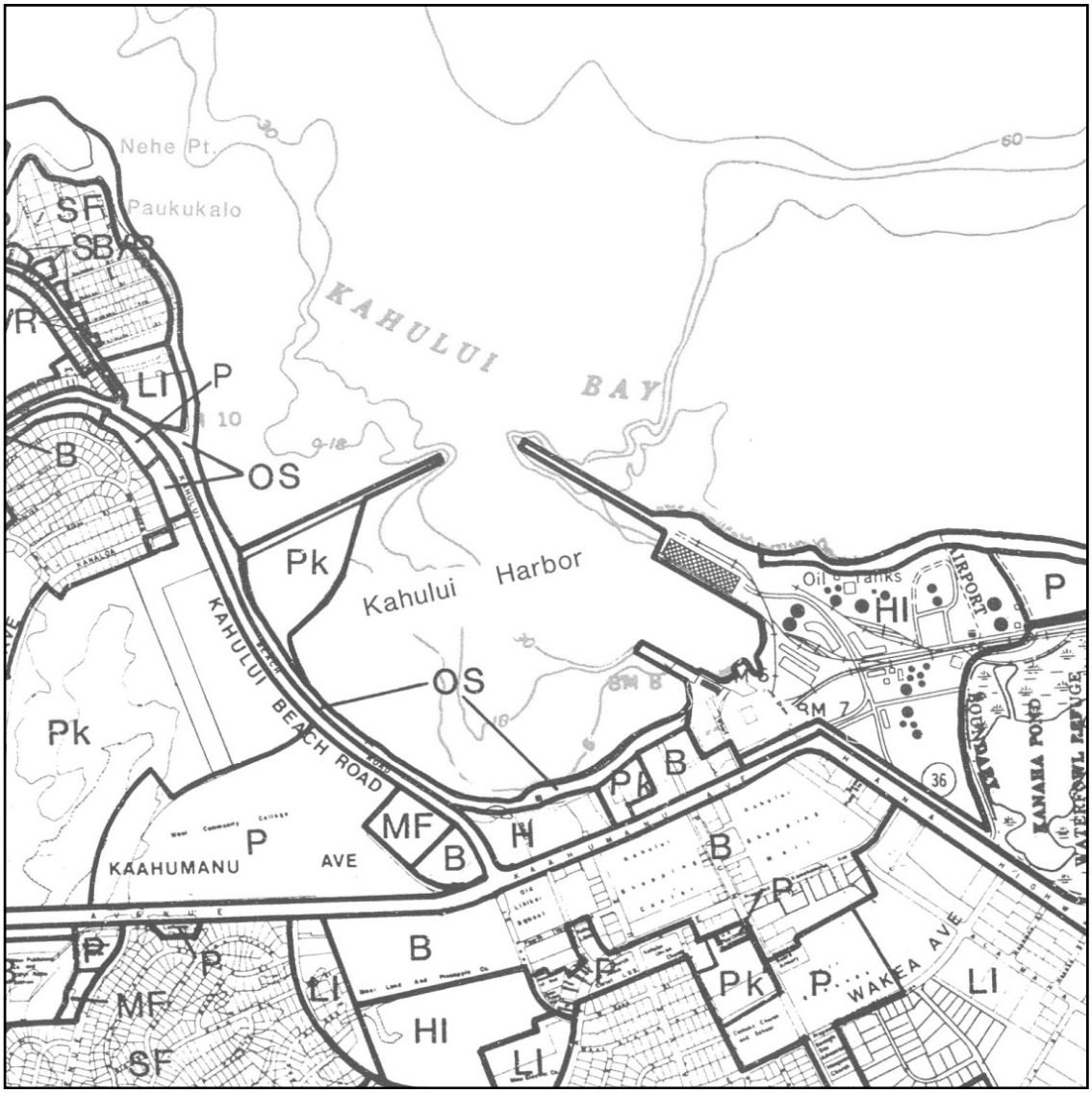

Figure 2-3. 1987 Wailuku – Kahului Community Plan Map – Open Space

3 Alternatives Considered

3.1 No Action Alternative

The no action alternative would mean that nothing is done to mitigate erosion control of the shoreline along Kahului Beach Road. Erosion would continue to occur, and eventually undermine the highway until it becomes a safety hazard for motorists and pedestrians. At that point, because in some areas the road is located in close proximity to the ocean, sinkholes, or large sections of the road could break off into the ocean, as shown in Figure 3-1 below. During storms, the waves would continue to surge onto the highway causing road closures and debris dispersion.

Figure 3-1. Sample photo of a beach road eroding

3.2 Alternative A: Rock Revetment

A common shoreline protection solution to decrease erosion is a rock revetment placed over geotextile fabric. The rock revetment acts as a buffer to the waves. As a wave breaks on a revetment, the water energy contained in the wave is absorbed in the void spaces between the rocks, reducing erosion-causing backwash. The rock revetment design is proposed to be 4.2 feet thick with a maximum slope of 1V:1.5H. The depth of the revetment toe is 4.0 feet.

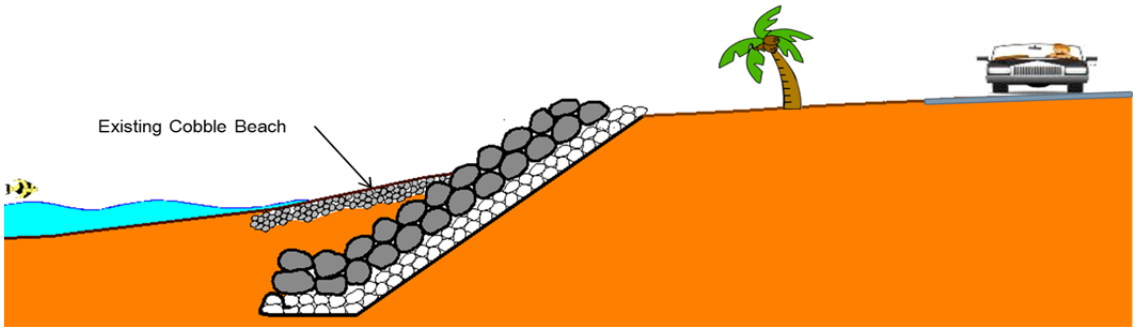

Figure 3-2. Typical cross-section of Alternative A

Figure 3-3. Example of Stone Revetment
(Courtesy of U.S. Army Corps of Engineers, http://www.poh.usace.army.mil/CW/CWPhotos-ASTu.htm)

3.3 Alternative B: Groins

Groins are low walls built perpendicular to the shoreline and provide an effective measure to reduce the long shore current and minimize sediment transport. This alternative design suggests five groins with the groin crest length of 110 feet evenly spaced at 340 feet apart along 1700 feet of shoreline using armored stones with an average size of 2.2 feet.

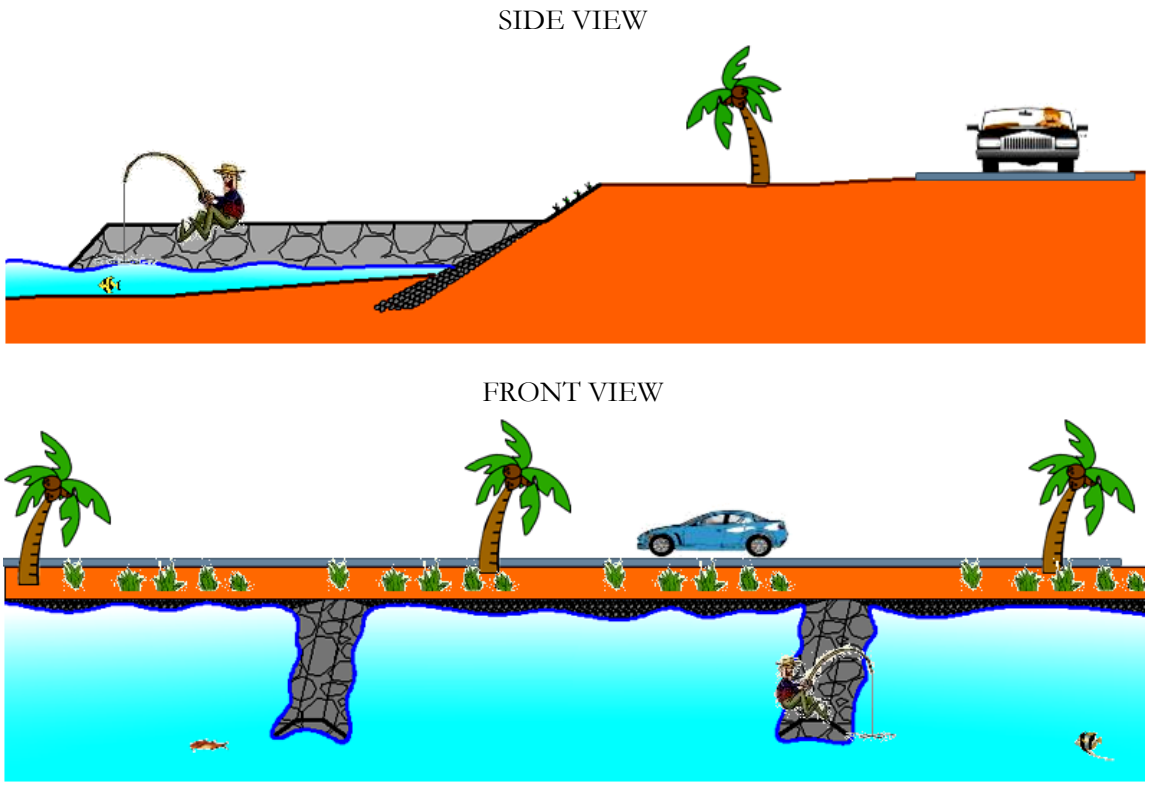

Figure 3-4. Typical cross-section of Alternative B

Figure 3-5. Example of Groins
(Photograph by Randy Schaetzl, Professor of Geography - Michigan State University)

3.4 Alternative C: Marine Mattress

A marine mattress is a large monolithic unit with porosity similar to placed riprap, and is designed to withstand heavy wave action. It is installed with a geotextile fabric to prevent migration of fine sediments from discharging into the ocean.

The proposed design has a thickness of 7.7 inches, providing shoreline protection for the 50-year storm return period waves. The design slope of the mattress is 1V:3H.

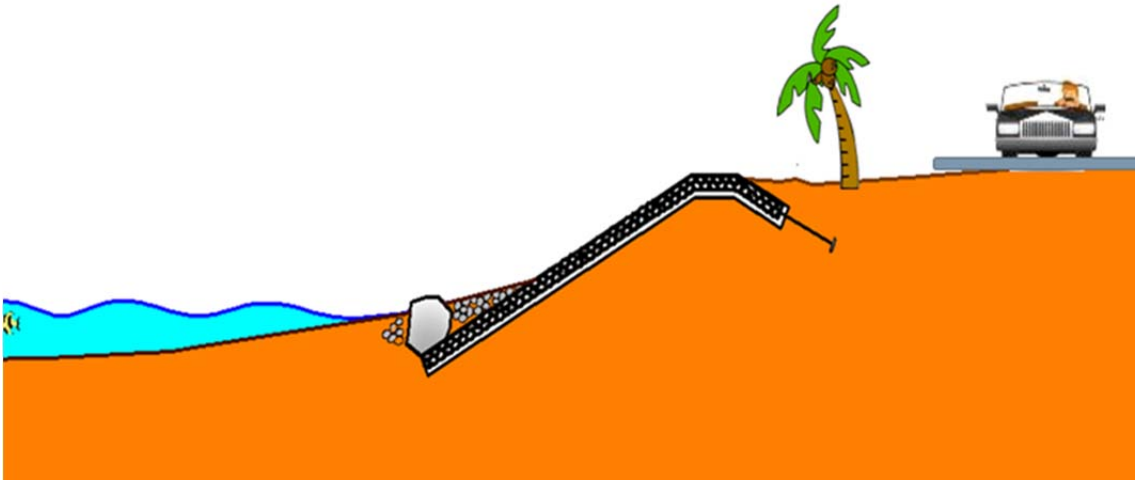

Figure 3-6. Typical cross-section of Alternative C

Figure 3-7. Example of the Marine Mattress Revetment.
(Courtesy of Government Information Agency, Guyana.
http://www.gina.gov.gy/archive/daily/b100426.html)

3.5 Alternative D: Rock Seawall

Seawalls are subject to tremendous hydraulic forces from waves, and should be constructed high enough to prevent storm-wave overtopping. Walls are embedded deep enough into the beach to prevent undermining or scouring of material beneath the wall from waves and currents.

Alternative D is a rock seawall with stones fronting the wall for toe protection. The wall is located within the roadway right-of-way. The 1V:3H slope in front of the seawall is covered with stones for toe protection to a water depth of - 4 feet mean sea level (msl). The thickness of the stones is 2-feet, which is needed for toe protection for the waves with a 50-year storm return period.

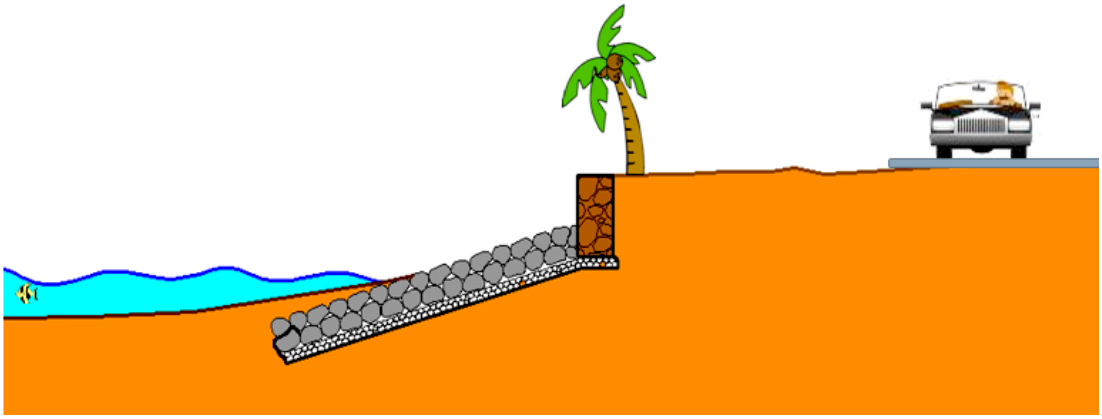

Figure 3-8. Example of Rock Seawall

Figure 3-9. Example of Rock Wall with Revetment (Oceanit)

3.6 Alternative E: Concrete Seawall

Alternative E is a concrete seawall and rock revetment that is located seaward of the roadway right-of-way. The rock revetment in front of the seawall will absorb wave energy and has a slope of 1V:1.5H. The revetment rock size for Alternative E is the same as Alternative D at 2 feet. The toe stones are expected to extend to a water depth of - 4 feet msl. For Alternative E, the toe stones in front of the sea wall serve the same functionality as the revetment in Alternative A.

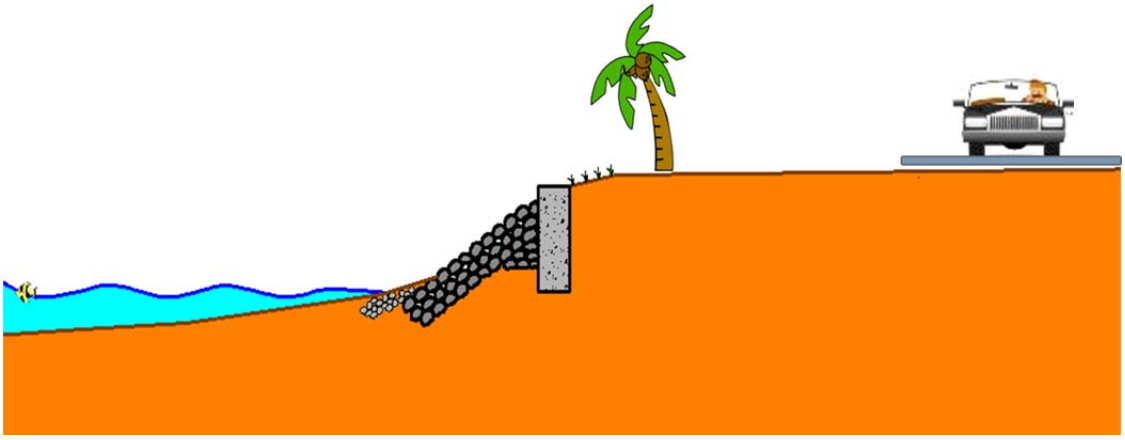

Figure 3-10. Typical cross section of Alternative E

Figure 3-11. Example of Concrete Seawall
(Courtesy of http://travel.webshots.com/photo/1206861284039119736etqigA)

3.7 Alternative F: Articulated Concrete Block Mattress

Articulated Concrete Block Mattress consists of a series of compartments linked by an interwoven perimeter. Grout ducts interconnect the compartments, and high strength revetment cables are installed between and through the compartments of grout ducts. Once filled, the articulating block mattress becomes a mattress of pillow-shaped, rectangular concrete blocks. The interwoven perimeters between the blocks serve as hinges to permit articulation. The cables remain embedded in the concrete blocks to link the blocks together and facilitate articulation.

A typical thickness of articulated block is 4, 6, 8, 10 and 12 inches. The design proposed has a thickness of one-foot, while the toe of the toe of the articulating block mat is buried to a 4 feet water depth below msl. A design crest elevation of 10 feet is required to address the relatively high run-up of waves.

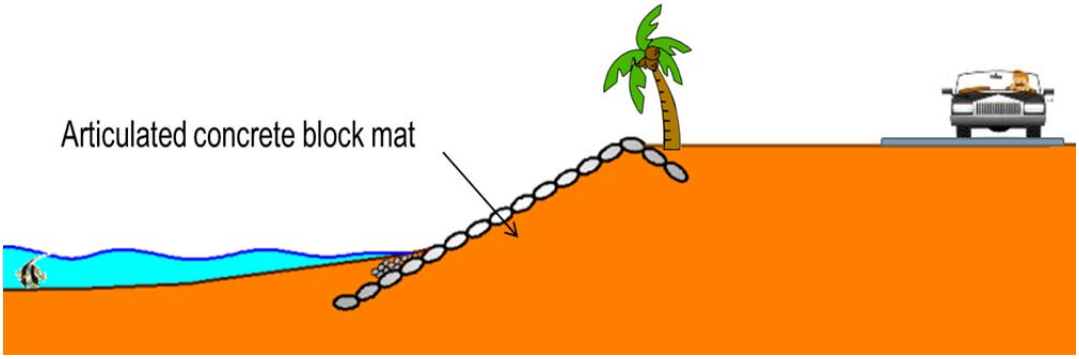

Figure 3-12. Typical cross-section of Alternative F

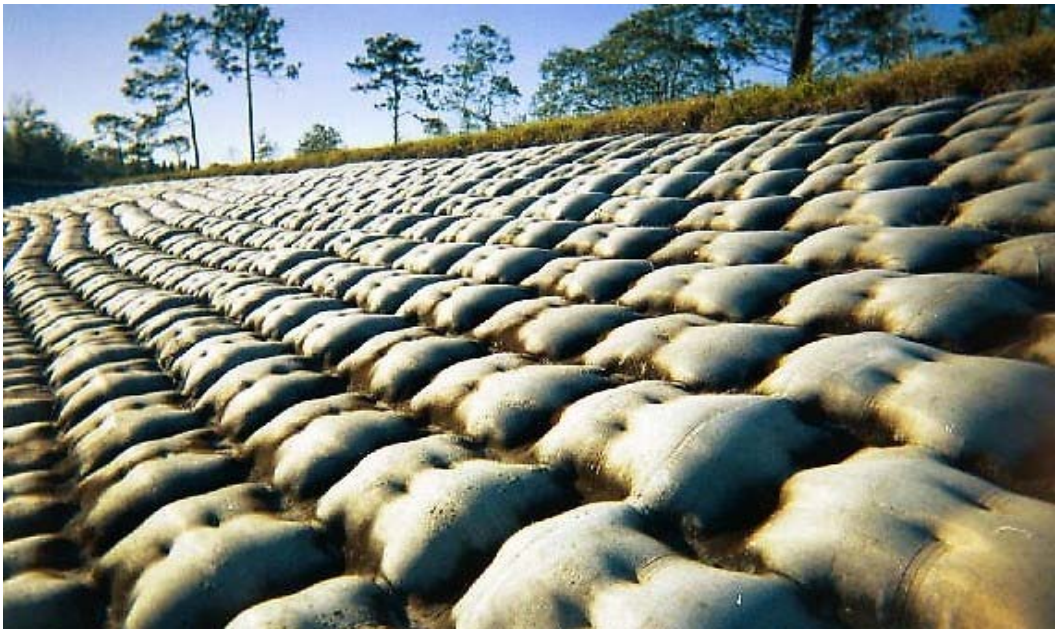

Figure 3-13. Example of the Articulated Concrete Block
(Photo by Construction Techniques, Inc.)

3.8 Alternative G: Revetment with Tribar Armors

Revetment with Tribar armor units are widely used in American Samoa and other Pacific Islands as an efficient shore protection solution. Tribars are three concrete formed cylinders connected at the center with concrete branches. Each Tribar interlocks with another creating an armored interlocked shoreline. The Tribar units have a larger porosity ratio than the natural stones which helps to dissipate wave run-up.

Design calculations indicate that half-ton tribar units are required for the prospective wave. Each Tribar unit has a fixed size, six sets of Tribar units and are placed along the revetment slope to achieve a +9 foot crest elevation with a toe depth of about -5.5 feet msl. An additional set of Tribars are placed in front of the toe to lock the toe position and protect against toe scouring.

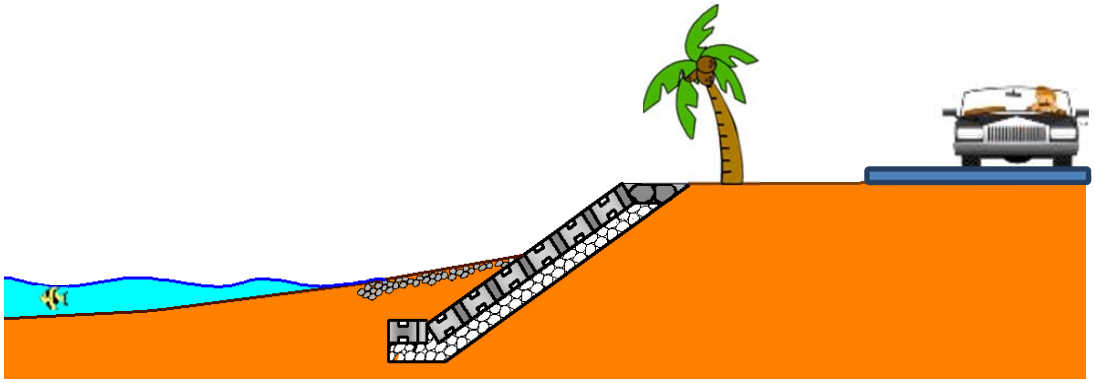

Figure 3-14. Typical cross section of Alternative G

Figure 3-15. Typical revetment with Tribar Armors

3.9 Cost of Alternatives

The cost of the alternatives was estimated based on the approximate dimensions of the conceptual designs and the length of shoreline treatment. Table 3-1 defines the costs.

Table 3-1. Alternative Cost Estimates

Alternative	Item	Unit	Quantity	Unit Cost	Subtotal($)	Total($)
A	Revetment Armor Stone	C.Y.	10578	$ 165	$ 1,745,370	$ 3,195,000
	Underlayer Stone	C.Y.	6799	$ 130	$ 883,870	
	Geotextile	S.Y.	7306	$ 17	$ 121,283	
	Excavation	C.Y.	8752	$ 32	$ 280,759	
	Soil Disposal	C.Y.	3737	$ 44	$ 163,963	
B	Groin armor stone	C.Y.	2933	$ 165	$ 484,000	$ 1,602,000
	Groin core stone	C.Y.	3153	$ 130	$ 409,933	
	Gravel	C.Y.	1417	$ 130	$ 184,167	
	Geotextile	S.Y.	7178	$ 17	$ 119,151	
	Excavation	C.Y.	590	$ 32	$ 18,927	
	Fill	C.Y.	3585	$ 108	$ 386,284	
C	Rock for toe	C.Y.	270	$ 165	$ 44,561	$ 3,298,000
	Marine Mattress	S.F.	61200	$ 23	$ 1,405,948	
	Earth Anchor	EACH	284	$ 2,000	$ 1,136,000	
	Geotextile	S.Y.	7933	$ 17	$ 131,693	
	Excavation	C.Y.	1229	$ 32	$ 39,423	
	Fill	C.Y.	3710	$ 108	$ 540,732	
D	Revetment Armor Stone	C.Y.	8815	$ 165	$ 1,454,475	$ 2,777,000
	Underlayer Stone	C.Y.	3589	$ 130	$ 466,570	
	Grouted Rock wall	C.Y.	1637	$ 234	$ 383,067	
	Geotextile	S.Y.	7556	$ 17	$ 137,662	
	Excavation	C.Y.	5833	$ 32	$ 187,133	
	Soil Disposal	C.Y.	2806	$ 44	$ 147,713	
E	Rock	C.Y.	5667	$ 165	$ 935,000	$ 2,707,000
	Rock Foundation	C.Y.	554	$ 130	$ 72,030	
	Concrete	C.Y.	2141	$ 600	$ 1,284,444	
	Geotextile	S.Y.	7367	$ 17	$ 134,221	
	Excavation	C.Y.	6065	$ 32	$ 194,552	
	Fill	C.Y.	595	$ 108	$ 86,672	
F	Articulating Block Mat	S.F.	68000	$ 29	$ 1,978,747	$ 2,769,000
	Excavation	C.Y.	1511	$ 32	$ 48,476	
	Fill	C.Y.	6881	$ 108	$ 741,480	

Alternative	Item	Unit	Quantity	Unit Cost	Subtotal($)	Total($)
G	Tribars	C.Y.	7695	$ 324	$ 2,492,341	$ 4,090,000
	Underlay Stone	C.Y.	3841	$ 130	$ 499,296	
	Geotextile	C.Y.	7556	$ 17	$ 137,662	
	Excavation	C.Y.	9067	$ 32	$ 290,859	
	Fill	S.Y.	4596	$ 108	$ 669,910	

3.10 Evaluation of Alternatives

All alternatives were evaluated using a weighted factor system. The factors represent the six main areas of importance. Each alternative receives a score comparing the importance of each factor. Each factor would receive an importance score based on the following criteria.

"1" - factor A is more important than factor B

"0" -factor A is equally important as factor B

"-1" -factor A is less important than factor B

The sum of the importance factors was normalized by adding 6 to the Weighted Score so no factor had a negative or zero weighted score. Table 3–2 gives the weighted factor for each item of concern.

Table 3-2. Weight Matrix

			Factor B						Total	Weight
			1	2	3	4	5	6		
			Erosion Protection	Total Cost	Constructability	Harbor Impact	Environment	Run-up, overtopping		
Factor A	1	*Erosion Protection*	0	1	1	1	1	1	5	10
	2	*Total Cost*	-1	0	1	1	1	1	3	8
	3	*Constructability*	-1	-1	0	1	1	-1	-1	4
	4	*Harbor Impact*	-1	-1	-1	0	0	-1	-4	1
	5	*Environment*	-1	-1	-1	0	0	-1	-4	1
	6	*Run-up, overtopping*	-1	-1	1	1	1	0	1	6

The weighted score for each factor was used to evaluate each alternative on a scale of one to seven, with seven being the most desirable. Multiplying the weighted score with the alternative score provides the final score. The alternative with the highest score would be the most desirable according to all factors considered. The results show that Alternative A (Revetment with cobbles at the toe) is the most desirable, followed by Alternative E (Concrete Seawall). The third option is Alternative G (Revetment with Tribar Armors) and the fourth option would be Alternative D (Rock Seawall). From the top two alternatives, both are durable structures requiring minimal maintenance, as a result the life-cycle cost analysis among all the alternatives was not evaluated.

Table 3-3. Evaluation Matrix

Factor	Weighted Score	Alternative Score							Final Weighted Score Per Alternative & Factor						
		A	B	C	D	E	F	G	A	B	C	D	E	F	G
Erosion Protection	10	7	1	2	4	5	3	6	70	10	20	40	50	30	60
Total Cost	8	3	7	2	4	6	5	1	24	56	16	32	48	40	8
Constructability	4	5	4	6	2	1	7	3	20	16	24	8	4	28	12
Harbor Impact	1	5	1	2	7	6	4	3	5	1	2	7	6	4	3
Environment	1	5	1	3	6	7	2	4	5	1	3	6	7	2	4
Run-up, overtopping	6	5	2	6	3	4	1	7	30	12	36	18	24	6	42
Total Score									**154**	**96**	**101**	**111**	**139**	**110**	**129**

3.11 Recommendations

Alternative A, a Rock revetment with cobbles at the toe is recommended. This alternative provides erosion protection, has a moderate cost, is can be easily constructed, has a low impact on the harbor, and has a low impact on the environment. Alternative A offers a solution that will protect the integrity of the shoreline and the adjacent Kahului Beach Road. Rock revetment is extremely durable and can last more than 50 years. The rock revetment will initially need maintenance as the rocks begin to settle, then periodically rocks may need to be added or moved if they become displaced by wave action. The projected cost for this design is roughly $3,195,000. Alternative A will blend well with the existing environment while still providing access to the shoreline. Alternative E (Concrete Seawall) is the second highest rated alternative to construct. A main difference between Alternative A and Alternative E is constructability. The third option is Alternative G (Revetment with Tribar Armors) and the fourth option was Alternative D (Rock Seawall).

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4 Physical, Biological and Cultural Environment

4.1 Climate, Topography, and Soils

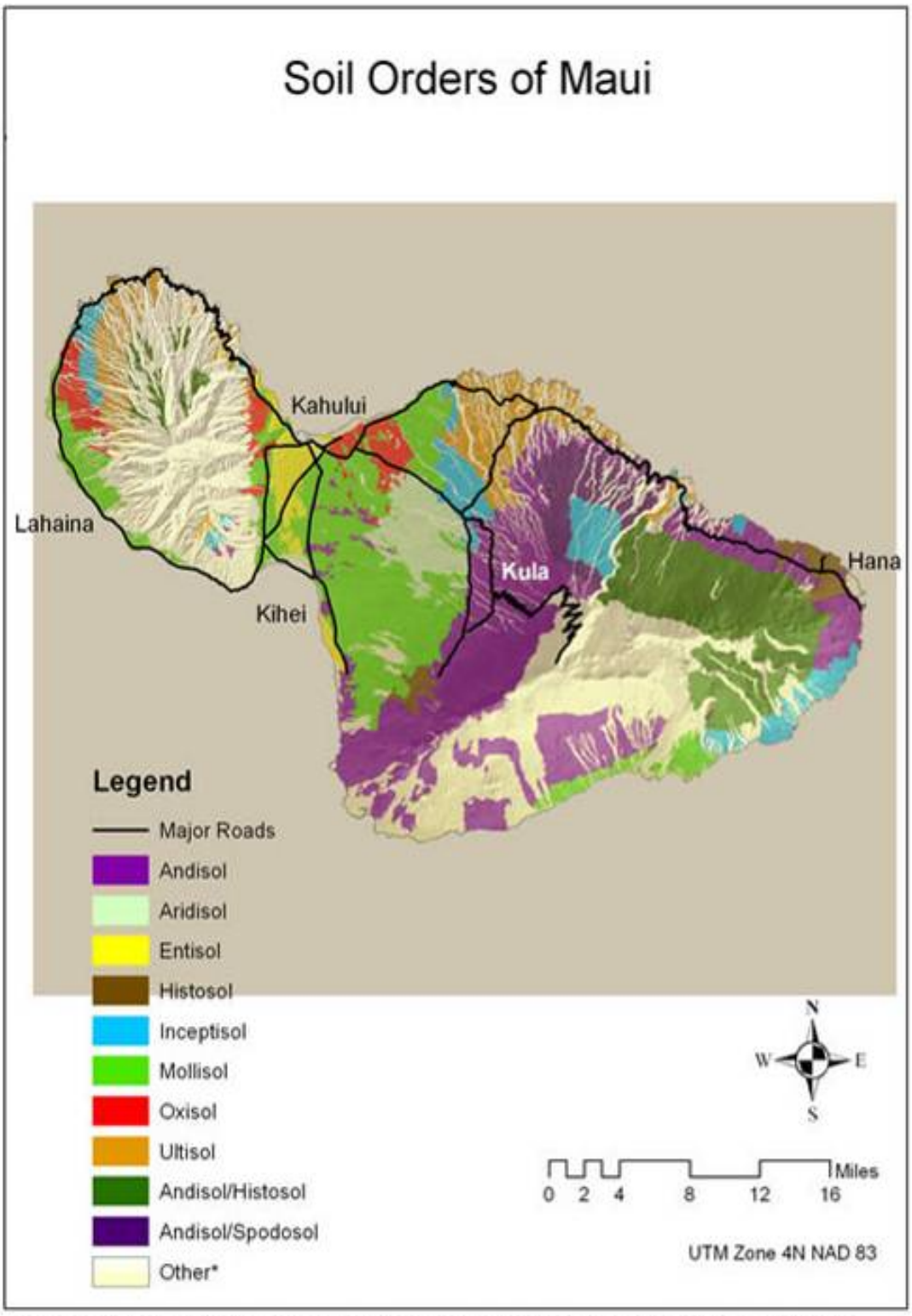
As the second largest island in the State of Hawai‘i, Maui is approximately 727.2 square miles and is made up of two volcanoes, the west Maui volcano, and Haleakalā volcano. The West Maui Volcano, also known to the Hawaiians as Mauna Kāhalawai, forms a shield volcano at 5,788 feet. On the East side of Maui, Haleakalā rises to more than 10,000 feet above sea level. Between the volcanic masses lies a valley that has been formed by sandy erosional deposits. Although the western volcano has eroded considerably and is cut by peaks and drainages, the eastern sides of both volcanoes are carved into deeply incised valleys and steep ravines that run down slope to the rocky shoreline.

Maui, like the other Hawaiian Islands, has a mild semi-tropical climate that varies across the terrain. Average temperatures range from 83 degrees Fahrenheit in the warmer months and 67 degrees Fahrenheit in the cooler months. In the proposed project area, average rainfall is between 120 inches and 160 inches. Average rainfall varies across the county at 81 inches in Hāna, 26 inches in Moloka‘i, and 15 inches in Lāhainā. The northeast trade winds blow approximately 80 percent of the year, but are interrupted by Kona storms from the southeast during the winter months.

The island of Maui is comprised of 10 soil associations. Soil associations in the vicinity of the proposed project are comprised of Entisol soil types. The main type of soil found in the area are classified as Pulehu-Ewa-Jaucus association which are deep, nearly level to moderately sloping, well drained and excessively drained soils that have a moderately fine textured to coarse-textured subsoil or underlying material.

4.1.1 Impacts & Mitigation

Stabilizing the shoreline along Kahului Beach Road would not have any adverse impacts to climate, topography, or soils. Instead the proposed project is a mitigation measure to preserve the shoreline and roadway and reduce coastal erosion. There would be no other mitigation necessary.



*Beaches, dune land, Koele rocky complex, Naiwa silty clay loam, Puuone sand, cinder land, ʻaʻa lava flow, rock land and outcrop, rough terrain, stony land, and Uma coarse sand

Figure 4-1. Soil Orders of Maui Map

4.2 Natural Hazards

Natural hazards consist mainly of hurricanes, tropical or severe storms, flooding, tsunamis, landslides, high wind, fire, earthquakes and volcanic activity. Haleakalā Mountain is considered a dormant volcano. Hazards from volcanic activity are not expected. Maui is also within earthquake zone 2B, on a scale of 0 to 4 with 4 having a 10 percent chance of severe shaking in a 50-year interval and 0 having no chance of severe shaking.

4.2.1 Impacts

Natural hazards associated with this area cannot be controlled only remediated for after the events occur. The shoreline protection structures proposed in this project could be affected by natural hazards particularly hurricanes, tropical and severe storms, flooding, tsunamis, and although less likely, earthquakes. Wave analysis that takes into account large waves and surges generated by severe storms and hurricanes, has been used to design the alternative structures for the proposed project site. Hence, the proposed alternatives are anticipated to withstand hurricane and severe storm winds and wave action. However, tsunamis, severe flooding earthquakes and unusually large tropical storms and hurricanes may cause damage to any of the proposed alternatives and make for unsafe conditions.

The proposed alternatives are not anticipated to increase the severity of any of these natural hazards. It is likely that the alternatives would help mitigate and dissipate wave impacts protecting the roadway therefore lessening the affect for damage and unsafe conditions due to some natural hazards.

4.2.2 Mitigation

To help avoid failure of the structure due to natural hazards, protective measures would be taken such as lining the land side of the structure with geotextile fabric to prevent soil loss and erosion behind and under the structure. Regular maintenance should be performed such as inspections of the structure to look for areas of soil loss or failure, particularly after a natural hazard event.

4.3 Geotechnical and Geophysical

Two exploratory borings were drilled and tested during this study. This analysis along with geophysical reconnaissance and available geologic and soil survey maps were studied to evaluate the geotechnical conditions of the proposed project area. The results and analysis from the geotechnical and geophysical investigations were completed by Yogi Kwong Engineers, LLC in November of 2011. Four primary types of soil were encountered in both boring cores: fill material, coralline deposit, alluvium, and basalt lava flows. The first boring drilled was located on the east end of the study area was drilled to a depth of 30 feet and did not encounter basalt. The second boring drilled was located on the west end of the study area, encountered basalt at 12 feet below grade. Groundwater was encountered in both boring sites at 11.9 to 17.6 feet below grade.

A geophysical investigation was performed using a Multichannel Analysis of Surface Waves (MASW) which determines variations in surface wave velocities. This information can be used to infer rock and soil types, stratigraphy and soil conditions. The results of this survey indicated that the depth to probable basalt lava flows decreases from approximately 40 feet near the east end of the study corridor to approximately 10-15 feet near the west end of the study corridor. The results from the geotechnical borings correlate to the geophysical survey.

The subsurface conditions encountered during the geotechnical investigation indicate there may be some difficulties in construction and installation of certain shoreline protection structures as follows.

- Cobbles, boulders and cemented zones may obstruct sheet pile driving and caisson drilling.
- Beach and dune sands flowing in and out of unsupported excavation due to the presence of groundwater.
- Over-excavation and increased construction quantities may be encountered due to removal of subsurface obstructions, breaking up rock ledges, cemented zones, cobbles and boulders.

4.3.1 Impacts & Mitigation

The shoreline protection alternatives are not anticipated to impact the geophysical conditions of the proposed project site and therefore no mitigation is required.

No sheet pile driving or caisson drilling would be conducted for this proposed project. During excavation best management practices (BMP) would be implemented to prevent material from flowing in and out of the construction area. These BMPs include a temporary sand bag breakwater around the construction area to prevent waves from entering the site. In addition, the existing cobbles would be removed and stockpiled, then put back onto the beach when the toe is covered with the excavated material, which is mainly sand.

4.4 Ocean and Coastal Environment

A benthic survey was conducted along three transects aligned perpendicular to the shoreline by Oceanit Laboratories Inc. on October 5th, 2010. The benthic survey transects started at the current waterline and extended 150 feet into the bay. During the Benthic survey the water quality was also assessed. The near shore salinity was 31-32 ppt, slightly lower than open ocean salinity (35 ppt) as a result of the inflow of groundwater and stormwater. The turbidity reading was lower adjacent to the existing revetment and the center of the shoreline where the beach is dominated by boulders and cobble. The turbidity increases rapidly near the west end of the beach where erosion is occurring. Flotsam, primarily plastic debris, was prevalent along the near shore transect. The substrate at the shoreline progressed from sand, gravel and cobble in the 0-50 foot zone. Beyond 50 feet from the shore, the bottom showed increased consolidation and decreased vertical roughness. The interstices between rocks were filled with rubble or sand and formed a relatively flat surface.

An analysis report of the erosion on Kahului Beach Road was completed by Oceanit Laboratories Inc. in March of 2012. The near shore wave conditions at the erosion site were determined by using the offshore wave conditions developed from buoy data as an input to wave transformation and erosion models. The design water level elevation and the design wave parameters were determined from the model results. Critical erosion areas were identified and the alternate shoreline stabilization concepts were developed by further evaluation of the other site conditions and model results.

Kahului Harbor is exposed to several types of waves: North Pacific swells from far away storms; local wind waves, Kona storm and hurricane waves and tsunami waves. Generally, the waves that damage the beach road are swells generated by large storms originating in the North Pacific Ocean.

The design wave height for the shore protection structures is controlled by the depth-limited wave breaking condition. There is a dredging and deepening plan (*Kahului Commercial Harbor 2030 Master Plan, 2007*) and the shoreline protection alternatives are designed to be safe during this process.

One of the major causes of shoreline erosion over the long term is attributed to sea level rise. The estimated mean sea level rise from Kahului ranges from 1.79 mm per year to 2.85 mm per year based on monthly mean sea level data from 1947 to 2006. This is equivalent to the average sea level rise of 0.76 feet in 100 years.

A steady-state spectral wave model (STWAVE) was used to simulate wave propagation from the deep ocean into Kahului Harbor. The model was then verified using historical data from a buoy located inside the harbor. Storm surges were estimated according to the historical hurricane event for a 50-year return period.

The results show that larger waves do not produce proportionately higher wave heights at the shoreline due to depth limited wave breaking and energy dissipation. As the waves approach the shore, they undergo a nonlinear dispersion process, which includes shoaling, refraction, diffraction, wave breaking and dissipation. In sections near the southeast end of the shoreline, the wave heights are comparably higher inside the harbor indicating higher rates of erosion. The results indicate that the wave heights for higher storm period waves are elevated. This is due to the increased still water level from previous waves. The design wave heights for the shore protection structures are selected from the maximum values in the wave model results.

An erosion analysis was performed to assess the potential causes of erosion and guide the development of the conceptual shoreline protection alternatives. The wave and erosion analysis show that wave turbulence in the breaker region combined with the wave induced littoral currents move sand adjacent to the beach. This type of erosion requires upland protection such as revetments to counteract wave breaker induced erosion. This erosion can also be reduced by the construction of sand barriers such as groins to block the sand movement across the beach and encourage sand movement out to deeper water, or nourishing the eroding area with materials coarse enough to withstand movement by waves and currents. The conceptual designs developed for the proposed project are based on these findings.

4.4.1 Impacts

All of the alternatives for this proposed project would have the effect of impacting the shoreline. The purpose is to protect the shoreline and therefore the coastal environment would be affected. However, it is not anticipated that there would be any adverse effects to the shoreline. The alternative structures were designed based on the wave and erosion models described above in section 4.4 Ocean and Coastal Environment. The structures are designed to dissipate the waves, discouraging the waves from further eroding the soil and rock on the shoreline. The structure may deflect some of the wave energy back into the harbor. This is expected to be minimal since most of the wave energy would be dissipated.

During construction, excavation and grading would cause an increase in sediment release into the ocean.

4.4.2 Mitigation

Best management practices (BMPs), such as sand bags or berms and geotextile fabric around construction in the water would be implemented to minimize the sediment and pollution caused during construction. The contractor should consider the weather and tidal conditions while doing construction in the water. Work should be performed during low tides or incoming tides and during low wave and rain conditions. All construction would be halted during storm conditions.

4.5 Aquatic Resources

A benthic survey and an aquatic flora and fauna survey was performed for the Kahului Beach Road proposed project area to investigate the aquatic resources at the proposed project site

The benthic survey was performed by Oceanit on October 5, 2010 which identified algae species over one inch. Furthermore, algae mats were observed, but no samples were taken of the algae mat for identification. Macro invertebrates were also identified at the site, but small cryptic or burrowing invertebrates were not identified.

The fish observed were two inches or less in length. There were four types of macro algae species identified. The dominant invertebrate was one or more species of colonial anemone. There were no significant corals or endangered, threatened or protected aquatic species observed during the benthic survey. There was one small coral observed about 100 feet from shore, *P. damicornis*. This is a rapidly growing adventurous species that often colonizes marginal habitats subject to turnover due to high surf or fresh water inundation.

An aquatic flora and fauna survey for Kahului Beach Road was also performed by AECOS in August of 2010 which identified and documented marine fauna by walking the length of the entire proposed project. The shoreline area is composed of cobble and sand beach with occasional boulders. Throughout the Hawaiian Islands, tidal marine environment is an environment where several species are commonly found. Some species endemic to Hawaii that were commonly or occasionally observed were: the Nerite snail

or *pipipi (Nerita picea)*; Black purse shells *(Isognomon californicum)*; and *ʻopihi (Cellana exarta).* Many of the individual species were larger in size than 1.25 in (3.18 cm) shell diameter (legal take size) (DLNR, 1989). Other commonly observed species included: the Hookweed *(Hypnea musciformis)*; *limu ʻakiʻaki (Ahnfeltiopsis concinna)*; *Hydrolithon onkodes*; and False*ʻopihi (Siphonaria normalis)*. *ʻAʻama* crab (*Grapsus tenuicrustatus*) is locally abundant on the armored boulder shoreline at the southern end of the proposed project area.

The portion of the proposed project area outside of the harbor has little marine biota, which is due to the absence of large boulders. This area is exposed to ocean waves, which move the cobbles and substratum, preventing marine biota growth. However, driftwood is commonly found along this shoreline.

4.5.1 Impacts

There were no marine species currently listed or proposed for listing under the Federal or State of Hawaiʻi endangered species during the course of this survey. No impacts on the aquatic resources are expected and no mitigation would be necessary.

4.6 Botanical Resources

The flora and fauna survey performed by AECOS in August of 2010 identified botanical resources. The entire length of the proposed project site was inspected. Plants were identified either in the field, through reviewing photographs or by studying samples in the laboratory.

The species identified during the field investigation were a combination of dry coastal scrubland and ruderal. The most abundant vegetation types along the survey area were tree heliotrope (*Tournefortia argentea*), *naupaka* (*Scaevola sericea*), *ʻakuliʻkuli* or sea purslane.

(*Sesuvium portulacastrum*), beach morning glory (*Ipomoea pescaprae)* grows along the shoreline, especially in areas with small sand dunes and seaside heliotrope (*Heliotropium curassavicum*) a salt tolerant succulent.

The vegetation near Kahului Beach Road varied somewhat from the shoreline vegetation. Some plants commonly observed in the proposed project work area included: hybrid pluchea (*Pluchea* x *fosbergii*); bristly foxtail (*Setaria verticillata*); Australian saltbush (*Atriplex semibaccata*); *koa haole* (*Leucaena leucocephala*); silky jackbean (*Canavalia sericea*), a leguminous vine; and bougainvillea (*Bougainvillea glabra*). In addition, several specimens of tree tobacco (*Nicotiana glauca*) were observed. These are one of the preferred food sources of the Blackburn's Sphinx Moth (*Manduca blackburni*), a State and Federally listed endangered species (DLNR, 2010; USFWS, 2010). No moths or caterpillars were observed during the field survey. However, Blackburn Sphinx Moth is indigenous to the Kahului area and the critical habitat which is a segment of coastal scrubland extending from Kaʻā Point to the west end of Kanahā Beach Park is located a mile east of the proposed project site at Kanahā Pond.

4.6.1 Impacts

There were no botanical species currently listed or proposed for listing under the Federal or State of Hawai‘i endangered species statutes observed or detected during the course of this survey. Thus no impacts are expected on vegetation and plant species. However, the tree tobacco *(N. glauca)*, was observed and is known to be a food source for the Blackburn's Sphinx Moth Larvae, which is listed as a State and Federally endangered species.

4.6.2 Mitigation

The tree tobacco plants would be inspected by a qualified entomologist immediately prior to removal or any disturbance related to this proposed project. Should specimens of Blackburn's Sphinx Moth Larvae be observed during the inspection, the proposed project construction would be modified to avoid any disturbances to the Blackburn's Sphinx Moth.

4.7 Avian, Terrestrial Fauna and Feral Mammals

During the flora and fauna survey performed by AECOS in August of 2010, avian species and marine and terrestrial fauna was identified and documented by a walking survey the entire length of the proposed project. In addition, there were three avian count stations located in the proposed project area. Visual observations were made from each station for twenty minutes and species were identified and documented.

During the walking survey and count station observations eight different species of birds were identified, representing six families. Six species recorded are considered to be introduced or naturalized to the Hawaiian Islands: Myna (*Acridotheres tristis*); Zebra Dove (*Geopelia striata*); Rock Pigeon (*Columba livia*); Spotted Dove (*Streptopelia chinensis*); House Finch (*Carpodacus mexicanus*); and Cattle Egret (*Bubulcus ibis* L.). Two species are indigenous to the main Hawaiian Islands: Wandering Tattler (*Tringa incana*), a wading bird, and Brown Noddy (*Anous stolidus*), a seabird.

The Wandering Tattler, Brown Noddy, and Cattle Egret (*Bubulcus ibis*) all sighted at the proposed project site are protected by the Migratory Bird Treaty Act (MBTA) of 1918. Protection via the MBTA is administered by the U.S. Fish and Wildlife Service (USFWS) and implemented through the protection or regulation of taking of a listed species including nests, eggs, and feathers.

4.7.1 Impacts

There were no avian or mammalian species currently listed or proposed for listing under the Federal or State of Hawai‘i endangered species statutes observed or detected during the course of this survey. The proposed project would not impact avian or mammalian species in the proposed project area.

4.7.2 Mitigation

No mitigation is planned because there is no identified habitat for the avian and mammalian species observed in the proposed project area.

4.8 Archaeological and Cultural Resources

An archaeological assessment was conducted regarding the erosion abatement measures on the Island of Maui. The purpose of the assessment was to determine the presence or absence of architecture, midden deposits, artifact deposits on the surface of the proposed project area, as well as assess the potential for the presence of subsurface cultural deposits. The survey is documented in a report dated October of 2010 by Scientific Consultant Services, Inc. which assessed approximately 1700 feet of shoreline along Kahului Harbor.

A pedestrian survey was conducted which covered the entire proposed project area. The State Historic Preservation Division (SHPD) concluded that testing was not necessary given that the proposed project entails adding boulders, concrete and soil to the area, but does not involve any significant excavation. Prior to conducting the survey, an inventory survey of the site was completed.

The area surveyed included all of the land from the high tide mark to the northwest (*makai*) shoulder of Kahului Beach Road (approximately 1.25 acres). The inventory survey identified archaeological studies conducted around the perimeter of Kahului Bay. Eight archaeological sites were located in close proximity to the proposed project area. The studies of these sites identified cultural deposits of remnants of the old Kahului Railroad Bed, historic refuse, as well as early pre-Contact artifacts, midden, and scattered human remains. Many of the cultural and pre-Contact material were over a meter in depth, in secondary fill deposits or in lithified dune sand.

The results of the field survey conclude that there were no additional sites of midden scatters or surface features identified. A small cobble beach was located in the northwestern portion of the proposed project. Sediments in the eroding bank have a top layer of compacted waterworn pebbles and cobbles over a layer of compacted waterworn cobbles and brown silty sand. The bottom layer is dark reddish brown silty clay. Above the beach is worn asphalt and compacted fill material, which was most likely imported. In the eastern section, the silty clay is no longer visible and the beach extends into the naupaka vegetation adjacent to the road shoulder.

A Cultural Impact Assessment (CIA) was conducted for approximately 1700 feet of shoreline along Kahului Harbor by Scientific Consultant Services, Inc. and documented in a report dated January of 2011. The purpose of this assessment was to identify the possibility of ongoing cultural activities and resources within a project area, or its vicinity, and then assess the potential for impacts on these cultural resources. This study was prepared in accordance with the Guidelines for Assessing Cultural Impacts (Office of Environmental Quality Control (OEQC) 1997). The report contains archival and documentary research, as well as communication with organizations with knowledge of the project area, its cultural resources, and its practices and beliefs.

Archival research was conducted focusing on historical documents both published and unpublished. This includes legendary accounts from native and early foreign writers, early historical journals and narratives, historic maps and land records, historic accounts, and previous archaeological project reports.

Interviews were conducted in accordance with Federal and State laws, and guidelines, with knowledgeable individuals who may be able to identify cultural practices in, or in close proximity to, the proposed project area. If they had knowledge of traditional stories, practices and beliefs associated with a proposed project area or if they know of historical properties within the proposed project area, they were sought out for additional consultation and interviews.

Letters were sent to organizations whose jurisdiction included knowledge of the area. Consultation was sought from Phyllis (Coochie) Cayan, History and Culture Branch Chief with SHPD; the Central Maui Hawaiian Civic Club; Office of Hawaiian Affairs; O'ahu, Office of Hawaiian Affairs, Maui Branch; member of the Burial Council, William Maxwell; Hirano Rodrigues, Cultural Historian with DLNR; and Department of Planning, Cultural Resources Commission.

A Cultural Impact Assessment Notice was published on November 23, 24, and 28, 2010 in *The Honolulu Advertise*r, the *Maui News* and in the December issue of the Office of Hawaiian Affairs (OHA) newspaper, *Ka Wai Ola*. These notices requested information of cultural resources or activities in the area of the proposed project. A Public Notice was published in *The Honolulu Advertiser* on October 14, 2013 and the *Maui News* on October 15, 2013 announcing a Public Informational Meeting for National Environmental Policy Act (NEPA), Chapter 343, Hawaii Revised Status (HRS) and Section 106 of the National Historic Preservation Act of 1966 as amended (2006) at Maui Community College on October 28, 2013. In addition, the Section 106 Consultation was announced in the October issue of the Office of Hawaiian Affairs (OHA) newspaper, *Ka Wai Ola*. These notices requested information of cultural resources in the area of the proposed project.

There are several cultural activities regularly occurring at the proposed project area. The western side of the bay where the proposed project area is located is known for fishing, surfing, and jet skiing. A launch ramp providing ocean access for private boats is located south of the Kahului Harbor Park. This area is used by fishermen seasonally to catch: *'opae* (shrimp), *'ama'ama* (mullet, *Mugil cephalus*) and *ulua* (*Carangidae* sp.). The area from Kahului Harbor Park to Maui Beach Hotel is used intermittently year around to fish for *papio* (*Carangidae* sp.) and to gather *limu.* When the waters are clear, diving for *he'e* (octopus) takes place within the harbor (McGerty and Spear 2001). During the winter season, surfing and jet-skiing activities occur inside the harbor. The largest cultural event of the year for the west side of Maui is the Hanapa'a Fishing Tournament held in the second or third week of July. Boats use the Kahului Harbor Park launch ramp to enter the harbor.

The results of the information gathered from the CIA show that the general area of the proposed Kahului Beach Road shoreline protection project is presently used for many cultural activities. However, the proposed shoreline protection would not impact any of

the cultural activities, but would stabilize the shoreline and allow a safe place for the continuation of any cultural activities. In conclusion, the proposed shoreline protection project would not negatively affect the cultural resources and activities pursuant to Act 50, concerning the exercise of native Hawaiian rights, or any ethnic group, related to gathering, access or other customary activities.

In addition, according to the *Wailuku-Kahului Community Plan (2002)*, one of the community's goals is to establish recognition of the culturally sensitive areas along Kahului Beach Road.

4.8.1 Impacts

There were no cultural remains observed and the excavation area associated with the proposed project is comprised primarily of fill material. Therefore, it is concluded that this proposed project would cause no adverse impact to any significant surface sites.

However, during construction, if archaeological resources are uncovered, such as burials, construction would cease and the State Historic Preservation Division (SHPD) and the Burial Council would be consulted.

No cultural practices would be impacted by the proposed shoreline protection project.

4.8.2 Mitigation

The State Historic Preservation Division (SHPD) reviewed the archaeological assessment report, and concluded that since there is no subsurface excavation being conducted during this proposed project, the method of the survey and the report was accepted. If the scope of work changes and subsurface disturbance is performed, SHPD would be notified. No monitoring or mitigation would be necessary because it is concluded that there would be no archaeological impacts. If excavation is required in the future, coordination with SHPD on appropriate mitigation prior to any subsurface construction work would be conducted.

4.9 Visual Resources

According to the Scenic & Historical Resources section of the *Maui County General Plan 2030* and the *Technical Supplement No. 8: Identifying and Managing the Scenic Resources in Hawaii's Coastal Zone* of the Hawaii CZM Program, there were no visual resources identified along the proposed project area of Kahului Beach Road. However, Kahului Beach Road fronts the harbor offering views of the island, ocean, and ports.

4.9.1 Impacts and Mitigation

The shoreline protection would be helping to preserve the Kahului Beach Road and access to this visual resource. The alternative selected would not impede the views from the roadway. The rock revetment and cobbles would blend with the existing environment. The proposed project would not negatively impact the visual resources it would help protect them. No mitigation would be necessary.

4.10 Air Quality and Noise

The State Department of Health, Clean Air Branch, monitors ambient air in the State of Hawai‘i via 14 air quality monitoring stations on three islands. O‘ahu has six monitoring stations, Big Island has seven monitoring stations and there is one monitoring station located on Maui. The Environmental Protection Agency has set standards for six pollutants: 1) carbon monoxide; 2) nitrogen dioxide; 3) sulfur dioxide; 4) lead; 5) ozone; and 6) particulate matter ($PM_{2.5}$ and PM_{10}). Particulate matter is measured in microns. The subscript 2.5 and 10 represents microns in aerodynamic diameter. Because of volcanic activity, the State has also set standards for hydrogen sulfide, which is monitored on the Big Island. The monitoring station on Maui is mainly to measure the air quality impacts from agricultural activities where only particulates ($PM_{2.5}$ and PM_{10}) are measured.

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

According to the 2006 annual summary, none of these pollutants exceeded State or Federal standards in the last 3 years from 2006 to 2008. Ambient air quality in the State of Hawai‘i continues to be one of the best in the nation.

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

Table 4-1.

Table 4-1. Maximum Permissible Sound Levels in dBA

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

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

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

4.10.1 Impacts

In the immediate vicinity of the construction activities, short-term impacts on air quality are anticipated from the movement and excavation of sand, cobbles, and rocks to construct the shoreline protection structure. Release of particulate matter is not expected to be excessive since there would not be a significant amount of excavation and most of the excavated material that would be moved would probably be wet.

Short-term noise impacts are also associated with construction activity. Heavy equipment would be used to place and remove rocks. The nearest multi-family complex is located approximately 200 feet landward of the construction site near the end of the existing revetment and where the new revetment would start. As construction moves northwest along Kahului Beach Road, the distance to this multi-family complex would increase and noise levels would be reduced. Other land uses in the area consist of Maui Community College and a district park.

4.10.2 Mitigation

Air quality can be mitigated during construction by periodic watering of the site where there is a potential for particulate matter to become airborne. Once construction is complete, the air quality would be the same as before construction. Noise impacts would also be generated from construction equipment. Curfew times for construction would be established and mufflers would be used on equipment to minimize noise from construction equipment. These impacts are short term and would occur only during construction. After construction is completed, no noise impacts would be generated by the proposed project.

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5 Social and Economic Factors

This section describes the social and economic environment of the Kahului area where the proposed shoreline protection project would occur. Factors such as demographic characteristics and economic context are described below.

5.1 Social Factors

According the U.S. Consensus the population of the County of Maui in 2010 was 154,834. This represents approximately 11 percent of the total population of the State of Hawai‘i. Wailuku has a population of 20,729 people and Kahului has a population of 26,328. The average number of people per household on the island of Maui in 2010 was 2.82 people.

The largest ethnic population of Maui is White with 53,262 people, followed by Asian with 44,592 people. The third largest ethnic population is persons reporting two or more races with 36,385. Native Hawaiian and Pacific Islander are the fourth largest ethnic population with 16,102 people. These numbers represent people on the 2010 U.S. Census Survey.

Housing units in Maui County in year 2010 totaled 70,379 compared to 519,508 units in the State. Owner occupied units totaled 30,055 units and renter occupied units totaled 23,831 units. Vacant units totaled 16,493. Homeowner vacancy rate was 2.4 percent while the rental vacancy rate was 12.7 percent. The median value of housing units in Maui County in 2010 was $614,600.

5.1.1 Impacts and Mitigation

The shoreline protection of Kahului Beach Road is not expected to have adverse impacts on the social environment on Maui. The shoreline protection will help prevent damage to Kahului Beach Road creating a positive impact on the population using this roadway. Thus no mitigation is planned.

5.2 Economic and Fiscal Factors

Civilian labor force for Maui County in 2010 was estimated at 85,675 people. The labor force is comprised of persons 16 years of age and over. Maui has the second smallest labor force compared to the other three counties. O‘ahu has the highest with a civilian labor force of 483,480 people. In Maui County 77,990 people make up the employed labor force. The unemployment rate is 4.8 percent. The median household income in 2010 was $63,989 in Maui County compared to $66,420 for the State of Hawai‘i.

Leisure and hospitality industry has the highest number of jobs at 18,069. These jobs include arts, entertainment, recreation, accommodation, food services, drinking places and full-service restaurants. The second highest job count was the educational services, and health care and social assistance industry with 12,616 jobs. Government (Federal, state, and local) accounted for 11,928 jobs. The job count in the agricultural industry was 2,002 jobs.

There were 1,156 farms located in Maui County in 2007 covering approximately 225,568 acres. The average farm size was 195 acres and the median farm size is 5 acres. Farms between 1 to 9 acres were the most abundant with 766 farms followed by 289 farms between 10 to 49 acres. Croplands totaled 54,557 acres, harvested cropland is 54,528 acres, and irrigated cropland is 28,027 acres. Sugarcane constitutes the largest amount of crop acreage at 34,500 acres. Agricultural products sold include nursery and greenhouse crops, livestock, poultry and their products.

5.2.1 Impacts

Long-term adverse impacts on the economy are not expected from the proposed Kahului Beach Road Shoreline Protection project. Short-term positive impacts are expected from direct and indirect employment and supplies needed to construct the shoreline protection structure. In the long-term there would be positive impacts to the economy, because the Kahului Beach Road would be protected from damage and not require continued maintenance on the roadway shoulder.

5.2.2 Mitigation

No mitigation is required regarding the economic environment associated with the proposed project since the proposed project is not anticipated to have adverse impacts on the economy and would have a short and long-term positive impact on the economy.

6 Infrastructure, Public Facilities, and Utilities

This section describes the existing infrastructure, public facilities, and utilities in the vicinity of the proposed project site and any adverse impacts that the proposed project would incur. Water, wastewater, drainage, solid waste, transportation, power, communications, medical, schools, police, and fire will be addressed in this section.

6.1 Water, Wastewater, Drainage, and Solid Waste

Services provided by the County of Maui include water, wastewater, drainage, and solid waste. Water is managed by the Department of Water Supply. Wastewater collected in the Kahului area is conveyed to the Kahului Wastewater Pump Station, which is located one mile from the proposed project site. Wastewater collected from the pump station is transported to the Wailuku-Kahului Wastewater Reclamation Facility.

There are two landfills: Central Maui Landfill - Refuse & Recycling Center, and Maui Demolition & Construction Landfill located approximately two to four miles away from the proposed project site. The County maintains an island-wide system of solid waste collection and disposal.

The proposed project would not have an impact on the wastewater facilities or solid waste facilities.

Nearby drainage consists mainly of surface runoff from the roadway, which flow into the ocean or nearby vegetation. No increase in runoff is expected from the proposed project. Storm water runoff near the proposed project currently flows into the ocean.

6.1.1 Impacts and Mitigation

The proposed shoreline erosion protection project is not expected to have an adverse impact on water, wastewater, drainage, or solid waste facilities. Because there are no impacts on public facilities, no mitigation is planned.

6.2 Transportation

Kahului Beach Road runs parallel to Kahului bay between Ka‘ahumanu Avenue and Waiehu Beach Road. Kanaloa Avenue and Wahinepio Avenue intersect Kahului Beach Road. The roadway connects Kahului with lower Wailuku and Waiehu. According to the *Wailuku-Kahului Community Plan (2002)*, one of the goals is to improve Kahului Beach Road between Ka‘ahumanu Avenue and Waiehu Beach Road/Lower Main Street.

Equipment and staging areas would be located on the shoulder of the road and are not expected to impede traffic flow along Kahului Beach Road.

6.2.1 Impacts and Mitigation

The proposed shoreline erosion protection project is not expected to have an adverse impact on Kahului Beach Road. Equipment and staging would take place on the roadway shoulder. The long-term impacts of the shoreline protection would be positive, because the shoreline protection would help protect the Kahului Beach Road from continual erosion damage. No mitigation is planned.

6.3 Power and Communications

Electricity is provided by Maui Electric Company, and telephone communications are provided by several private companies. Oceanic Time Warner Cable provides cable TV service. The proposed shoreline stabilization project would not require electricity, telephones or cable service.

6.3.1 Impacts and Mitigation

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

6.4 Medical, Schools, Police, and Fire

Maui Memorial Medical Center is the medical facility located closest to the proposed project site and the largest medical facility in the area. It is located approximately 1.5 miles southeast in the town of Kahului Beach Road. Other hospitals in close proximity include Kaiser Permanente and the Maui Medical Group in Wailuku.

The Wailuku-Kahului region is served by the State Department of Education public school system and private school systems. The Department of Education facilities in Kahului include Lihikai, Kahului, and Pomaikai Elementary Schools, Maui Waena Intermediate School, and Maui High School. Other existing facilities in the area include Waiheʻe Elementary School, ʻĪao Intermediate School, and Baldwin High School. University of Hawaii-Maui College serves the community and is located in Kahului.

Police protection for the Wailuku-Kahului region is provided by the Maui Police Department headquartered at the Wailuku Station approximately 1 mile southwest from the proposed project site. Fire department services are provided by the Maui Fire Department's Kahului Station located in Wailuku town approximately 1.7 miles southwest from the proposed project site.

6.4.1 Impacts and Mitigation

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

7 Conformance with Plans and Policies

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

7.1 Hawai‘i State Plan and Functional Plans

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

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

Functional plans that have a positive or adverse impact from the proposed shoreline stabilization project are Employment, Historic Preservation, Recreation and Transportation.

7.1.1 Employment Functional Plan

The major issues of concern for the *Employment Functional Plan* include the following:

- Improve the qualifications of entry-level workers and their transition to employment;
- Develop and deliver education, training and related services to ensure and maintain a quality and competitive workforce;
- Improve labor exchange;
- Improve the quality of life for workers and families; and
- Improve planning of economic development, employment and training activities.

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

7.1.2 Historic Preservation Functional Plan

The issues of concern in the *Historic Preservation Function Plan* include the following:

- Preservation of historic properties;
- Collection and preservation of historic records, artifacts and oral histories and perpetuation of traditional skills;
- Public information and education on the ethnic and cultural heritages and history of Hawai`i;

Historic and cultural resources were found to be a characteristic of the Kahului Beach Road. The archaeological inventory survey (AIS) was submitted to SHPD for approval. Construction of the proposed project would not affect any historical resources at the site.

7.1.3 Recreation Functional Plan

The issues of concern in the Recreation Function Plan include the following:

- Promote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes.

The proposed project would have a positive impact on the recreational aspect of the functional plan, because the proposed project would stabilize the shoreline and the adjacent road. Sustaining the shoreline and roadway would allow the public to enjoy the beach, and harbor at their leisure.

7.1.4 Transportation Functional Plan

The issues of concern in the *Transportation Function Plan* include the following:

- An integrated multi-modal transportation system that services statewide needs and promotes the efficient, economical, safe, and convenient movement of people and goods;
- Design, program, and develop a multi-modal system in conformance with desired growth and physical development as stated in this chapter;
- Provide for improved accessibility to shipping, docking, and storage facilities;
- Promote a reasonable level and variety of mass transportation services that adequately meet statewide and community needs;
- Encourage transportation systems that serve to accommodate present and future development needs of communities;
- Encourage the design and development of transportation systems sensitive to the needs of affected communities and the quality of Hawaii's natural environment;

Although no roadwork would occur on the highway, the shoreline stabilization and erosion control would benefit the functionality and lifespan of the road. Motorists and pedestrians would be safer as storm waves and surges would be abated at the shoreline. This mitigation measure would insure fewer road closures in the future.

7.2 County of Maui General Plan 2030

The General Plan 2030 for the County of Maui was adopted March 24, 2010. The purpose of the General Plan is to recognize and state the major problems and opportunities concerning the needs and the development of the County and the social, economic, and environmental effects of such development. The plan seeks desired sequence, patterns and characteristics of Maui County development. The themes of the plan are: 1) Protect the Natural Environment; 2) Preserve Local Cultures and Traditions; 3) Improve Education; 4) Strengthen Social and Healthcare Services; 5) Expand Housing Opportunities for Residents; 6) Strengthen the Local Economy; 7) Improve Parks and

Public Facilities; 8) Diversify Transportation Options; 9) Improve Physical Infrastructure; 10) Promote Sustainable Land Use and Growth Management; and 11) Strive for Good Governance.

The proposed project is most closely supportive of themes seven, eight, and nine: Improve Parks and Public Facilities, Diversify Transportation Options, and Improve Physical Infrastructure. These themes support protecting the shoreline and maintaining the roadways for community use.

7.3 Wailuku-Kahului Development Plan 2002

The Development Plans were developed to provide more detailed guidance for development in each of Maui County's nine districts. These plans are an expression of community values and provide form and substance to the goals and aspirations of those who live, work, and play in an area. There are nineteen areas of planning identified in the plan 1) Economic activity; 2) Environment; 3) Cultural Resources; 4) Indigenous architecture; 5) housing; 6) Social infrastructure; 7) Recreation; 8) Social Services and Health; 9) Public Safety; 10) Education; 11) Government; 12) Land Use; 13) Infrastructure; 14) Water and Utilities; 15) Liquid and solid Waste; 16) Drainage; 17) Energy; 18) Transportation; and 19) Urban Design.

The areas in which the proposed shoreline protection project would relate to the *Wailuku-Kahului Community Plan* are in the area of recreation, public safety, infrastructure, and transportation. Stabilizing the shoreline would allow the community to use the beach for recreation as well as use the roadway for safe travel from place to place.

7.4 Kahului Commercial Harbor 2030 Master Plan

The *Kahului Commercial Harbor 2025 Master Plan* updated the 2010 plan that was written in 1989, and revised in 1994 as the 2025 version. A 2030 plan is now the current version. The master plan has six main objectives: 1) Maritime cargo handling; 2) Passenger operations including ferries, fishing boats, cruises and excursions; 3) Domestic and foreign commercial fishing; 4) Shipbuilding repair and maintenance; 5) Navigational concerns; 6) Assorted ancillary activities. The master plan also discusses the integral parts of roadways in support of commercial harbor infrastructure. The master plan states that the interface between harbors and highways are considered intermodal facilities of increasing concern as critical transportation facilities.

The proposed project would best coincide with the *Harbor Master Plan* with the concept of maritime cargo handling, passenger operations, as well as roadway significance. The proposed project proposes to stabilize the shoreline and install erosion control measures. By installing shoreline stabilizers and erosion control measures, the shoreline of the harbor would be protected from further erosion, and the roadway would be protected for everyday use. Kahului Beach Road is considered a major thoroughfare and aids in the transportation of cargo movement as well as a throughway for passengers to get to the ocean for recreational and fishing activities.

The proposed project is in compliance with the plans and policies of the State and the County of Maui.

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8 Significance Criteria

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

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

The proposed project would not result in the irrevocable destruction of a cultural resource; the AIS was approved by SHPD.

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

The stabilized shoreline along Kahului Beach Road would preserve the beneficial uses of the environment by allowing the shoreline to be protected, and allows the public to travel along the road, and utilize the harbor for recreational purposes.

(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 would not conflict with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS. Evaluation of the construction activity described in this EA shows that the proposed project would not have long-term negative impacts. Short-term negative impacts would occur during construction from noise, dust and turbidity in the water. However, these impacts can be mitigated by the use of best management practices (BMP), such as mufflers on equipment, frequent watering to keep dust down, and control of construction material.

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

The proposed project would have a short-term positive effect on the economy from jobs and increased revenue during construction. However, after construction the shoreline protection would not directly affect the economy. The proposed project also would affect the social welfare of the community or the state as the shoreline is stabilized allowing motorists to transport cargo or travel to work, recreational areas, and shopping facilities.

(5) Substantially affects public health;

Stabilizing the shoreline along Kahului Beach Road maintains the safety of motorists and pedestrians along the highway. The structural integrity of the roadway would be preserved from erosion, ocean undermining, sinkholes, and roadway loss.

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

The proposed shoreline stabilization project would have no impact on population, but would make the highway safer for vehicular traffic.

(7) Involves a substantial degradation of environmental quality;

The stabilization and erosion control measures installed along the Kahului Beach Road would not degrade environmental quality but instead would improve environmental quality of the shoreline. The shoreline protection project would actually reduce the loss of shoreline into the ocean by implementing permanent erosion controls in place and would work to contain storm surges from overtopping onto the highway.

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

The proposed project is not part of a larger action and would not contribute to cumulative adverse environmental effects on the environment. The shoreline would require periodic maintenance to ensure erosion is under control.

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

The construction for the shoreline protection for Kahului Beach Road would not affect any endangered species or their habitat. Of the species observed, none were on the State or Federal endangered species list. Most species observed were invasive species. Therefore, no negative impacts on endangered plants are expected during or after construction.

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

Short-term impacts on air quality and noise levels would occur during construction. However, when the construction is completed, no long-term effects on air quality and noise level are expected.

Constructing the rock revetment may temporarily increase turbidity in ocean waters adjacent to the proposed project. Best management practices would be implemented to minimize the effects of turbidity or other pollutants.

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

The shoreline stabilization and erosion control is planned for an environmentally sensitive area. The proposed project is located in coastal waters, tsunami zones, flood zones, and an erosion prone area. The proposed project aims to stabilize an eroded coastline in order to salvage damage to the roadway, and further loss of shoreline. The attributes from the proposed project would benefit the environmentally sensitive area. In the event of a tsunami, damage to the stabilization and erosion control measures along the coast cannot be predicted.

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

The proposed project would not adversely affect view planes. The proposed structure is a low profile and would not affect any view planes. The proposed project does not conflict with harbor operations or other county or State plans or studies.

(13) Requires substantial energy consumption.

The proposed project would not require any substantial energy consumption.

8.1 Anticipated Determination

A Finding of No Significant Impact (FONSI) determination is anticipated for the proposed project based upon the information provided in the Draft EA document. The results of the assessments conducted have determined that there would be no "significant" impact in accordance with HRS Chapter 343 from the stabilization and erosion control of the shoreline along Kahului Beach Road.

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9 Permits and Approvals

This section lists the anticipated permits and approvals that will be required to stabilize the shoreline along Kahului Beach Road in Maui.

9.1 Permits Required

Table 9-1 lists the permits that would be required to stabilize the shoreline along Kahului Beach Road. Other agency approvals are also shown below.

Table 9-1. Permits Required

Permit	Agency Approval
National Pollution Discharge Elimination System (NPDES), General Form C	State of Hawai‘i Department of Health(HDOH), Clean Water Branch
CWA Section 401 Water Quality Certification (WQC)	State of Hawai‘i Department of Health (HDOH), Clean Water Branch
Conservation District Use Permit (CDUP)	State Department of Land and Natural Resources (DLNR)
Office of Conservation and Coastal Lands (OCCL) Permits	State Department of Land and Natural Resources (DLNR)
Section 10 / 404 Clean Water Act (CWA) Permit	U.S. Army Corps of Engineers (USACE)
Approval of Archaeological and Cultural Reports (Section 106 Consultation)	State Department of Land and Natural Resources (DLNR), Division of Historic Preservation (SHPD)
Coastal Zone Management (CZM) Certification	State of Hawai‘i Department of Business & Economic Development & Tourism
Special Management Area Permit (SMA) and Shoreline Setback Variance (SSV)	County of Maui, Planning Department

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